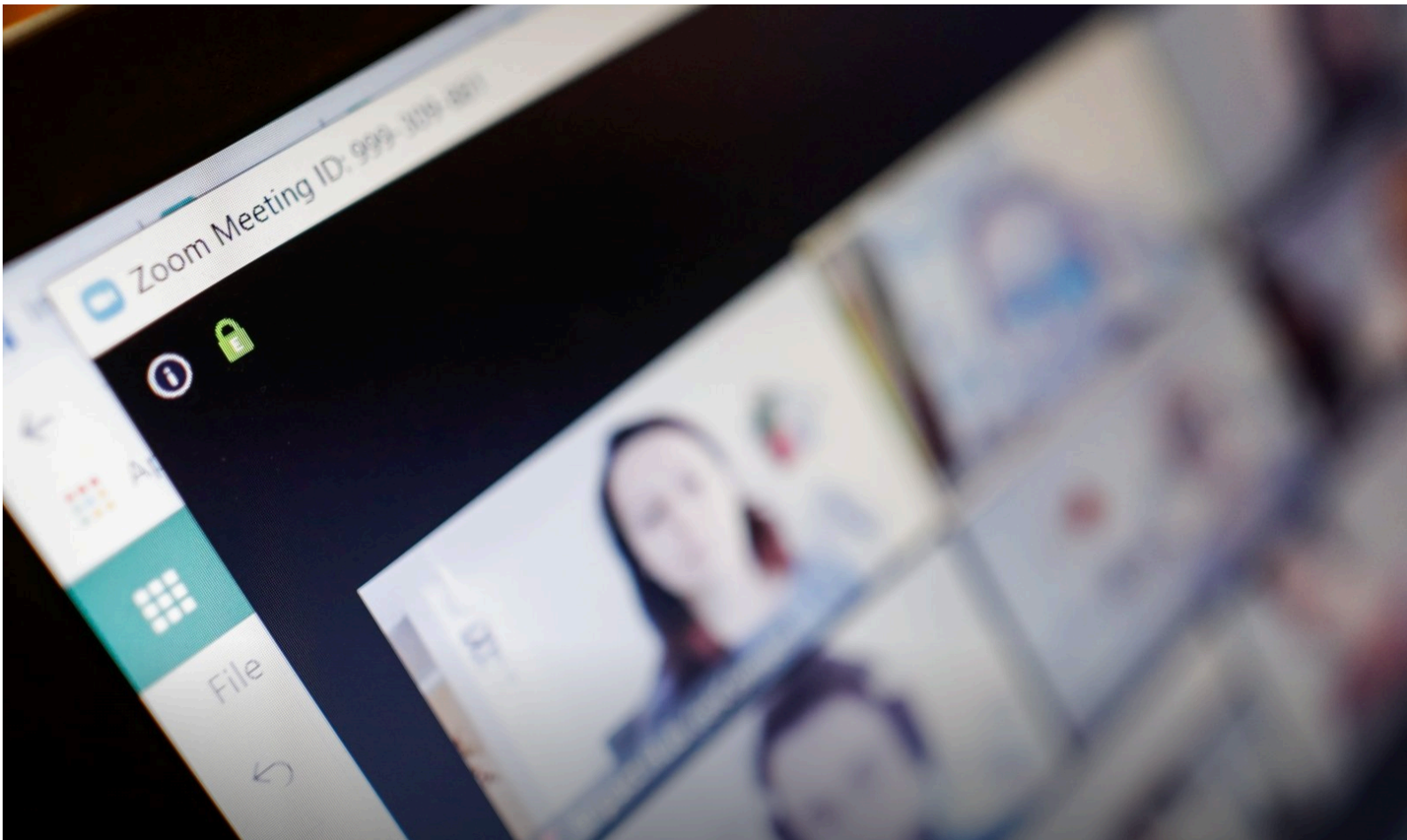


ISSN 2621-5799 (Online)  
ISSN 2657-215X (Print)

*Asian Institute of Research*  
**Education Quarterly Reviews**  
Vol. 3, No.3 September 2020



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<b>Table of Contents</b>	i
<b>Education Quarterly Reviews Editorial Board</b>	iii
<b>Review on Regional Standardized Training of First-year Teachers in Shanghai</b> Xuan Zhao	271
<b>Mentors Views on Mathematics and Science Student Teachers School Experience</b> Leonard Nkhata, Asiana Banda, David Chituta, Jack Jumbe, Beauty Choobe	285
<b>Challenges for Moving Chinese Language Courses Online</b> Mohammed Alfatih Alzain Alsheikhidris	300
<b>Development, Validation and Standardization of Tertiary Examination Behaviour Inventory: Diagnostic Instrument for Measuring Cheating Tendency in Educational Assessments</b> Moses Chukwugi Ossai, Nathaniel Ethe, Dennis E. Edougha	313
<b>Single-Parent Teachers' Work-Life Balance and Job Productivity in Edo State Public Senior Secondary Schools</b> H. O. Alonge, E. O. Osagiobare	325
<b>Impact of Quality Assurance on Quality Teaching among Teachers in Oman Higher Education</b> Wafa A-Maawali, Munira Al-Siyabi	334
<b>Assessment of Mining Students' Perception of Industrial Attachment Programme at Malawi Polytechnic</b> Jabulani Matsimbe	351
<b>Statistics as Measurement: 4 Scales/Levels of Measurement</b> Patricia E. Allanson, Charles E. Notar	375
<b>Aligning ACRL's Framework for Information Literacy with Communication Studies' Learning Outcomes for Library Instruction: An Exploratory Study</b> Raymond Pun	386
<b>Toy library: Possibilities of Actions in the Education of Pedagogues</b> Merie B. Moukachar, Regina Rosa L. dos Santos	398
<b>Action Research in a Juvenile Detention School: New Processes, Paradigms, and Possibilities</b> David Coker	411

**Exploration of PAD Class Teaching Mode for the Engineering Masters in  
the Colleges and Universities of National Special Needs Talent Cultivation  
Project**

431

Cheng Hong, Yu Ber-Lin, Wu Yandong, Lu Zhonghui, Yu Zhenfeng

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# Review on Regional Standardized Training of First-year Teachers in Shanghai

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## Abstract

Shanghai has promoted regional induction for first-year teachers since 2012. In Mar 2012, Shanghai Municipal education commission (SMEC) issued "Guidance of regional standardized training of first-year teachers in Shanghai"(RSTFTS). According to this guidance first-year teachers are required of 1-year induction after recruitment. As training content should consist of four parts, namely, professional perception and teacher ethics cultivation, classroom experience and teaching practice, class management and ethics experience, fieldwork and professional development. Regional Education Bureau (REB), Regional Teachers' Education College (RTEC), kindergartens, primary and secondary schools (K-12 schools) of Shanghai's 16 districts have participated in this program. All 15 districts and 1 country in Shanghai have followed the guideline and taken charge in specific training affairs, which finally accumulated rich experiences in 7 years.

**Keywords:** Teacher Induction, First-Year Teacher, Teachers' Professional Development (TPD), Regional Standardized Training of First-year Teachers, Shanghai

## 1. Introduction

### 1.1 Teacher Induction in Contemporary China

Informal teacher induction (ITI) has a long history in school field, mainly organized by school administrators. Most ITI constitutes of being assigned to an experienced teacher, participates in classroom observation, as well as involved in subject group and teamwork. Usually informal teacher induction (ITI) is not required by school districts. Though ITI is under the charge of specific school, most school even doesn't have definite requirement. ITI is conducted inside of subject teaching group. For example, new English teacher would like to watch how senior English teachers teach in the same context. The purpose of ITI is to help new teacher to adapt to campus, facilities, and school table, communicate with colleagues, and get familiar with subject matter knowledge and so on. New teachers frequently meet difficulties and frustration in daily practice, as well as feel confused in playing teachers' occupation role (Qu, 1990; Liu, 1996; Ye, 1998; Gu, 1999; Ren, 2004; Chen, 2008).

In 1952, Ministry of Education of the People's Republic of China held an administrative meeting on primary and secondary education, which discussed how to strengthen in-service training of primary and secondary school teachers. This meeting finally decided to establish teachers' training system, which aimed at improving teachers' political, cultural and professional literacy. In September 1952, Ministry of Education of the People's Republic of China issued a circular on the issue of primary and secondary school teachers further education. It was suggested that teachers' training colleges, correspondence normal schools and teachers' part-time schools should be set up everywhere in order to strengthen teachers' in-service education (MEPRC, 1952). In 1953, Ministry of Education of the People's Republic of China and the Ministry of Finance of the People's Republic of China jointed together and made some supplementary provisions to guarantee in-service training of teachers (MEPRC, 1953). During the Cultural Revolution (1966-1976), teachers' training colleges and normal universities were merged or stopped. Regional in-service training for primary and secondary school teachers also stagnated from 1968 to 1978.

In December 1978, the Third Plenary Session of the Tenth Central Committee was convened. Normal education and teachers' in-service training started to get back on the right track. In 1980, Ministry of Education of the People's Republic of China issued "Opinions on Strengthening the Further Training of in-service Teachers in Primary and Secondary Schools". The Opinions put forward: "The government should combine the systematic study on knowledge of teacher professional development, and strengthen the teachers' work" (MEPRC, 1980). From the late 1970s to the 1990s, normal universities and colleges, College of Continuing Education, as well as teachers' training colleges jointed together to undertake and support teachers' training. Teachers' education colleges trained primary school teachers who did not have the diploma of secondary normal colleges. In 1980, "the Consultation Report of Ministry of Education of the People's Republic of China on Several Questions of Normal Education" clearly pointed out that we should make contributions to the practice of basic education (MEPRC, 1980). In order to clarify the tasks, scope and principles of teachers' training in primary and secondary schools, in March 1986, Ministry of Education of the People's Republic of China (MEPRC) issued the "Plan and Opinions on Basic Education Teachers and normal Education". And in April 1986, the "Compulsory Education Law" stipulated that "the State should develop and accelerate teacher education" (MEPRC, 1986). In China, there was 1-year probation system existed for new teachers. The Teachers' Law of the People's Republic of China also clearly stipulated that "after obtaining professional qualification and get offer as a new teacher, he or she would have 1-year probation." However, new teacher's probation system in China mainly focused on the difference of personnel salary. At the end of 1 years' probation, after passing professional test, the newly appointed teachers will get the same salary as formal teachers. Since the 1990s, with the emphasis on teachers' continuing education, the first year of probation training for new teachers had gradually been put on administrations' agenda. In September 1999, the "Stipulation for Continuing Education in Primary and Secondary Schools" implemented that "Continuing Education for Primary and Secondary School Teachers includes non-diploma education and diploma education". According to this regulation, non-diploma education includes professional training, which should be arranged of no less than 120 hours of training session for new teachers during the probation period" (MEPRC, 1999).

On Sep 1999, Ministry of Education of the People's Republic of China promulgated "the Provisions on Continuing Education for Primary and Secondary School Teachers", which stated: "Continuing Education for Primary and Secondary School Teachers is divided into non-diploma education and diploma education. Non-diploma education includes the training of new teachers, which is set up for new teachers to meet the needs of education and teaching during the probation period. "Teachers' continuing education colleges at all levels and normal universities carried out continuing education for primary and secondary school teachers. Primary and secondary schools were required to assure teachers participating in continuing education, as well as organize various forms of training in local school (MEPRC, 1999). In March 2002, Ministry of Education of the People's Republic of China issued "the Opinions on the Reform and Development of Teacher Education during the Tenth Five-Year Plan Period", which affirmed that there had been a breakthrough in the construction of professional training for primary and secondary school teachers during the Ninth Five-Year Plan Period (MEPRC, 2002). The project of continuing education for primary and secondary school teachers has been implemented overall. And teachers' continuing education colleges at all levels have mainly carried out information technology training and professional ethics training in various forms. Based on the "Provisions for Continuing Education of Primary and Secondary School Teachers", a great deal of national, provincial and municipal level training for key teachers emerged. The report "Opinions on the

Reform and Development of Teacher Education during the Tenth Five-Year Plan" clearly pointed out: "Continually strengthen the construction of regional teachers training colleges and institutions. All provinces including autonomous regions and municipalities directly under the Central Government must establish teachers training centres"(MEPRC, 2002).

In 2011, Ministry of Education of the People's Republic of China promulgated the Opinions on Strengthening the Training of Primary and Secondary School Teachers, which positioned the overall requirements for the training of primary and secondary school teachers in the new period: "All of district and county teacher training institutions should fully play the role of service and support. Local Government should promote the integration of regional teachers' further education schools with relevant institutions, strengthen the basic capacity building of teacher training institutions at County level, promote the integration of learning and training resources from universities and colleges to primary and secondary schools, as well as form regional teacher's learning and resource centers. Those regional learning and resource centers should coordinate centralized training, distance training as well as support school-based research. All new teachers should attend not less than 120 hours pre-service training in order to adapt to education and teaching as soon as possible (MEPRC, 2011).

## **1.2 Regional Standardized Training of First-year Teachers: Shanghai's Exploration and Innovation**

In 2010 "National Medium & Long-Term Education Reform and Development Plan of China (2010-2020)" suggested that the national country to improve teacher's management system, set teachers' qualification standards, strictly implement the teachers' admission system and control the professional entrance of teachers. The state has established teacher qualification standards of academic and morality requirements. The state will establish a regular registration system for teachers' qualification certificates. The provincial education administration uniformly organizes the literacy examination and professional certification for primary and secondary school teachers. And national administration plays important role in recruitment of primary and secondary school teachers, application of professional title, training and assessment (MEPRC, 2010).

Since newly recruited teachers' education backgrounds are different. The professional theoretical knowledge acquired by newly recruited teachers during their higher education often has hysteresis when they finally get the offer. Newly recruited teachers frequently feel difficult to adapt to the teacher's role and the teaching positions' requirements at the very beginning. Therefore, it is necessary to provide induction for first-year teacher and complete the role transition from student teacher to formal teacher.

In response to the call for the National Medium & Long-Term Education Reform and Development Plan (2010-2020). In 2012 Shanghai Municipal Education Commission promulgated the "Guidance on regional standardized training of first-year teachers in Primary and Secondary Schools (Kindergarten) (Trial)" (hereinafter referred to as "Guidance"), which indicated the implementation of first-year teachers' induction in Shanghai.

Educational Administration coordinates city's training resources as well as regional training resources. First-Year Teacher; will be placed in teaching community, instructed by mentors, correctly understand and adapt to the role of teachers, strengthen the teaching ability, and finally become competent for teaching. On April 11, 2012, the Shanghai regional standardized training of first-year teachers in Primary and Secondary Schools (Kindergarten) Launch Conference was held in Shanghai Jinyuan High School, which marked the inauguration of formal teacher induction.

According to "Guidance on regional standardized training of first-year teachers in Primary and Secondary Schools (Kindergarten) ", teacher professional development school (TPDS) would be assigned in municipal level and district level. Regional standardized training of first-year teachers in Primary and Secondary Schools (Kindergarten) would be organized by teacher professional development school (TPDS) and appointment school which has recruited new teachers. Shanghai Municipal Education Commission invited experts to carry out annual review on teacher professional development school (TPDS). Passing annual review, teacher professional development school (TPDS) would get the next year's certification (SMEC, 2012).

"Guidance on regional standardized training of first-year teachers in Primary and Secondary Schools (Kindergarten)" has 1300 characters. This guidance responds to "the National Medium & Long-Term Education Reform and Development Plan (2010-2020)", and aims at improving and strictly implementing the teacher's admission system. The guidance requires first-year teachers to participate in teacher induction during first-year. The training content is composed of four parts, namely, professional perception and teacher ethics cultivation, classroom experience and teaching practice, classroom management and moral education, teaching research and professional development. First-year teachers should complete teacher induction within one year, basically grasp the key points of the training contents in the four major sectors, meet the corresponding standards and requirement, so as to obtain the qualifications of teachers' posts (SMEC, 2012).

Since 2012, Shanghai's basic education system has implemented standardized training system for first-year teachers. Graduates from normal universities and colleges are scheduled to participate in unified content and standard training in teachers' professional development schools during the first-year induction period (SMEC, 2012).

Establish training base to improve training ability. Shanghai has selected a few schools with advanced concepts and outstanding achievements in promoting professional development of teachers, training first-year teachers and guiding the practice of student teachers. Teacher professional development school should play a demonstration, radiation and leading role for neighborhood schools. As the first batch of training bases to carry out exploratory pilot projects, these selected training base schools continue to practice, innovative methods, and actively undertake the dual task of training first-year teachers. In order to ensure the training quality of training base schools, the Municipal Education Commission has also established the mechanism of declaration, evaluation, access and annual inspection of training base schools (SMEC, 2012).

Design content scientifically and define training objectives. The standardized training of Probationary Teachers is the content that new teachers should know when they first take up their posts, such as preparing lessons, classes, designing assignments, preparing examinations, evaluating students, teaching and research activities, student interviews, home visits, class teacher's work, guidance of community activities, offering elective courses, other part-time jobs in schools, etc. It covers professional awareness. There are eighteen key points in four aspects: professional perception and teacher ethics cultivation, classroom experience and teaching practice, classroom management and moral education, teaching research and professional development. Each key point has specific objectives, training methods, accomplish process and outcome records (SMEC, 2012).

Establish supporting policies to ensure the implementation of training. During the standardized training period, first-year teachers will sign employment contracts with institutions appointed by schools or regional education bureaus, and enjoy the same treatment as in-service teachers. After the training, the contract will be terminated naturally, and the assessment will be completed jointly by the regional teachers' education college, training schools' bases, and appointment schools which have enrolled first-year teachers (SMEC, 2012).

Develop pilot training and explore training mode. From September 2011 to July 2012, Shanghai selected four districts, concluding Xuhui, Changning, Putuo and Fengxian, to conduct internship training for first-year teachers. 570 first-year teachers participated in the training. The Shanghai Municipal Education Commission has set up an expert guidance group to equip each pilot area with six experts from basic education field. Experts visit each training school base once a month for guidance. Experts will spend no less than half a day each time on fully understanding the training process, helping regional education bureau, training school bases and instructors to sum up experience, pointing out existing problems, and giving suggestions. According to training school's own conditions, characteristics and the law of teachers' professional growth, the pilot schools have creatively carried out training and achieved experience (SMEC, 2012).

## **2. Municipal Construction of Standardized Training of First-year Teachers in Shanghai**

### **2.1 Ideological Guidance**

Guided by the professional standards of primary and secondary school teachers, we should improve and strictly implement the teacher admission system, strictly control the entrance of teachers, consolidate the professional foundation of first-year teachers, and improve the quality and ability of first-year teachers in P district. Studying the professional needs and growth rules of first-year teachers, coordinating and coordinating high-quality educational resources at district and school levels, so that first-year teachers can correctly recognize and quickly adapt to the role of teachers in the infiltration of excellent educational and teaching teams and in the process of teaching by specialized instructors, form good norms of educational and teaching behavior, and strengthen education and teaching. Practice ability and be competent for education and teaching as soon as possible (Yu & Wu, 2015).

## 2.2 Training Objects and Targets

Graduates from normal universities or other institutions of higher education in that year and taught in primary and secondary schools, kindergartens and vocational schools, but have not obtained the "Shanghai First-year teachers' Standardized Training Certification" Graduates and social workers who first serve in primary and secondary schools, kindergartens and vocational schools, are required to attend teacher induction during their first-year's employment (Shanghai Beginning Teachers' Standardization Training Project Group, 2014).

"Guidance on regional standardized training of first-year teachers in Primary and Secondary Schools (Kindergarten)" requires first-year teachers to participate in teacher induction during first-year. The training content is composed of four parts, namely, professional perception and teacher ethics cultivation, classroom experience and teaching practice, classroom management and moral education, teaching research and professional development. First-year teachers should complete teacher induction within one year, basically grasp the key points of the training contents in the four major sectors, meet the corresponding standards and requirements, so as to obtain the qualifications of teachers' posts (SMEC, 2012).

Regional standardized training of first-year teachers in Primary and Secondary Schools (Kindergarten) would be organized by teacher professional development school (TPDS) and servicing school which has recruited new teachers. Shanghai Municipal Education Commission invited experts to carry out annual review on teacher professional development school (TPDS). Passing annual review, teacher professional development school (TPDS) would get the next year's certification (SMEC, 2012).

## 2.3 Organization Frame of Standardized Training of First-year Teachers in Shanghai

Standardized training of first-year teachers in Shanghai is conducted at municipal level, while at the same time is operated and designed in details at regional level (Chen&An, 2016).

Table 1 Organization Frame of Standardized Training of First-year Teachers in Shanghai

<b>Organization Frame of Standardized Training of First-year Teachers in Shanghai</b>		
<b>Roles</b>	<b>Municipal level</b>	<b>Regional Level</b>
Educational Administer	Shanghai Municipal Education Commission	Regional Education Bureau
Organizers and Host	Shanghai Teacher Training Center	Regional Teacher's Training College
Cooperation Unit	Teachers' Professional Development School Training School (train new teacher)	Appointment school (recruit new teacher)

## 2.4 Organization Frame of Standardized Training of First-year Teachers in Shanghai

First-year teachers initialize "Trainee-Manual" to fill in blank forms and record training content. Mentors gave formative assessment and comments during fixed time session (Xia, 2018).

Table 2 Organization Frame of Standardized Training of First-year Teachers in Shanghai

<b>Organization Frame of Standardized Training of First-year Teachers in Shanghai</b>	
<b>Training Section</b>	<b>Training Content</b>
<b>Professional Perception and Teacher Ethics Cultivation</b>	<ul style="list-style-type: none"> <li>-First-year teachers draw up individual training plan with instructors.</li> <li>-Read a book about teachers' career development or morality and write reading notes.</li> <li>-Write ten informal essays on teachers' career experience during the training period.</li> <li>-Finish personal summary.</li> </ul>
<b>Classroom Experience and Teaching Practice</b>	<ul style="list-style-type: none"> <li>-Study subject course standard, make relative speech and write down outline.</li> <li>-Analysis unit teaching material, complete teaching plan, practice writing on the blackboard, as well as present teaching plan.</li> <li>-Complete the conception and syllabus of an extended elective course and try to teach an elective course.</li> <li>-Watch on 10 lessons and write down classroom observation report.</li> <li>-Three Formal Trials on subject teaching.</li> <li>-Watch and comment on three other teachers' lessons.</li> <li>-Design a unit of student assignments and interpret the reasons.</li> <li>-Design unit exams, make quality analysis after the actual test, complete mid-term and final exam class quality analysis.</li> </ul>
<b>Classroom Management and Moral Education</b>	<ul style="list-style-type: none"> <li>-Hold on a student leader meeting, a student symposium, and promote home visit for some student's specific problem.</li> <li>-Plan and host a class meeting, organize one social activity and practice.</li> <li>-Write a class situation analysis and two students' case analysis.</li> <li>-Write the phrase of comprehensive evaluation of students' semester.</li> </ul>
<b>Field work and Professional Development</b>	<ul style="list-style-type: none"> <li>-Intensive reading of professional books recommended by tutors.</li> <li>-Conclude reading notes, and carry out self-study of relevant books.</li> <li>-Participate in teaching and research group activities and undertake relevant tasks. Plan and host a lesson preparation group activity.</li> <li>-Three-year Personal Professional Development Plan</li> </ul>
<b>Others</b>	<ul style="list-style-type: none"> <li>-Instruction Agreement</li> <li>-Evaluation of Training Center</li> </ul>
<b>Appendix</b>	<ul style="list-style-type: none"> <li>-Hard-pen Calligraphy (at the beginning of training)</li> <li>-Hard-pen Calligraphy (after the training)</li> <li>-Utilize and design teaching aids and courseware</li> </ul>

## 2.5 Regional Training Mode

Shanghai Municipal education commission takes charge of overall design of regional standardized training of first-year teachers. Regional Education Bureau and regional teacher training college conduct and supervise regional standardized training of first-year teachers. Teacher professional development school (training school) and appointment school undertake regional standardized training of first-year teachers. Regional standardized training of first-year teachers generally has 4 sections (Xu et al., 2018).

Table 3 Regional Training Mode

<b>Regional training mode</b>			
<b>Section</b>	<b>Organizer</b>	<b>Theme &amp; Content</b>	<b>Mode</b>
<b>Orientation</b>	Regional Education College	<ul style="list-style-type: none"> <li>-Program introduction</li> <li>-Career counseling</li> </ul>	<ul style="list-style-type: none"> <li>-Lecture</li> <li>-Workshop</li> </ul>
<b>Centralized training</b>	Regional Education College	<ul style="list-style-type: none"> <li>-Subject teaching</li> <li>-Classroom management</li> <li>-Moral education</li> <li>-Education research</li> </ul>	<ul style="list-style-type: none"> <li>-Lecture</li> <li>-Group work</li> <li>-Demonstration course</li> <li>-On-line training</li> </ul>
<b>In-service training</b>	Teacher development school (Training school)	<ul style="list-style-type: none"> <li>-Subject teaching</li> <li>-Classroom management</li> <li>-Moral education</li> <li>-Education research</li> </ul>	<ul style="list-style-type: none"> <li>-Group work</li> <li>-Class observation</li> <li>-Teaching activities</li> <li>-Open Courses</li> </ul>
	Appointment school	<ul style="list-style-type: none"> <li>-Subject teaching</li> </ul>	<ul style="list-style-type: none"> <li>-Demonstration course</li> </ul>

		-Classroom management -Moral education -Education research	-Training & Practice
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### 3. Regional practice of standardized training of first-year teachers in Shanghai

#### 3.1 Regional Training Object

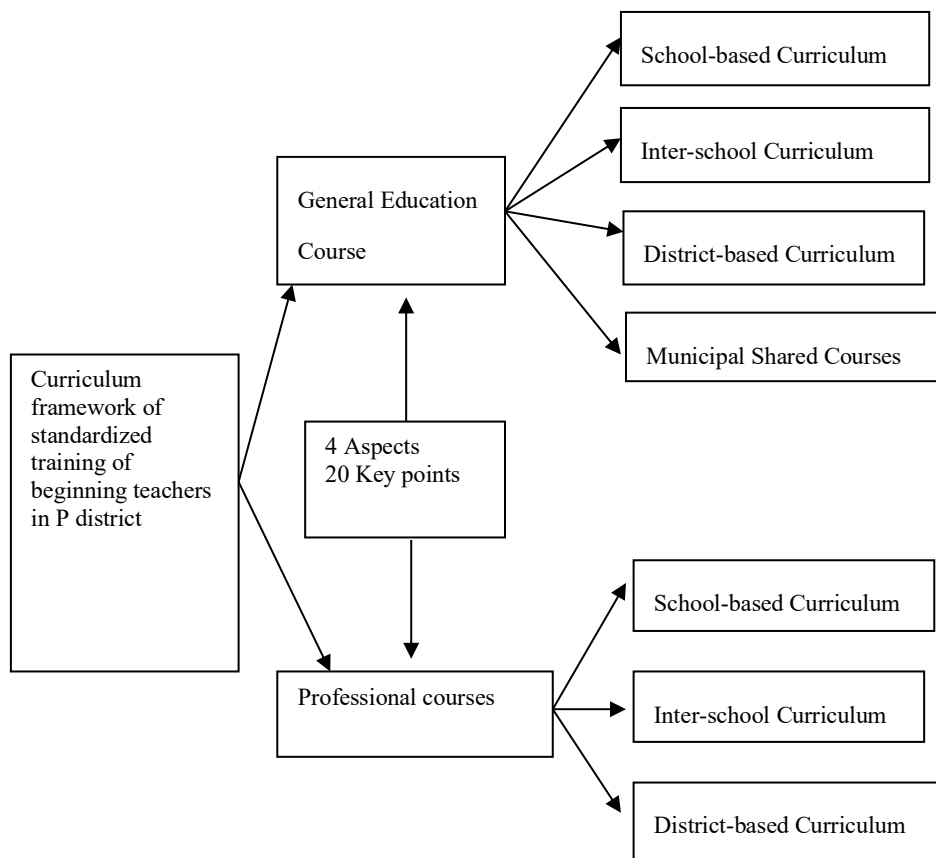
P district has built a number of standardized training courses, which are guided by teachers' professional development standards, based on training needs, closed to the reality of first-year teachers, and finally accelerate their professional development. It constructs standardized training curriculum system for first-year teachers according to the regional education situation rebuilds original training courses for first-year teachers, and finally improve the quality and efficiency of first-year teachers.

Y district lies in the northeast of shanghai city. It holds standardized training of first-year teachers in whole area aims to: "Make full use of high-quality education resources in whole region, consolidate the professional foundation of the first-year teachers, improve the professional quality of regional first-year teachers, organize and carry out the training of first-year teachers at higher point, higher standard and higher level. Excellent teaching groups and experts will participate in instructing teaching process. First-year teachers should form good norms of education and teaching behavior, strengthen practical ability of teaching, and be competent for the post as soon as possible."Standardized Training Scheme for kindergarten, primary and secondary school's first-year teachers of Y district in 2012" is applicable to graduates from normal universities or other higher institutions, and those who first teach in primary and secondary schools, kindergartens, vocational schools, Children's Palace, Youth Science and Technology Station.

#### 3.2 Regional Curriculum Framework

Since the implementation of standardized training for first-year teachers, P district has always regarded the development of standardized training courses for first-year teachers as an important task, which has been strictly planned. After several rounds of practice of standardized training of first-year teachers, training base schools closely link school-based induction content to the requirements of guidance, which has initially formed some standardized training courses for first-year teachers in line with the regional's actual situation (Institute of Education Development in P district, 2014). So far, P district has constructed 3-level curriculum system for standardized training of first-year teachers as follows:

Figure 1 3-level curriculum system for standardized training of first-year teachers in P district



Curriculum system for standardized training of first-year teachers in Y district is conducted from 4 levels: regional level, school level, teaching group level, and individual level.

Table 4 Curriculum structure for standardized training of first-year teachers in Y district

Curriculum system for standardized training of first-year teachers in Y district	
<b>Morality and Literacy</b>	-Educational theory -Moral sentiment -Humanistic literacy -Scientific literacy -Mental health care -Educational art
<b>Knowledge and Skill</b>	-Educational concept -Subject knowledge -Teaching skills -Curriculum development -Class management -Scientific research method -Innovation ability -Moral education -Psychological techniques -Information Technology
<b>Practice and Experience</b>	-Case analysis -Curriculum construction -Teaching method -Educational research -Class management -Group construction

Table 5 Curriculum system for standardized training of first-year teachers in Y district

Curriculum structure for standardized training of first-year teachers in Y district					
Level	Session	Objectives	Modular	Methods	Faculty
<b>Region Level</b>	K-12	-Professional accomplishment -Teachers' Morality and Literacy -Teaching Knowledge and Practice -Students' Psychology	-Morality and - Literacy -Knowledge and Skill -Practice & Action	-Lecture -Group work -Field work -Online training -Elective units	-Experts -Subject research fellow -Excellent teacher
<b>School Level</b>	K-12	-Pedagogical Content Knowledge -Content Knowledge - Professional identity	-Culture Adaption -Campus Culture -School-based Curriculum	-Group work -Classroom - Observation	-School administrator -Excellent teacher

		-Teaching Knowledge and Skills			
<b>Teaching Group</b>	K-12	-Team Work -Teaching Content and - Technology	-Subject knowledge -Discipline activities -Practice &Skills	-Group work -Classroom Observation -Learning Community	-Experienced teacher
<b>Subject Level</b>	1-12	-Teachers' role and duty -Teaching Content and Technology	-PCK -Daily-Practice -Teaching Strategy	-Group work -Classroom Observation -Learning Community Peer work	-Experienced teacher
<b>Head Teacher</b>	1-12	-Students' Psychology -Theory and Practice -Classroom Management	-Daily Affairs -Knowledge and Skill	-Thematic counseling -Individualized Tutor -1 to 1mentor	-Experienced teacher
<b>Nursery</b>	K	-Child Psychology (3-6years old) -Nursery Theory -Games and Activities -Preschool education theory	-Daily practice -Nursing Strategy	-Thematic counseling	-Experienced teacher
<b>Daily Management</b>	K	-Classroom Management -Child Psychology (3-6years old)	-Daily practice -Management strategy	-Thematic counseling -Individualized Tutor -1 to 1mentor	-Experienced teacher

### 3.3 Regional Curriculum Requirements

Besides municipal's requirements, regional curriculum requirements of standardized training of first-year teachers in P district covers : content requirements, format requirements , training hours and implementation requirements, training hours and implementation requirements.

Table 6 Curriculum Requirements of standardized training of first-year teachers in P district

<b>Regional Curriculum Requirements of Standardized Training of First-year Teachers in P district (2014)</b>	
<b>Content Requirements</b>	-Embody the advanced nature -Highlighting practicality -Emphasize innovation -Focus on development
<b>Format Requirements</b>	-Course category: General Studies Course, Professional Courses -The course materials submitted in the application mainly include the following contents: the course's title, school section and subject suitable for, lecturer's qualification, the analysis of the training objects and needs, the background and significance of the course, the course contents with three-level outline, the main characteristics and innovation of the course, the arrangement of the class hours, the course implementation process and mode, and course evaluation, etc. Specifically, it refers to the Information Table for Collection and Application of Standardized Training Courses for first-year teachers in P district.
<b>Implementation Requirements</b>	-Class hours: 5 to 20 hours; 1-4 half-day, 5 hours in each half-day (inside the district); 1-4 half-day, 4 hours in each half-day (outside the district). -The implementation of the curriculum should be comprehensive in many forms, including: lecture (highlighting case teaching, supplemented by observation, interactive discussion, etc.), discussion (student activities, observation and diagnosis), as well as network platform (watch micro-video, participate in forum interaction etc.).

<b>Faculty Requirements</b>	<ul style="list-style-type: none"> <li>-Recommendation: single school or school alliance</li> <li>-Declaration: single teacher or teaching group</li> <li>-Applicant Qualifications: curriculum director should have rich training experience, teaching and moral management experience, distinct training characteristics and remarkable training effect. Generally, curriculum applicant should have middle or senior professional titles or has already become regional discipline leader or key teacher.</li> </ul>
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### 3.4 Procedures of Regional Curriculum Construction

The construction of standardized training curriculum for first-year teachers in P district adopts the dynamic management mode of fair competition, selection of the best, process management, continuing development, project establishment and under co-construction of schools and districts. The following procedures generally concluded: announcement, declaration, submission, review, and evaluation.

Table 7 Procedures of Regional Curriculum Construction in P district

<b>Procedures of Regional Curriculum Construction in P district</b>	
<b>Announcement</b>	-Regional Education Bureau and Regional teachers' training college organize curriculum construction, formulate procedure, and post announcement in district.
<b>Declaration</b>	-Teachers declare independently. Schools advance first-selection inside campus and recommend high-quality courses. Teachers submit curriculum application material to school.
<b>Submission</b>	-Schools submit teachers' curriculum application material to regional education bureau and regional teachers' training college.
<b>Review</b>	-Regional education bureau and regional teachers' training college invite experts to review curriculum under selection. Experts recommend curriculum list for further selection.
<b>Results</b>	-Regional education bureau publish selected courses and support curriculum construction.
<b>Curriculum Cultivation</b>	-Experts give guidance and advice on curriculum cultivation. Declared teachers follow experts' guidance, further improve the curriculum structure, content and form, write or revise textbooks, record video course and finally public online.
<b>Evaluation</b>	-Regional Education Bureau and Regional teachers' training college organize formative evaluation and summative evaluation on curriculum construction and curriculum application. Curriculum's audience and attendant participate in evaluation. Experts conduct declaration review, term review, and annual review on curriculum.
<b>Application &amp; Promotion</b>	-Curriculums which have passed declaration review will be divided into 2 categories concluding "excellent" and "qualified". "Excellent" and "qualified" curriculums will be selected in district-level training courses, and participate in term review and annual review successively. Curriculums achieved excellent title will be popularized and spread in district and recommend to municipal level.

Regional education bureau and regional teacher education school in P district formulate mentor's package, as well as provide mentors with guidance and task information.

Table 8 Catalog of Mentor's Package in P district

<b>Catalog of Mentor's Package in P district</b>	
<b>Personal Information</b>	<ul style="list-style-type: none"> <li>-Basic information of subject mentor</li> <li>-Basic information of first-year teachers (Mentee)</li> </ul>
<b>Plan &amp; Summary</b>	<ul style="list-style-type: none"> <li>-Mentor's Work Plan</li> <li>-Mentor's personal summary</li> </ul>
<b>Records of Instruction</b>	<ul style="list-style-type: none"> <li>-Records of class attendance</li> <li>-Records of First-year teachers' Preparations for Lessons (SemesterI/II)</li> <li>-Records of First-year teachers' Homework Arrangement (SemesterI/II)</li> <li>-Records of First-year teachers' Open Class Attendance (SemesterI/II)</li> </ul>
<b>Evaluation</b>	-School's evaluation of mentor

	-Regional evaluation and commendation of mentor
	-Municipal commendation of mentor

Inside this package, education administrators' analysis duties of subject mentors, as well as duties of head teacher's tutor.

Table 9 Duties of Subject Mentors in P district

<b>Duties of Subject Mentors in P district</b>	
<b>General Qualifications</b>	-Familiar with the contents and requirements of the standardized training of teachers in P district, and pay attention to the full growth of first-year teachers. -Mentors should set an example and influence the First-Year Teacher; imperceptibly show their excellent teachers' moral cultivation and etiquette norms.
<b>Mentor's Assignment</b>	-Mentors should initiatively introduce to First-Year Teacher; of the school's history, characteristics campus and culture, so that the first-year teachers can know the school, accept the school and identify with the school. -Mentors should guide First-Year Teacher; to obtain basic skills in subject teaching and help them to form good teaching habits. -Check the contents of "Pudong New District Primary and Secondary Schools (Kindergartens) Standardized Training Manual for First-year teachers" filled out by first-year teachers in time, and provide relevant evaluation seriously. -Fill in the blanks of mentor' package in time, and complete the assignment of instructor.
<b>Mentor's Responsibility</b>	-Accept the training, guidance, assessment of the mentor's work by the school and district.

Table 10 Duties of Head Teacher's Tutor in P district

<b>Duties of Head Teacher's Tutor in P district</b>	
<b>General Qualifications</b>	-10 years of working experience as a head teacher or an education administrator in school. -District academic leader and key teacher.
<b>Tutor's Assignment</b>	-Tutor should instruct head teacher to promote and conduct: *Class Cadre Meeting *Home visit *Student Symposium *Home-school contact *Class Meeting *Class Social Practice Activities *Class Situation Analysis *Student Case Analysis *Comprehensive Evaluation of Students -Fill in the blanks of tutor' package in time, and complete the assignment of instructor.
<b>Tutor's Responsibility</b>	-Accept the training, guidance, assessment of the tutor's work by the school and district.

#### 4. Conclusion

In the past, China's probation system was mainly from the perspective of personnel wages. Upon the expiration of one-year probation period, the first-year teacher will be transferred to regular rank after passing the examination, and will receive the salary as formal teachers. In practice, in the probation period, the traditional apprentice guidance is basically limited to the small scope of the school, that is, the school arranges the mentor to guide first-year teachers, so as to continue the previous independent support between schools. After the national medium and long term education reform and development plan (2010-2020) issued in 2010, it was pointed out that the strategic requirements of "improving and strictly implementing the teacher access system and strict the entrance of teachers". New mechanisms of national standard, provincial examination, county recruitment and district policy should be piloted to further improve the enrollment standard for new teachers. This paper attempts to integrate and link the

teacher's induction and the current one-year probation system into the terms of "teachers' rights and obligations" in the new round of education program revision. In the supplement to the provisions on the continuing education of primary and secondary school teachers, it is confirmed that the first-year teachers must participate in induction during the current one-year probation period, and they can get formal offer after passing the training.

China has a vast territory and complicated regional characteristics. Simply unified national teacher induction is not operational, so the province and city should try to gradually implement the teacher's in-service training system including teacher induction. In 2012, Shanghai carried out the standardized training of first-year teachers, and provided one-year probationary training for new teachers in regional teachers' colleges and teachers' professional development schools of the counties. The training contents covered four major parts and 18 key points, including professional perception and moral cultivation, classroom experience and teaching practice, classroom management and moral experience, teaching research and professional development. Forming three level collaborative operation mode engaged cities, districts and schools which adopts team teaching, equipped with discipline teaching and head teacher teaching, bringing new teachers into teaching, moral and research teams, constructing school and district learning communities, and providing all-round guidance.

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# Mentors Views on Mathematics and Science Student Teachers School Experience

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## Abstract

This study investigated mentors' views on Mathematics and Science student teachers' school experience with a focus on student teachers' classroom management practices, instructional strategies, student-mentor relationships, behaviour patterns, and participation in co – curricular activities. It utilized a descriptive survey design on a sample of 60 mentors, 43 males and 17 females, randomly drawn from the departments of Mathematics and Natural Sciences in twenty two (22) secondary schools across Zambia. Questionnaires and focus group discussions were used in data collection. SPSS was used to analyse quantitative data to arrive at descriptive statistics such as frequencies, means and standard deviations while qualitative data were transcribed and then analysed using Atlas.ti. The study revealed that mentors had positive thoughts of Mathematics and Science student teachers' classroom management practices, and instructional strategies. It was also evident that a positive rapport was created between mentors and student teachers and that mentors saw Student Teachers' behavioural patterns as generally acceptable and upheld professional ethics. Furthermore, mentors were satisfied with the levels of student teachers' participation in co – curricular activities. The study results revealed, therefore, that mentors had positive thoughts of the student teachers school experience.

**Keywords:** Student Teachers, Mentors, School Experience, Classroom Management, Instructional Strategies, Behavioural Patterns, Co - Curricular Activities, Mentoring

## BACKGROUND

School experience is vital in the preparation of Mathematics and Science teachers because it offers student teachers unique experiences (Kiggundu & Nayimuli, 2009). It may be considered as one of the most significant milestones in the training of student teachers (Brimfield & Leonard, 1983) because of its beneficial impact on them (Guyton & McIntyre, 1990). It generates excitement in student teachers and provides an avenue for them to be a part of a real classroom setting, of getting to know pupils, of planning and organising instructional strategies, (Perry, 2004),

of creating student teacher - mentor relationships, of displaying acceptable behaviour patterns and of participating in co – curricular activities. School experience refers to all the learning experiences of student teachers in schools during which period student teachers exercise self - reflection, implement a variety of approaches, strategies and skills (Kombo & Kira, 2013) within and outside the classroom.

During school experience, student teachers observe mentors (qualified teachers) at work so as to learn about their teaching skills, strategies and classroom management, behaviour patterns and involvement in other school activities (Marais & Meier, 2004) and evaluate their own school experiences through interactions with mentors. Mentors are volunteer-experienced teachers in various disciplines and assume multi-faceted roles of being guides, counsellors, overseers, coaches, models, supporters, critics and instructors to student teachers during school experience in a process referred to as mentoring (Ganser, 1996; Haney, 1997; Holloway, 2001; Maphosa, Shumba & Shumba, 2007; Chakanyuka, 2006; Nilsson and Van Driel, 2010). Mentoring has no one standard definition (Halai, 2006; Wunsch, 1994), but often considered as a collaborative effort involving university supervisors, school administrators, mentors, and student teachers (He, 2010; Schwille, 2008) in preparing teachers for the increasingly challenging in and out of classroom environment is a critical aspects in the training of teachers of mathematics and science.

Mentors play a critical role in providing support and guidance to student teachers who face numerous challenges as they seek to motivate pupils, plan and implement curriculum, provide instruction and take up responsibilities and roles (Roehrig, Pressley, & Talotta, 2002), to ensure that student teachers effectively undertake the school experience. It is here that mentors come in to serve as collegial and emotional supporters, providers of feedback, gatekeepers of the profession, modellers of practice, supporters of reflection, gleaners of knowledge, purveyors of context, conveners of relation, agents of socialization, advocates of the practice and abiders of change to student teachers (Clarke, Triggs, & Nielsen, 2014) for this challenging phase of their school experience. Research on mentors' perceptions of student teachers' school experience has revealed that mentors feel responsible for the professional growth of student teachers (Koskela & Ganser, 1995; Anold, 2002). Vacc and Bright (1999) have shown that mentors have great influence on the student teachers' professional development in pedagogical and content knowledge and other aspects throughout the mentoring process. This is supported by Frykholm (1996) who reveals that two - thirds of mathematics student teachers modelled the teaching styles of their mentors. Since mentors spend more time with student teachers (Maria & Evrim, 2009) and are among the most relevant variables in student teaching (Milner, 1959; Yee, 1969), mentors are better situated to provide their views regarding mathematics and science student teachers' school experience.

Despite mentors having their own challenges and difficulties, most of them still feel enthusiastic and committed to their work with student teachers. According to Yendol-Hoppey (2007), once mentors become committed to mentorship, they enter into a special relationship with the student teachers that make them to develop positive attitudes towards assisting the less experienced teachers. Accordingly, mentorship is a special form of teaching that requires particular skills and abilities (Schatz - Oppenheimer, 2016).

According to Perry (2004), student teachers on school experience are excited of being a part of real classroom settings, of getting to know pupils, of planning and organising the classroom tasks. They want to exercise self - reflection, implement a variety of approaches, strategies and skills in their teaching with a view of bringing about meaningful learning (Kombo & Kira, 2013). All these are aspects of classroom management which refers to any action teachers take to create environments that supports and facilitates academic and social-emotional learning (Evertson & Weinstein, 2006) ensuring the smooth running of classroom lessons to meet pupils' developmental needs. This is achieved through the use and organization of the classroom space, the daily schedule and routines in spite of pupil's strengths, weaknesses, individual differences and disruptive behaviour (Dodge, Rudick and Colker, 2009). It involves the prevention of undesirable and disruptive pupil's behaviours (Berliner, 1988) and maintenance and continuity of an orderly atmosphere arising from student teachers' ability to effectively plan, organise, decorate classrooms, structure classroom interactions, establish and enforce classroom rules and prepare materials for the classroom lessons (Tan, Parsons, Hinson, & Sardo-Brown, 2003).

With reference to classroom management, Dreikurs, Grunwald and Pepper (1998) are convinced that the goal of student teachers' school experience is considering and satisfying pupils' developmental needs by creating conducive learning environments, stimulating sights, relaxing sounds and good ventilation. Feldman (1998) views a classroom as a place where pupils should feel comfortable and at ease. Positive school experience enhances effective classroom management which is a critical ingredient of effective teaching (Marzano, Marzano, & Pikering, 2003) with the potential to positively affect the pupils' academic performance and attracts the attention not only of student teachers but also of mentors and other stakeholders in the education sector. Classroom management attracts mentors interests to observe the students' progress, behaviour and attitude at school, and assess the student teachers' practical teaching and learning activities. Kiggundu and Nayimuli (2009) suggest that some mentors do not have confidence in the student teachers' classroom management approach and consequently are unwilling to surrender their classes to student teachers because they felt that student teachers delayed and wasted pupils' valuable time. In their study, Kiggundu and Nayimuli (2009) argue that mentors find class control, timing, maintaining pupils' attention, getting and keeping a class quiet, keeping children on task were problematic for student teachers.

Instructional strategies are critical for effective lesson delivery. Teaching is a demanding task for both student teachers and experienced teachers since it involves many instructional skills. It is therefore not surprising for student teachers to be anxious in actual classroom situations because of teaching methods and strategies to use (Freiberg & Driscoll, 2005). Encounters such as difficulty in choosing and using teaching strategies and techniques are also important concerns and are perceived as critical for successful teaching in order to achieve positive learning outcomes (Goh & Matthews, 2011). Hudson (2013) identified the use of appropriate teaching strategies as one of the desirable practices mentors expect of the student teachers. It was expected therefore that mentees would build a repertoire of teaching strategies, be willing to try new teaching strategies, possess knowledge of and be prepared to use various strategies to identify what works best and be able to work out own teaching strategies based on best practice. In fact Kagoda and Sentongo (2015) in their study found that mentors were of the view that student teachers exhibited a mastery of the subject matter in the areas of specialization and used effective and appropriate instructional strategies in their teaching. They actually noted some student teachers were extremely excellent in the way they did their work as if they were regular teachers.

Student teachers' interactions with Mentors' can result in a fruitful or disappointing interpersonal relationships. In fact mentoring could be considered as a nurturing relationship based on mutual trust, shared and common values, goals, and understandings that leads to the development and professional growth of both the mentor and mentee (Halai, 2006; Tauer, 2002). Establishing rapport is very important in mentor – student teacher relationship during school experience as it enables the mentor and student teacher to develop trust and confidentiality which are critical in a student teacher's goal attainment (Samkange, 2015).

The nature of relationship existing between the mentor and mentee greatly influences the success of mentoring process. A positive relationship is an important ingredient for the mentor's enthusiasm that can present desirable teaching and non-teaching traits for a student teacher to model during school experience (Hudson, 2010). It can safely be said that a good mentor – student teacher relationship is a precursor to boosting the morale and confidence of the student teacher because the mentor introduces collegial supervision, where the mentor and mentee criticise each other on professional issues (Lu, 2010). In the interest of the student teacher, Li (2009) indicated that there are times when mentors take an authoritarian role on the rights and wrongs of student teachers' teaching and execution of other duties while managing to maintain trust and warm relationships. However, tensions can arise between mentor-mentee due to lack of open communication and disparate beliefs (Bradbury & Koballa, 2008), a wide gap in age differences (Maphosa & Ndamba, 2012) making it difficult for a mentor to provide the needed assistance to the mentor and to be flexible and appreciate new ideas from student teachers (Tomlinson, 1995). Interestingly however, research has shown that during school experience most mentors have reported that the student teacher – mentor relationship is good and impacting student teachers positively (Maphosa & Ndamba, 2012). On the other hand there are a few mentors that developed poor working relationships with student teachers.

Student teachers' behaviour patterns during school experience are critical during school experience. With regard to behaviour, Kagoda and Sentongo (2015) stated that mentors were of the view that student teachers had fairly

good professional ethics and dressed well except some female student teachers who dressed poorly. The behaviour of student teachers was influenced by the behaviour of mentors (Bubb, 2010) and therefore a mentor, who exhibited pomposity and arrogance, promoted negative attitudes from student teachers. Among some of the unprofessional conducts and act that mentor engaged in were absenting themselves from duty, reporting late or sending pupils for personal errands even during lessons (Kiggundu & Nayimuli, 2009). Mapolisa and Tshabalala (2014) assert that what student teachers wore was in a way a product of what they observed mentors dress. According to Korthagen and Evelein (2016), student teachers' behaviour is also influenced by their needs fulfilment. Student teachers displayed desirable behaviours if their needs were met but thwarted needs induced in them fight, flight or freeze tendencies (Korthagen & Evelein, 2016).

School experience is aimed at ensuring that student teachers contribute to the school and school community by participating in co-curricular activities, and community events. During school experience, student teachers have the opportunity to get involved in all aspects of curricular as well as co-curricular activities which include teaching, clubs and sports. In fact Marais (2011) revealed that it was important for student teachers to actively participate in co-curricular activities during school experience in order to prepare them for their teaching career. Kiggundu and Nayimuli (2009) further revealed that student teachers' participation in co-curricular activities is excessively limited even when schools were requested to allow student teachers to be actively involved in them. Kiggundu and Nayimuli (2009) also indicated that sometimes student teachers even excluded themselves from sporting activities.

Mentors by virtue of the interest they have in the welfare of the classes they surrender and also their responsibility to provide guidance to the student teachers are better situated to provide and account for student teachers' classroom management, instructional strategies, student teacher - mentor relationships, behaviour patterns, and participation in co-curricular activities during their school experience.

## **PROBLEM STATEMENT OF THE STUDY**

A generally accepted view is that during school experience, Mathematics and Science student teachers need to perform a variety of roles and demonstrate various qualities in classroom management, instructional strategies, and student teacher - mentor relationships, their behaviour patterns and participation in co-curricular activities. During this period there is an undeniable link between mentors and student teachers. Whilst there is a lot of research dealing with student teachers' views on mentors, there is scanty research providing mentors views on student teachers school experience in spite of their immerse contribution to the professional development of these trainee teachers (Hudson, 2010). This study was therefore undertaken to investigate mentors' views of Mathematics and Science student teachers' school experience. In particular, the study focused on mentors' views of student teachers relating to classroom management, instructional strategies, and student teacher - mentor relationships, their behaviour patterns and participation in co-curricular activities.

## **OBJECTIVES OF THE STUDY**

This research sought to descriptively determine mentors' views of Mathematics and Science student teachers' school experience.

The study was guided by the following questions;

1. What are the mentors' views of Mathematics and Science student teachers' classroom management practices during school experience?
2. What are mentors' perceptions of science and mathematics student teachers' instructional strategies?
3. What are mentors' views on student teacher - mentor relationships during student teachers' school experience?
4. How do mentors view Mathematics and Science student teachers' behaviour patterns while on school experience?

5. Do Mathematics and Science student teachers on school experience participate in co – curricular activities?

## **METHODOLOGY**

This study utilized a descriptive survey design focusing on mentors' views on mathematics and science student teachers' school experience. It used a randomly selected sample of 60 mentors from departments of Mathematics and Natural Sciences in twenty two (22) secondary schools in Zambia consisting of 43 male and 17 female mentors. Forty two (42) of these mentors responded to the questionnaire while eighteen (18) of them participated in the focus group discussions. These mentors, with teaching experience from 1 to 25 years, taught either mathematics, chemistry, biology or physics.

Questionnaires and focus group discussions were used in data collection. The use of the questionnaires was arrived at because it provided a quick and easy way of obtaining mentors' perceptions. A pilot study was conducted with mentors in the nearby secondary schools to ensure the questionnaire's validity. Data were collected during student teachers' school experience by twelve supervisors who were monitoring student teachers. The Statistical Package for the Social Sciences (SPSS) was used to analyse the quantitative data to arrive at descriptive statistics such as frequencies, means and standard deviations while qualitative data were transcribed and then analysed using Atlas.ti.

## **FINDINGS**

The study investigated mentors' views of mathematics and science student teachers school experience. In this section major themes that emerged from data analysis are presented.

### **Classroom Management**

In the questionnaire -mentors were asked to rate the student teachers' class management skills on a four point scale from very good, good, fair and poor. The findings indicate that 80.5% of the mentors rated student teachers' classroom management abilities from good to very good. In fact 87.8% of the mentors indicated that student teachers managed their classes well while 4.8% of them stated that student teachers failed to effectively manage their classes. Another question was on whether or not the mentors felt it was necessary for student teachers to improve in their classroom management.

The focus group discussion revealed that generally student teachers managed their classrooms well. Mentors were impressed with student teachers' ability to teach and deal with issues arising from the pupils. In their view "some student teachers had very good management skills".

However, 15% of the mentors felt that some student teachers failed to provide effective classroom management on account of small age differences between them and the pupils. According to these mentors, student teachers established very intimate relationships with pupils so that "sometimes it was difficult to distinguish between a pupil and a student teacher".

### **Professionalism, Content Delivery, Teaching Skills and Student – Mentor Relationship**

Mentors were asked to provide their views on student teachers' professionalism, content delivery, teaching skills and student – mentor relationships by rating them from poor, fair, good and very good. Results showed that the majority of mentors rated student teachers' professionalism at 51.2%, content delivery at 83.2%, teaching skills at 90.2% and student mentor relationship at 87.8% as good to very good as shown in Table 1.

Table 1: Student teachers' professionalism, classroom management, content delivery, teaching skills and mentor relationship

	Number of respondents = 42			
	Very good (%)	Good (%)	Fair (%)	Poor (%)
Professionalism	14.6	36.6	46.3	2.4
Content delivery	29.3	53.7	17.1	0
Teaching skills	19.5	70.7	7.3	2.4
Student teacher – mentor relationship	29.3	58.5	12.2	0

Most mentors in the focus group discussions stated that student teachers had adequate subject content in their specialisation and were professional in their classroom management. Mentors stated that student teachers ensured that classrooms were well managed before they were visited by supervisors after which some of them relaxed. The student teachers faced challenges in content delivery and pedagogy or transmission of the content. They felt student teachers sometimes failed to align lesson objectives to the content. They suggested that they should be exposed more to education courses to improve their pedagogy.

### Class Discipline

On class discipline, most mentors revealed that student teachers rarely had disciplinary problems (51.3%), sorted out disciplinary cases effectively (65.9%), were familiar with problem solving structures (73.0%) and used problem solving structures often (51.2%). Conversely only 31.6% and 24.4% of the mentors disagreed that student teachers rarely had disciplinary problems and used problem solving structures often respectively as shown in Table 2.

Table 2: Student teachers' ability to deal with class discipline

	Number of respondents = 42				
	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Student teacher rarely had disciplinary problems with pupils	22	29.3	14.6	29.3	2.4
Student teachers sorted out disciplinary cases effectively	17.1	48.8	24.4	9.8	0
Student teachers familiar with problem solving structures	12.2	61.0	9.8	14.	2.4
Student teachers used problem solving structures often	7.3	43.9	24.4	22.0	2.4

The focus group discussion revealed that most student teachers were able to ensure classroom control and pupil discipline. Mentors highly commended mathematics student teachers for being very good in classroom management. A few of them failed to control classes because they created very close pupil – teacher relationships which inhibit effective classroom management. Mentors noted that with time even those that had challenges were able to control pupils and maintain discipline.

### Resourcefulness and creativity

Mentors were asked questions on whether student teachers were resourceful and creative to create an enabling environment for effective teaching and learning to take place. It was revealed that 70.8% improvised teaching materials when need arose, 90.2% created an enabling environment, 63.2% prepared classroom layout for lessons and 80.5% ensured that the classroom layout remained conducive for teaching and learning. Table 3 presents the rest of the details.

Table 3: Mentors responses on student teachers resourcefulness and creativity

	Number of respondents = 42				
	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Student teachers created enabling environment	14.6	75.6	2.4	7.3	0
Student teachers always prepared classroom layout for lessons	14.6	48.8	12.2	22.0	2.4
Student teachers' classroom layout was conducive to learning	19.5	61.0	7.3	9.8	2.4
Student improvised when need arose	4.9	65.9	9.8	14.6	4.8
Student always resourceful	9.8	58.5	4.9	24.4	2.4

Mentors unanimously agreed that student teachers created environments that were suitable for teaching and learning. Focus group discussions revealed that whilst a good number of student teachers used teaching aids, fewer science student teachers did so compared to the mathematics counterparts. Further it was reported that mathematics student teachers were more resourceful than science student teachers.

### Lesson preparations

With regard to lesson planning, 83.0% of the mentors indicated that student teachers prepared detailed lesson plans that could be used by other teachers in the event that they were not available, 75.6% reported that student teachers were ready to improve their lesson plan preparation, 85.9 % said that training institutions adequately prepared student teachers while 21.9% of them felt that student teachers were not ready for the exercise at the time they report for school experience. Additionally 70.8 % of the mentors indicated that student teachers planed their work in advance, 82.7% said that student teachers used different lesson plans for different classes at same level and 81.0% indicated that student teachers' language in class was always simple, clear and unambiguous. Table 4 provides the rest of information

Table 4: Mentors Responses on student teachers' preparedness for lessons

	Number of respondents = 42				
	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Student required improvement in lesson planning	36.6	39.0	2.4	19.5	0
Detailed lesson plans usable by another teacher	17.1	65.9	4.9	12.2	0
Student was ready when they came for school experience	17.1	48.8	12.2	19.5	2.4
Student used different lesson plans for different classes at same level	17.1	53.7	7.3	22.0	0
Student always planned work before teaching	36.6	56.1	2.4	2.4	2.4
Student teachers language always, simple, clear and unambiguous	14.3	66.7	7.1	9.8	0

From the focus group discussion mentors stated that student teachers were ready for school experience, had "excellent knowledge in content though they had challenges in pedagogy", prepared lesson plans for different lessons and classes of the same level , always had teaching aids and majority of the student teachers regularly prepared satisfactory lesson plans. Mentors also stated that a few student teachers had problems of lesson

preparation, writing of the objectives, were too proud to learn from the mentors, never used teaching aids, refused to adopt lesson plans they found in schools and adopted attitudes of some serving teachers of not writing lesson plans after they had been observed by supervisors. Mentors proposed that student teachers with pedagogical challenges should be exposed to educational courses like psychology and sociology to help them improve in lesson preparation

### Student Teachers' Instructional Strategies

Concerning instructional strategies student teachers used, 48.8% of the mentors were of the view that they used learner centred approaches, 68.3% extensive group work and allowed learners to work on their own in groups respectively. Concerning which teaching strategies they often used, rarely used or did not use, 48.8% of the mentors indicated class discussions 64.3% lecture method, and 58.5% problem solving were often used while for those rarely used or completely ignored 70.7% them indicated experiments, 95.2% project method, 82.9% role play and 78.0% field trips as shown in Table 7.

Table 5: Mentors responses on student teachers' preferred teaching strategies.

	Number of respondents = 42		
	Often used (%)	Rarely used (%)	Did not use (%)
Experiment	29.3	46.3	24.4
Class discussion	87.8	9.8	2.4
Group discussion	48.8	48.8	2.4
Project method	4.8	39.0	56.1
Inquiry	48.8	39.0	12.2
Discovery	29.3	46.3	24.4
Role play	17.1	34.1	48.6
Field trips	22.0	73.2	4.8
lecture	64.3	19.5	14.6
Problem solving	58.5	36.6	4.9
Problem based	41.5	39.0	19.5

Arising from the focus group discussion, when requested to provide reasons why student teachers preferred one teaching strategy over the other, mentors indicated that student teachers preferred methods that were less involving in preparation, ensured that effective classroom control and were cost effective. According to them some strategies like field trips and role play were not familiar to student teachers. Mentors also reported that most science student teachers took learners to the laboratory and carried out experiments particularly before they were observed by the lecturers while in some cases laboratories were used as normal classrooms.

### Student teacher – mentor relationship

When asked to give their views on student teachers – mentor relationship, 29.3% and 58.5% of the mentors felt that the relationship between them and mentors was very good and good respectively. On the other hand 12.2% of them indicated that the relationship was fair while 2.4% of them saw the relationship was poor. Further 92.7% of the mentors stated that students responded to the advice, 90% that student teachers acted on the given advice and 92.9% that they found them useful in the school. However 2.4% and 4.8% of the mentor felt that student teachers did not respond to the advice or act on them respectively. Table 6 presents the information figuratively.

Table 6: mentor – student teacher relationships

	Number of respondents = 42				
	Strongly agree	agree	Not sure	Disagree	Strongly disagree
Student teachers always responded to advice	39.0	53.7	4.9	2.4	0.0

Student teachers acted on advice	26.8	63.4	4.9	2.4	2.4
Student teachers are useful to the school	42.9	50.0	2.4	2.4	0

From the focus group discussion mentors revealed that most student teachers were very cooperative, obedient, responded to advice, ready to learn and change for the better. Most of mentors indicated willingness to recommend student teachers to administrators to be recruited in their schools after completion of their studies. Mentors indicated that a small number of student teachers took no advice from mentors because they viewed mentors as stumbling blocks to their freedom

### Student Teachers' Behaviour Patterns

When mentors were asked whether student teachers needed to improve in the area of discipline, 67.8% of the mentors indicated there was need for student teachers to improve in matters of discipline. However, 82.8% and 78.1% of the mentors felt student teachers rarely absented themselves from school and rarely gave excuses from duty. On whether student teachers acted as role models to pupils, 78.1% of the mentors saw student teachers as role models to pupils. Table 7 provides details of the mentors' responses.

Table 7: Mentors views on whether student teachers required discipline

	Number of respondents = 42				
	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Student teachers required discipline	26.8	39.0	14.6	9.8	9.8
Student teachers rarely absent from school	46.3	36.6	7.3	7.3	2.4
Students teachers rarely gave excuse from duty	41.5	36.6	2.4	14.6	2.4
Student teachers always acted as role model	22.0	56.1	7.3	12.2	2.4

It was revealed from the focus group discussion that most student teachers adhered to school regulations, well behaved and were obedient. It was also clear from the mentors that some student teachers were badly behaved and engaged in illicit activities such as beer drinking. Other student teachers were overzealous, very proud and highly rated themselves, displayed antisocial behavioural tendencies towards student teachers from other universities, were resistant to change, disregarded school administrators and were poorly dressed thereby disregarded the dress code. Mentors also pointed out that the generation gap was a barrier for student teacher to open up to the mentors and the mentors to accept student teachers' foreign classroom practices.

On what training institutions could do to improve student teachers undesired attributes, mentors called for counselling student teachers on their poor behaviour, poor dressing (short dresses and tight trousers), disobedience, lack of respect and lack of appreciation for school administrators during school experience. They also suggested that institutions training teachers should collaborate with schools regularly to outline what was expected of student teachers. In addition, mentors should be oriented regularly on their roles regarding student supervision.

### Participation in Co – Curricular Activities

As to whether student teachers participated in co – curricular activities 63.5% of the mentors agreed that student teachers participated in co – curricular activities while (11.9%) felt that student teachers did not participate in co – curricular activities. The focus group discussion unanimously agreed that student teachers were active in sports activities and that their participation depended on their fields of interest. Mentors indicated that a few student teachers participate in co- curricular activities because they had no interest in sports and therefore shun co-

curricular activities. Mentors added that student teachers were extremely helpful in co – curricular activities in major sporting competitions at school, district, provincial and national levels.

## **DISCUSSION**

### **Student Teachers Classroom Management**

Mentors' views of mathematics and science student teachers' classroom management practices were generally positive. Student teachers had appropriate classroom management skills that enhanced effective teaching and learning. Most student teachers according to the mentors prepared detailed lesson plans that could be used by any standby teacher, prepared different lesson plans for different classes of the same level, spent time to adequately prepare for the coming lessons, created conducive classroom layouts and enabling environments for effective teaching and learning. Mentors also observed that student teachers worked on their weaknesses and improved in their lesson planning and lesson delivery with time in line with Barry and King (2002) who found that effective teachers spend a great deal of time on careful and detailed planning. Barry and King (2002) further found that student teachers' planning skills improved during the preparation phase of school experience. The findings further support previous research findings asserting that school experience enhances student teachers' acquisition of interactive, communication and classroom management skills (Al Naji, 2000; Hammad, 2005; & McNamara, 1992) critical for pupils' good academic performance.

It was also clear according to the mentors that a number of student teachers were aware or familiar with problem solving structures in the schools they practiced and used these structures to sort out pupils' disciplinary cases effectively. With this then mentors felt that most student teachers rarely had disciplinary problems with pupils.

However, while a number of student teachers managed their classrooms well, mentors also noted that some student teachers had challenges in managing their classes. Among the factors that led these students fail to manage their classes were their poor pupil – student teacher relationships. Some student teachers took pupils for their friends. In extreme but very rare cases male student teachers had intimate relationships with the pupils of the opposite sex. Another factor that led to poor classroom management was that these student teachers failed to adequately prepare for lessons; they had poorly prepared lesson plans or used inappropriate instructional strategies. The poor mentor – student teacher interpersonal relationships among some student teachers was another hindrance to effective classroom management because mentors were unable to provide the required counsel. These findings agree with other studies that revealed that student teachers often felt poorly prepared in the area of classroom management (Jones, 2006; Clement, 2002; 1996; Meister & Melnick, 2003; Pilarski, 1994). The situation affects the effective delivery of the lessons. It has been reported that student teachers often feel underprepared during school experience because effective classroom management is both challenging and difficult (White, 1995 and Pilarski, 1994; Armstrong, 1976)). This may be arrested if student teachers were provided with the variety of discipline styles available for them to effectively interact with pupils and ensure acceptable levels of class control.

### **Student Teachers Instructional Strategies**

The study indicates that most science and mathematics student teachers use teacher centred approaches such as lecturing as well as learner centred teaching strategies like class discussions. The factors that influenced the teaching strategies student teachers used were the desire to maintain classroom management, the unavailability of teaching and learning materials in schools and lack of certain skills associated with the use of some teaching strategies such as role play.

While science and mathematics are practical subjects, according to the study, mentors revealed that student teachers avoided using strategies such as experiments, field trips, Discovery, Project method and role play which encouraged hands on experiences and the development of creativity, innovation, critical thinking and discovery. Effective pedagogy can reduce problematic student behaviour but cannot eliminate it (Emmer & Stough, 2001; Oliver & Reschly, 2007) and promote fast grasping of concepts, retention of knowledge and enhance personal and national development. The current trend in which lessons are devoid of practical and hands - on teaching strategies

should be a source of worry and concern for training institutions because of the serious negative effects they have on national scientific, technological and socio – economic development.

The study revealed that among the other things that could be done to improve the student teachers' instructional skills was to ensure that the educational courses offered to students by training institutions were strengthened. Strengthened educational courses would provide student teachers with clear approaches of handling learners, increasing their confidence and also the ability to effectively plan for the lessons

### **Student Teacher – Mentor Relationship**

The study revealed that generally there was a good student teacher - mentor relationship. The positive rapport created ensured that mentors were able to freely interact with and provide guidance to student teachers. In return student teachers were able to ask for assistance from the mentors whenever they had challenges in their school experience. This shows that mentoring is a symbiotic relationship benefiting and satisfying the mentor as well as the mentees. This was in with earlier studies which found that the relationship between student teachers and mentors is positive and collaborative in which the duo cared for each other personally and professionally and had a positive impact on student teachers' school experience (Glenn, 2006; Su, 1992). In fact several studies have shown that a good student teacher - mentor relationship is a precursor to a student teacher's ability to control the class, set appropriate lesson objectives, effectively deliver lessons (Loizou, 2011; Sempowicz & Hudson, 2011; Nkhata, Chituta, Banda, Jumbe & Chobe, 2016), acquire valuable knowledge, skills and positive attitudes that make them feel part of the school (Kiggundu & Nayimuli, 2009) and enjoy their school experience. This was evident from the findings because mentors indicated that student teachers went all the way to "model behaviours and skills appropriate for student teachers' positive and effective school experience". This underscores that teaching requires high levels of interaction for developing positive relationships; hence developing personable attributes that lead towards facilitating such relationships was considered desirable (Hudson, 2013). Health student teacher – mentor relationships helps student teachers to become part of the educational system.

From the study, it was also evident that not all was rosy. There were rare instances when student teacher - mentor relationships during school experience were poor and sour when student teachers had no respect for mentors and the school management, refused to take up responsibilities and advice and saw mentors as intruders in their personal lives. Although rare, such conflicts and undesirable relationships are reported to have their origin in mentors' inability to match their mentorship style to the student teachers' capacity to perform instructional tasks (Ralph, 2000), asymmetrical power relationships in which mentors look down on student teachers or student teachers perceptions that they were being over used at the expense of professional development and recognition (Lawrence, 2005); White, 2000). In such situations, student teachers may be demotivated, isolated and lonely, frustrated and perceive their school experience as horrible and time wasting.

### **Behaviour Patterns**

The findings revealed that student teachers displayed very good interpersonal relationships. Student teachers were neither problematic nor pompous and their dress code was acceptable. According to them the mentor – student teacher relationships were either good or very good. This finding was in line with Maphosa and Nambe's study in Zimbabwe that revealed that the mentor – student teacher was very good (Maphosa & Ndamba, 2012). They consulted, cooperated and were obedient. It was clear that some of the mentors acted as precipitators for the student teachers' displayed behaviours. From the findings it was evident that if mentors were considerate and friendly then student teachers displayed acceptable social relationships. This is in agreement with findings of White (2000) and Lawrence (2005) that revealed that in most cases, there were cases of asymmetrical power relationships between the mentor and student teacher. They argued that more often, student teachers felt that their mentors looked down upon student teachers, over used them without giving them due recognition (White, 2000; Lawrence, 2005) and belittled each time mentors instructed them to undertake certain activities (Mapolisa & Tshabalala, 2014) creating in student teachers resentment. In fact the findings were also supported by Wilson (2009) who also found there were mentor-student teacher personality clashes.

## Participation in Co – Curricular Activities

Co-curricular activities fall outside the realm of the core curriculum of school education (Marais 2011) and could be considered as purely voluntary. However, the findings of this study reveal that student teachers participated in the co – curricular activities. This sharply contradicts the findings of Kiggundu and Nayimuli (2009) who reported that student teachers were not fully involved in co – curricular activities during their school experience. During teacher training, student teachers are provided skills not only to deal with pupils within the classroom settings but also in out of classroom environmental setting. This is what makes them useful to the schools they go for school experience. They are put on duty, in charge of sports such as netball, football, basketball and clubs like debate, anti HIV/AIDS, Science and Mathematics clubs. In being fully involved in co – curricular activities student teachers uphold the sociological and psychological concepts that educating pupils must be all rounded to enhance social interaction, leadership, healthy recreation, self-discipline and self-confidence in learners.

## CONCLUSION

The study revealed that mentors had positive views of Mathematics and Science student teachers' school experience. In addition student teachers' classroom management was generally satisfactory in spite of the isolated cases of poor classroom management practices. It was also found that student teachers adequately prepared for their lessons. However mentors were concerned that some teaching strategies such as experiments, project methods, field trips and role play critical to the learners' cognitive and psychomotor development were ignored. Student teachers behavioural patterns were generally acceptable although there were isolated cases of undisciplined student teachers. It was also evident from the study that positive relationships were created between mentors and student teachers. The positive mentor – student teacher relationship enhanced student teachers' sound school experience because mentors were able to offer guidance to the student teachers.

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# Challenges for Moving Chinese Language Courses Online

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## Abstract

In the context of education globalization and informatization, the open education resource movement supported the concept of "open sharing" is a crucial trend within the development of worldwide education. The large-scale online open curriculum (MOOC) could be a new development and breakthrough within the open education resource movement and features a profound impact on the inheritance of human civilization and also the way of informal learning. Especially after the spread of the COVID-19 pandemic in early 2020, the importance of digital education has increased. Worldwide, school systems have been impacted by the COVID-19 pandemic and nearly all schools, universities and colleges have been closed down. UNESCO recommends that, in response to high school terminations, distance learning and open training programs and platforms be used by schools and teachers in order to remotely achieve learners and reduce disturbances in schools. No doubt positive impact of online courses on curriculum and teaching Chinese in colleges and universities. The online course can change the subject of the exploitation of curriculum, enrich the curriculum content in colleges and universities, change the curriculum carrier in colleges and universities, and change the means of curriculum implementation, it contributes to the improvement of teachers' professional knowledge and skills and the effect of classroom teaching, it also helps students to train their ability of active learning and to enrich their study life. But as a new teaching resource, the online course also has the negative impact of the online course on curriculum and teaching in colleges and universities, it can strike the traditional curriculum, make the relationship between teachers and students alienated, make teachers become more dependent on it, and disperse the attention of students. As an emerging curriculum teaching model, Chinese language online courses are a course within which most or all content is conducted online. Therefore, its emergence and development will inevitably bring challenges to the standard college curriculum and teaching. Online courses won't only bring challenges to school teaching ideas, course resource management, attainment management, course network security management, teaching process management, teaching evaluation, etc., but also to teachers' ideological awareness, teachers' teaching ideas, teachers' roles, Teachers' curriculum development techniques, students' self-knowledge, students' self-learning ability, and self-control ability pose challenges. This text attempts to explore the challenges of online courses to school courses and teaching through the analysis and discussion of online courses mainly supported micro-courses and MO courses.

**Keywords:** Chinese Language Courses Online, Challenges, Countermeasures

## Introduction

In December 2019, a widespread pneumonia epidemic of uncertain origin occurred. On 9 January 2020, the World Health Organization (WHO) formally declared a new Coronavirus discovery: SARS-Cov2. This pathogen is responsible about an infectious disease known as COVID-19 (Coronavirus Disease). COVID-19 spread rapidly all over the world and on 11 March 2020, the World Health Organization declared it as a pandemic. According to the WHO, 783 360 confirmed cases of COVID-19 were estimated to be identified in 205 countries or territories across the world on 1 April 2020 (the date this survey was conducted), and there were 37 203 deaths. One month later, on 7 May, 3 634 172 COVID-19 cases were confirmed, with a death toll of 251 446 people in nearly all countries and territories around the world.

Only a few months, though the virus spreads across the globe, China succeeded in reducing local exposure to zero by drastic distancing and control steps. The success of China's social distancing and containment measures, which the WHO strongly recommends, has led several countries to take the same actions. In April 2020, over 3.4 billion civilians were shut up in more than 80 countries and regions around the world, representing 43% of the estimated world population. Immediately, the lock-up and social isolation policies had a huge effect on higher education. In contemporary culture, awareness is characterized by the need for lifelong learning, in the sense of rising demand for schooling, including education (HE). More and more people are applying for schooling. Current capabilities in HE institutions are not enough, not just due to physical or technical limitations, but also because education in several countries is far removed from prospective student ability: that is to say, access to a HE institution is simply too costly or it is in other countries should to be included or supported by the families. Throughout the field of interactive education, pervasive data and communication technology ( ICT) are among the potential solutions. There are many ICT applications in education labelling for their rapid growth and creative existence as emergent; one of them is Massive Open Online Courses (MOOCs), among other established applications.

## The effect on education and higher education in particular

UNESCO reports that on 1 April 2020, 185 countries had postponed schools and higher education facilities (HEIs), including 1,542,412,000 students, who make up 89.4% of enrolled students. Some countries began removing mechanisms of restraint at the beginning of May, with a declining number of cases and deaths. On 7 May (with the study being published), 177 countries were already represented in schools and enhanced education institutions (HEIs), with 1 268 164 088 students, who made up 82.4 percent of the total enrolled students.

Most organizations face the need to maintain learning and lectures, connections and inspire students if steps are placed in place that separate themselves from community, with a rapid and unexpected transition into online education. The transformation is also divided into several intertwined aspects concerning the viability and the level of learning distance, namely:

- a. Technical infrastructure and accessibility
- b. Distance learning competencies and pedagogies
- c. The field of study.

### A. Technical infrastructure and accessibility

Online access and infrastructure are the basic requirement for moving into distance learning. There are often two different trends in the responses. Many institutions cannot go online because their students literally cannot connect to the internet from home, particularly in Africa, but also in other low and middle-income countries. In those cases, where lock-downs or social distancing are in place, education and learning will completely be disrupted and the completion of the academic year is seemingly unrealistic for these students.

On the contrary, the second category of HEIs is based in strong Internet access countries. Recognize that institutions have clarified that even in these situations they do not always have a technological framework at the

fingertips of institutions or technical resources appropriate for maximizing distance learning. Some listed the financial consequences of investing in online licenses and resources.

There are those HEIs that separate students who have access to the Internet and students who do not, inside an equivalent organization, which makes it impossible for the college students to obtain equal opportunity in their academic year. Several schools have agreed to avoid their research during the lockout entirely because they might not be able to meet their students by distance education.

#### **B. Distance learning competencies and pedagogies**

In the unassuming fact that it needs a special pedagogy, which is a challenge for the faculty to smoothly make a transition from face to face to remote teaching and learning. This transition is a challenge for the faculties. Teachers have an incredibly different extent of willingness or preparedness to meet this challenge. Nevertheless, while the most basic practicable comprehensive instruction may not offer a standard of consistency similar to that initially intended for the semester relative to face-to-face schooling, it is claimed to be still better than not having any preparation.

Institutes don't necessarily have a management framework in place to develop the teaching skills of employees in order for them to move easily to online learning, and this often leads to "learning through" strategies or trying to imitate what would be the face-to-face strategy, but using distance method.

#### **C. The field of study**

Practicing study can be a challenging issue and the teaching offered during the lockdown often restricts itself to the theoretical element of the program. That's all.

Where the professorship is prepared to adjust to a change in modes of delivery, the preservation of the training experience standard will depend heavily on one discipline of study to the other in the present framework marked by constraining measures of social separation, within institutions where technical facilities enable online education and learning.

There are great differences in the quality of distance teaching in response to emergencies, with regard to institutions' infrastructure, teachers' abilities to adapt to online teaching and the sphere of study. The availability of technological infrastructure may be a precondition for effective distance learning. This is not shocking that the struggles of those HEIs employed in sectors of inadequate facilities during this crisis rises. Similarly, the worst hit are those students with no compulsory access to electronic networking resources and, ultimately, the Internet. Further exacerbating existing inequalities will be the current crisis.

It is in light of the foregoing that this paper will examine the challenges of Chinese online courses and the role of the educator in this process and give some advantages and solutions. The study is guided by the subsequent three questions :

1. What are the challenges of the Chinese language courses online project?
2. What are the sources of those challenges?
3. How can these challenges be overcome?

### **1. Challenges of Online Chinese Courses**

In the history of our discipline we manage one of the most exciting and promising times. Thanks to a radical transition in its conceptualization, philosophy and analysis, the industry has achieved this crucial level. Digital e-learning has been made possible by the connection between machine and telecommunications technology. The modern digital model aims to give students worldwide instruction wherever and wherever they are. In addition, teachers and students are provided with groundbreaking forms of interactive instruction.

At first sight, MOOCs are an ideal solution: many users can access knowledge easily and learn expertise from friends at all times. In fact, there are the resources for instruction, the spectrum that is meant to be open to everyone. But with the positive features of MOOC, challenges exist. The phenomenon of these problems must therefore be studied with the MOOC and the solutions to its weaknesses must be found. There are already many scholars all over the world concerned. Among them, through its study and a network of university-based educational technologies with ICT (Information and Communications Technology) study is making an attempt to add to this. MOOCs can be said to face a range of pedagogical and technical obstacles.

But the good news is that online education releases the creativity of teachers from more aspects, inspires teachers to constantly improve their motivation to boost teaching methods, and provides a platform for more outstanding teachers to display and impart knowledge. To some extent, online education is more likely to drive teachers to surpass themselves and focus more on the most effective ways of practice and innovation. For college students, the acceptance of technical education within the 21st century has been integrated into all aspects of life and learning. Emerging technical education has opened a broader world of data for college students. If you'll be able to observe the use of those resources, it'll have a major positive effect both on the communication ability and influence of Chinese language and culture, and on the international communication and influence of Confucius Institutes.

It has a transparent positive effect on the international communication and influence of the Confucius Institute. With the proposition of cultural self-confidence, China is preparing to travel to the planet with a positive and responsible image of an enormous country. This puts forward higher requirements for the Confucius Institute to spread Chinese language and culture, introduce China to the planet, and spread Chinese ideas and ideas. At the identical time, this is often also an inevitable move for China to develop soft power within the world.

China has made active practices within the development of online education in Chinese instruction, gained valuable experience, and achieved certain results, but it's undeniable that some problems have also been exposed, like high-quality direct use by Chinese instruction teachers. There are few materials, poor online effects, difficult to interact, and no language environment, the effect is difficult to continue. These challenges have two parts: pedagogical and technological challenges.

### **1.1 pedagogical challenges.**

The MOOC trends have provided many fascinating informations and experiences in web context concerning course design and distribution. Two distinct pedagogical bases underpin the predominantly common MOOC categorization: connectivism (cMOOCs) and behaviorism (xMOOCs) [23]. The literature states that all three theories of learning, physiological, cognitive and sociocultural theories are taken into account to some degree in the development of MOOCs. Regardless of this, we believe that here it cannot be fully utilized for its socio-cultural component, which stresses the interaction between lecturers and learners. The pedagogy of MOOCs has little novelty because it is restricted to video sharing and checking of skills by multi-choice issues and offers the scholars no guidance. Work to test and assess the best pedagogical methods to be assisted by MOOCs is still incredibly scarce. Throughout this sense, we have established various reasons and obstacles to the MOOC Trend: Pedagogical Problems to understand:

#### **1.1.1 Less content and fewer teachers**

At present, foreign countries provide a large number of online education resources and contents for online education teachers to collect or re-create. Teachers can directly search for the selected high-quality materials on relevant websites, which provides great convenience. At present, only the Confucius Institute Digital Library in China provides free online lesson preparation materials and support for teachers and other online course preparation and Chinese exam preparation. There is a lack of supplementary basic courses for different countries and regions and a breakdown of online courses developed for groups with special knowledge needs. The international online education system for Chinese language teaching needs to be improved, so the number of teachers engaged in international Chinese language teaching is obviously insufficient.

### **1.1.2 The online effect is poor and it is difficult to interact**

Interaction is an important way to promote language learners to gradually gain independent use of language ability, and effectively promote the formation of language ability and cognitive ability of learners. International Chinese teaching is also a linguistics course. It is an indispensable part of classroom teaching activities to make appropriate adjustments to teaching strategies in a timely manner according to students' speech expressions. Teachers only give correct language demonstration and guidance through the dialogue between teachers and students in order to enable students to properly understand, analyze, and use language. Therefore, there is still a gap between the teaching effect and the real environment.

### **1.1.3 Without a language environment, the effect is difficult to sustain**

A large number of language facts form the linguistic laws summarized in the international Chinese language teaching courses. On the contrary, if students want to effectively understand, master, and operate these laws, they can not do without the combination of theory and practice, only repeated practice and continuous practice. In order to blend in. Online learning students mainly understand and digest the teaching content in the video on their own. During the self-learning process, it is difficult to generate desire and impulse for speech practice. Questions and confusion are not answered in a timely manner. There is no listener and audience, so there will be no stage for self-expression, lack of objects for comparison and observation, and the impulse to try to speak and write will be suppressed. The stripping of theory and practice naturally limit the cultivation of language practice ability.

### **1.1.4 Suggestions**

#### **(1) Mobilizing teachers**

The motivation of online classrooms for teachers is obvious. The development of an international online education platform for Chinese language teaching can break the limitations of objective factors such as space and time, attract more outstanding online technology education practitioners, and become an incentive for teachers to communicate with each other, inspiring teachers to take the lead in leading technology. When one is challenged by the excellence of others, it will become more courageous, more professional, and more creative, which will undoubtedly directly promote the quality of Chinese language and culture teaching.

The innovation of Internet technology has certainly brought an impact on teachers' traditional teaching methods, but the real challenge facing teachers comes from the change of teachers' own concepts. On the one hand, teachers have changed from lecturers in traditional classrooms to designers of online classrooms. Now the traditional classroom teaching method is still teacher-led, students follow the teacher's lecture rhythm to accept the unidirectional transfer of classroom content and knowledge. With the innovation of modern technology, a large number of high-quality teaching resources are available for students to observe and study at any time and any place. Students can master the progress of learning according to their own rhythm. Therefore, teachers' selection and design of high-quality resources have become the process of online education. The main task. On the other hand, online education not only requires teachers to be an excellent knowledge designer, but also an excellent marketer.

Online education is not only a transfer of knowledge but also a platform for teachers' personal charm and innovative thinking. Teachers should treat students as customers, focus on user needs, and deliver more positive, sunny, and intelligent information, so as to attract more "customers" and affect more students.

#### **(2) Mobilizing enterprises**

The problem of knowledge reserve for online teaching teachers requires targeted training, which requires both the overall national planning and layout and the economic investment of enterprises. The issue of innovative textbooks requires publishers to quickly adjust their thinking and redevelop textbooks suitable for online teaching. In the past, whether the specific method of offline international Chinese teaching is suitable for online teaching is also worth pondering in academia. Students may have passive learning in traditional classrooms, and online education

allows students to change from passive acceptance to active search, which puts higher demands on students' self-discipline and self-management capabilities.

Online education provides a platform for teaching remotely through PC Internet or mobile Internet technology in the form of recording, broadcasting, or live broadcasting. Online education implementation tools include online live broadcasting, recording and broadcasting tools, video editing, interactive whiteboards, online school systems, LMS (Learning Management System).

The Confucius Institute can choose to cooperate with domestic excellent online education course content producers, such as Xueda Education, New Oriental, Peking University, Tsinghua University, Renmin University of China, etc., or use its mature experience to develop its own international online education platform for Chinese language teaching. MOOC's construction and application have achieved a wide range of high-quality resource sharing. But so far, the Confucius Institute, a non-profit educational institution with the purpose of teaching Chinese and spreading Chinese culture, as an important platform for the world to understand China, its online teaching is like a blank piece of paper, without any relevant progress. Using the existing domestic and foreign technical foundations, the Confucius Institute's international online education platform for Chinese language teaching can be quickly established and developed steadily. At the same time, new requirements for the ability of Chinese language and culture teachers are also put forward: How to manage the teaching team online? How to balance the needs of students from all over the world? How to stimulate online students' interest in learning? . In ? virtual classroom, the lens is the main tool that connects the teacher with the world. How can the expression be sufficient to enable students to feel and learn and discuss knowledge in a common space with the teacher? CCTalk's continuous microphone function, Chatbox's voice function, etc. can allow students and teachers to ask questions, answer, and comment anytime, anywhere. Students can also discuss each other for two days through an interactive chatbox. This kind of communication is more sufficient than traditional classrooms, intimacy and fun are stronger, and creativity is more easily stimulated.

Many high-quality virtual classrooms have a split function. Teachers can classify students and send them to different sub-classrooms. In this way, many new games can also be introduced. Although the virtual classroom is stripped of the face-to-face interaction mode between teachers and students, teachers can conduct online teaching interaction through comic creation, video production, and Internet connection storytelling, which also poses creative challenges for students. Allowing students to make videos or create comics can allow students to overcome reservations and greatly stimulate the fun of creation and the joy of sharing. On the other hand, many teachers help students explore Internet attentively by creating interesting WebQuests.

From a psychological point of view, the supplementary use of social software has enabled any student to have the opportunity to get the full attention of the teacher, helping shy students to provide more opportunities for full communication, 24/7, anytime Learning and communication provide convenience. The teacher's energy will not be affected by this. On the contrary, the teacher can use his free time to concentrate on these scattered questions in any place where he can connect to the Internet. The essence of knowledge payment is to "make knowledge acquisition more efficient". The teaching content is endless. There will never be the most complete video, the most complete PPT, the most complete question bank. Only by taking the high-quality route can the spread of Chinese language and culture achieve the desired effect. Confucius Institutes can select high-quality international online education products for Chinese language teaching to promote and publicize through multiple channels, such as domestic excellent online education tool product providers YY, Youdao, Zhihu, Douban, etc., abroad can use edx, UniversityNow, Lynda And other platforms for course delivery, link sharing and promotion through social platforms such as Blog, Facebook, Twitter, etc., so that more people around the world have the opportunity to contact, understand and even love the Chinese language and culture.

### **(3) Take advantage of the cooperation and cooperation of offline institutions**

With the development of online education, knowledge payment has been accepted by the public. The Confucius Institute can gradually transform from a non-profit organization to achieve a profitable model through the combination of a Chinese teaching international online education and knowledge payment platform. The distinction between the rights of free users and paid users is one of the effective ways to promote the payment of

knowledge. For example, to limit the time for free users to watch videos, paid users can watch unlimitedly, and provide tracking tests and personal question answering services for paid users. After the course content, authoritative and valid certificates can be obtained.

Look for teachers with unique Chinese teaching methods, and combine their teaching methods and technologies to form a set of online learning models for Chinese language and culture. Let the teaching content of the Chinese exams be linked to the scores, and the teaching content of the vocational classes be linked to the employment, provide complete content and manual services, and develop deep vertical Chinese education international online education products. The balance and proportion between education and entertainment should be properly managed. Dull and boring online education products are like fishing with only hooks and no baits. Violating human nature will cause no one to continue learning. Powerful and entertaining online education products are like fishing with only bait and no hook. It is easy for students to take it seriously and fail to learn their true skills. The standard for testing online education products is not the knowledge taught by teachers, but the content that students can master and apply.

### **The role of teachers in the network teaching environment (methodology and model)**

We live in a society that is increasingly open and participatory, distinguished by developments such as the increasing importance of informal education, new knowledge on the subject and mixed cultural forms of expression. Such advances have a combined effect on the way people think. In the one hand, the cumulative and streamlined role of information and communications technologies, leading to solutions like virtual education, data analytics or customized data, has made a range of processes characteristic of the educational value chain more effective. On the contrary, new developments, such as the creation of open educational resources (OER) and the use of social teaching networks, encourage innovation in education, shifting from traditional lecturing mechanics to open and integrated teaching strategies.

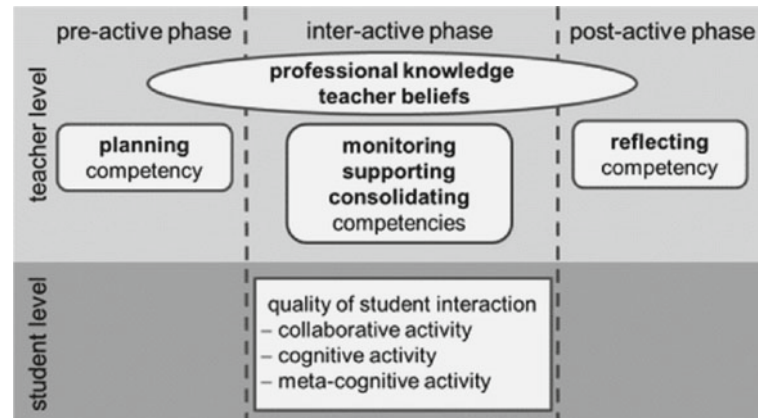
Some facets of higher education, beginning with the position of academics, require transformation to be able to adapt universities to these developments and be prepared to retain their societal significance. The main areas of production, pedagogy, and delivery of education are the three essential elements for digital, networked and open. Conventionally, the role of educators is disputed by educational scholars, who continually identify educators as co-travelers, mediators, and facilitators while experts are responsible for presenting the requisite information to students. We will start from two education approaches: collaborative learning and Open Education to better understand the new role of university educators and to start defining the skills that they should master to fulfill their role efficiently and properly. This approach exists since people are reflecting on teaching and learning and in contemporary open and networked societies are becoming more commonplace. Collaborative learning ensures that students work with each other to fully comprehend ideas, to create assignments and solve problems. Collaborative learning, if managed properly, can enhance individual students' strengths while building essential skills, such as teamwork, problem solving. Peer-to-peer learning is critically valuable in this methodology, as it involves students in the same working process and providing them with opportunities to learn and be educated. We may consider three main functions that educators (Chinese language) would have opened up and networked. Firstly, to exchange ideas and issues, they will cultivate the interactions and dialogs of students and find their classroom as a learning network through which each contact is a means to brand new thinking. Secondly, educators should be in a position, rather than simply allowing them to use a predefined number of learning resources, to add learners to a very collaborative process of information co-creating and open exchanging. Thirdly, they must interpret apprentices in their own right, in their own way and through their own relations as autonomous agents in the field of schooling.

The process of transition of education providers does not only mean changing the way teachers plan lessons, license materials, facilitate the growth of experience and understanding for students, but also providing a mirrored image of their professional identity. In addition to the need for a review and reshaping of the strategies followed by teachers and students within the process of teaching and the underlying knowledge production, the introduction of cooperative or open practices actually brings about a major cultural change within the educator's self-perceptual

perception. In order that teachers can teach them meaningfully and responsibly through open, networked practices, the first important step is to define which skills educators need to master.

In the area of open education, the eight attributes presented in Fig. 8.3 (Hegarty, 2015) do represent quite well what are the key competences that educators need to master in order to work openly with their students.

**Fig.1** The ICLC framework (Kaendler et al., 2015)



## 1.2 Technological challenges

### 1.2.1 Infrastructure

The complexities of successful production of MOOCs have also been a powerful topic. The rhetoric of MOOCs in terms of access and quality of higher education, which can 'overcome inequality,' must perhaps be rethought in a very large number of ways. We now realize that MOOCs are only open to the most skilled. How are we going to meet the least qualified? There are general questions about the quality of the text, language acquisition, complexity of educational needs and cultural variations in pedagogy. However, MOOCs4D may face the greatest real challenge due to the lack of sufficient telecommunications infrastructure outside the urban environment. Although recent accounts forecast a slight rise in global Internet penetration, about 4 billion people still unable to connect to the internet, 90% from the developing countries. It is important to consider the structural and social breakdown behind these global patterns. There are also no publicly available disaggregated statistics indicating parity in access for specific ethnicity, cultural and linguistic minorities. The estimated gender disparities in non-OECD countries have nevertheless been more pronounced (ITU, 2013). Differences in the Internet access of broadband high speed between developed countries continue while damped by connectivity (ITU, 2014),<sup>8</sup> Therefore the lower bandwidth networks most commonly used in LMICs should take account of alternative methods to contain MOOC content which rely on more advanced data transfers. Lightweight mobile applications, such as those provided by Khan Academy Lite, are being created to provide core content (videos and exercises) from a neighborhood server offline<sup>9</sup>. Likewise, other channels such as biNu provide educational contents with cellular network functionality using digital pressurization technology.

MOOCs4D offers a unique opportunity for the proliferation of mobile phones in developing countries. The idea that users use all the ubiquity of cell phones and other electronic devices when discussing MOOCs4D architecture is imperative for the bulk of subscribers living in developing countries. Encouraging an interactive social experience can have a profound impact on learning through encouragement of persistence and motivation. To order to promote pair learning on mobile app materials, Future Learn at United Kingdom's Open University transforms the MOOCs into the promotion of small groups of conversation.<sup>12</sup> Mobile apps utilized by Future Learn are utilized with the benefit of vital monitoring to live how learners use the program and to provide the MOOC moderators with feedback on performance management. A recent experiment in India showed how student animators could apply video material to the test scores for a control group overall (Cutrell et al., 2015).

### 1.2.3 Digital inclusion

"Digital inclusion is the ability of individuals and groups to access and use information and communication technologies." From "Building Digital Communities: A Framework for Action", 2011. The basic MOOC targets differ considerably from one LMIC to another. Thanks to the impacts they require for sustainable economic growth, connectivity infrastructure and technical advances would be available and affordable to anyone of some. The three factors supporting the technology's success in cities are broadband access, broadband adoption (understanding how it is used), and therefore the effective implementation of broadband access. Through equality through the use of MOOCs often includes solving transparency and inequality issues. One misconception about MOOCs is the frequently reported assumption that because MOOCs content is user friendly, these sites will democratize schooling through gender, race and economic class disparities (Chamberlin & Parish, 2011). The ancillary risk for forgone chance in many fields is also a big hurdle for schoolchildren world-wide, whether given without expense or not (Daniel, 2012).

OECD and developed countries have demonstrated that MOOCs are over-trained, young and male consumers (Christensen et al. 2013; Emanuel, 2013). MOOC web creators have also observed gender differences (Straumsheim, 2013). In order to reach a larger group of learners, providers and instructors on-line, Chinese language courses have to be aware of specific barriers that impede access from certain populations (educational level, digital literacy, language constraints, etc.). Several of these programs relies on regional alliances. (RESCIF) intends to plug technical advancement through its network of 14 universities in Africa, North America, Asia, Europe and hence geographic area.<sup>6</sup> The purpose of this initiative, in particular, is to introduce a wide-ranging collaboration in Africa through public-private partnerships which enables the Chinese language courses to be optimally optimized on the MOOCs platform in Africa. Libraries may also be involved in enhancing access to knowledge in developing countries. Various initiatives dramatically reduce the gaps in knowledge by offering access to information resources such as online journals and books at free and affordable cost. As seen by all of them, a host of initiatives in different contexts around the world have made substantial advances in the understanding and use of online learning. The obvious problem with focus on increased access is that MOOCs provide alternatives to sustainable learning. Many areas of MOOC growth have been powered by compounds (such as Coursera, Udacity, etc.), top colleges and other providers (Gaebel, 2014) Even so, the ability of such providers to provide specific populations with located content is limited (Baggaley, 2014). The potential of local developers developing related material to manufacture, housing and manage large MOOC platforms is also restricted to this. Interventions which provide localized literature (i.e., Yoza Cellphone Stories 13, FunDza Literacy Trust 14), but little has been attempted with a standardized digital curriculum. No single business model has been implemented due to the most sustainable approach during the economics of the MOOC group. A Coursera representative proposed that the idea of import growth be a critical strategy for developing countries<sup>15</sup>. Demand generation will address chance costs for the learners and costs of production for local organizations due to capital limitations and economic potential (Ng, 2014). A panelist from the OECD identified multiple market models for cost-compensation, including public/private support, targeted ads by personal consumer data processing and organizations' technical training <sup>16</sup>. A "freemium" model, such as the Coursera signature series, was introduced for university students whereby the class can be accessed without charging, but premium resources such as the certificate of finishing are charged (Dellarocas & Van Alstyne 2013). While the question arises as to whether any of these models could contribute developing countries, the panelists concluded that an adequate solution should be linked to appropriate work place skills or an adequate incentive for the promoter. Sustainability and the teachers' engagement and encouragement are closely related to systemic policy interventions (UNESCO, 2014). Several LMIC countries are experiencing national policies in an extremely digital age to create an inclusive learning environment (UNESCO 2014). The project "One Laptop per Child" (OLPC) functions with education ministries in an extremely large number of countries to deploy laptops for children throughout all schools<sup>18</sup>. Malaysia is trying to create every school with broadband access via 1BestariNet initiative<sup>17</sup>. In Zambia the Multi-American Partnership, renamed iSchool, is delivering a holistic guide to digital learning for teachers, students and homes <sup>20</sup>. Both initiatives all have a common "tech strategy" integrating policy command The South African government is collaborating with private and Non-Profit sector to close the digital gap through the Broadband 4 All Partnership. (Murphy, Castillo, Zahra, & Wagner, 2014).

#### 1.2.4 Evaluation and Accreditation

The topic of success monitoring and assessment in MOOCs is key to all of the opportunities described earlier. Critics point to a difference in the formative assessment of traditional channels in which the testing is too reliant on multiple selection quizzes or is left to an unstructured peer review (Suen, 2014). Automatic Essay Score (AES) or customizable arbitrator (CPR; Balfour, 2013) are alternative solutions to electronic assessment. The challenges of each method are diverse learning contexts and unique cultural contexts, which limit the level of evaluation. Every method has its own set. Basically, as MOOCs4Ds are taken and adapted to suit their function, current measurements of country and MOOC content will be matched in a very high way that can show that studying the material really has influence. This field helps social media and other ICTs to provide successful approaches for encouraging peer-to-peer reporting of results central to many existing MOOCs. (Raftree & Bachan, 2013). Chat rooms and message boards are critical elements for promoting synchronous and asynchronous communication in flexible multimedia environments. However, the University of African countries (UNISA) currently includes a pilot MOOC in written French, that uses cell phones to fuel interaction between lecturers and non-site students, mobiles may provide a more suitable approach with a variety of engagement and monitoring purposes in low-infrastructure contexts.

MOOCs4D 's extra challenge is to accredit. Organizations fail to turn their research into a marketable credential while creating culturally relevant content (Daniel, 2012). Alignment of requirements requires more and greater coordination with education ministries and personal businesses. University of the People's initiatives<sup>23</sup> and Kepler<sup>24</sup> provide insights into the sustainable development of free and accredited online universities. New research leads to clarifying how and when students engage with this kind of technology (Koutropoulos & Zacharias, 2015; Macleod et al., 2015). However, MOOCs could lead to greater divisions between students in rich and poor communities if they are not addressed.

#### Closing thoughts

Chinese language teachers need not develop new skills dramatically but upgrade their skills in terms of collegial and collaborative learning, as long as we remain in the domains of formal education at the very least. Nonetheless, one of the key capabilities of modern education professionals — not only in higher education — is to be capable of meaningfully linking formal and informal learning to the multiple knowledge-rich activities taking place in classrooms beyond learning institutions.

From this point of view, teachers should learn some additional skills to better handle knowledge produced by teachers and to allow very constructive, interactive and open use of information produced by their students.

We suggest those areas of expertise which should be explored to match educators' potential with the criteria of the most recent open and online Chinese language courses at the same time as formal and informal learning.

First of all, the freedom to access the open network. The ability to exchange information produced by others and to use the information generated by others in an exceedingly ethical, clear and traceable manner, is in many cases the norm of unreasonable society, where intelligence is exchanged freely. To learn the way through online networks and through accessible and networked processes requires a compilation of professional information related to, for example, understanding of copyright, and a profound improvement in day-to-day activities as regards the design, creation, teaching and assessment of content. With open websites, educators need to be able to work on-line identities, so that they should take a transparent and consistent approach to their education work in on-line spaces, depending on social networks to complement their teaching through their personal learning networks and nurture them. We want to use emerging technologies as a way to navigate the growing multiculturalism of our societies — and our student cohorts — from a reactive and defensive stance to make educational interaction a more dynamic approach that adds value due to the presence of various cultural experiences through the creation of intercultural emerging dialogues. Aside from improving the intercultural ability of communication, intercultural multimedia dialogs have the capacity to exploit, understand and obey alternate values, and appreciate diverse viewpoints through different on-line cultures. This can influence

successively the probability of students with different backgrounds to identify and relate to teaching resources, preventing bias and stereotypes. Second, Chinese language educators should be able to tackle problems of accessibility. Next, the basic usability problems should be taken into account so that students with restricted access are able to understand, interact and respond to internet. Secondly, their classes will be more open to all types of students, including students with a impairment. One strategy to use is also the universal design system for learning (UDL), which offers many means of engaging with curriculum material, for example, to represent ideas through different perspectives and forms of media, to assist students in their own interpretation of topics and to allow them to communicate with each other in a single process.

In an increasingly knowledge-based and knowledge-sharing environment, contemporaneous educators have to be able to train students for engaged or responsible people, to handle their changing information complexities in an responsive and accessible manner. To do so, students must be able to participate in interactive dialogs focused on traditional legal, social, justice and the role played by students as creators of information and not only as users. Such a commitment capability will also help to connect formal and informal learning contexts, as evidence indicates that students, given their frequent use of social networks, are not necessarily familiar with interactive strategies in structured learning environments. If we want to keep our students informed and thoughtful and become confident, resilient and self-ruling people, we need educators who can objectively address our increasingly interactive, networking, and open societies' core concerns with them and encourage them to solve the new problems of our time. To do so, we need to ensure that educators are able to improve their expertise and respond and open and linked environments, while still learning a variety of new skills. Only by developing on and improving teachers' expertise, can educators become participants who can both learn in new, open and networked environments and take constructive and meaningful steps to co-form current activities with their students.

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# Development, Validation and Standardization of Tertiary Examination Behaviour Inventory: Diagnostic Instrument for Measuring Cheating Tendency in Educational Assessments

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## Abstract

The research focused on development, validation and standardization of a diagnostic instrument called Tertiary Examination Behaviour Inventory (TEBI) for determining the tendency of students in tertiary institutions to participate in academic cheating. Anchored on the Modified Theory of Planned Behaviour (MTPB) and Item Response Theory (IRT), the table of test blue print covered the constructs of examination anxiety, examination ethics, study habits, and attitude towards cheating in examinations in one dimension and the phases (prior, during and after examinations) on the other dimension. Initial pilot study analysis of 50 items using test-retest reliability and factor analysis led to pruning down to 35 final items. The final sample size for validation of the TEBI was 1000 students drawn from higher institutions across the six geo-political zones in Nigeria and 3500 students for the standardization (construction of the national 'norms'). The Cronbach Alpha and Principal Component Analysis (PCA) were used to determine the psychometric properties. Standardized Cronbach Alpha ( $\alpha = .78$ ) is an acceptable index indicating internal consistency, reliability and validity. Each of the 35 items yielded scaled means above 80 and each item's Cronbach Alpha is greater than .75. PCA yielded 13 factors from the 35 item TEBI. Those 13 factors contributed 62.73% variance in TEBI items. National 'norms' are 84.19% and 82.82% for male and female students respectively. Thus, TEBI is reliable, valid and standardized for use as a diagnostic instrument for identifying students who have positive dispositions towards academic dishonesty which is an educational monster.

**Keywords:** Tertiary, Examinations, Cheating, Behaviour, Inventory

## Introduction

A reliable and valid examination system is important for the educational development of all nations. However, the incidence of “examination malpractice” or cheating in tests has constituted a serious threat to the attainment of the laudable goals of education. Examinations ought to be conducted in such a manner devoid of malpractices or cheating but unfortunately reports in research literature across the world including Nigeria show a preponderance of incidents of cheating in examinations. It involves all acts of dishonesty connected with examination administration which violates the rules and regulations governing the conduct of examinations and could occur before, during and after an examination usually intended to favour a candidate or candidates in that examination. Examination malpractices constitute severe threats to the very essence of education and human capital development since it negates the acquisition of knowledge, skills and values expected to be bequeathed to students in schools.

Examination as it relates to education has been defined as the written, oral or practical tasks or set of questions or exercises designed to test a candidate’s knowledge and skills in particular domains of learning (American Heritage Dictionary of English Language 2015). It occupies a very important pivotal position in the educational system of any country. A well designed and conducted examination system is the best indicator for assessing the success or failure of an educational programme. It is, therefore, important that examination should be conducted in such a manner devoid of malpractices or cheating. Unfortunately reports in research literature across the world show a preponderance of incidents of cheating in examinations (an educational phenomenon which will subsequently be referred to in this paper as “examination malpractices”).

Examination malpractices which is referred to as cheating in examinations or in broad terms as ‘academic dishonesty’ in international research literature is a global educational pandemic comparable in magnitude and spread to the ‘coronavirus’ (COVID-19) in the health sector. It is the educational equivalence of the COVID-19. According to Punch Editorial (2019):

In 2016, China prescribed a seven-year jail term for cheating and deployed IT tools to scan students’ clothing, shoes and accessories. Drones were also flown over and around examination centres to detect and block wireless signals by crooked students. In 2018, China’s courts jailed six persons four years each for cheating at the national graduate school examinations.

In a study of the endemic nature of the phenomenon of academic dishonesty which lasted for 12 years from 2002-2015, McCabe and The International Center for Academic Integrity (2020) reported that from a sample of size of 70,000, “95% of the surveyed students admitted to cheating on a test and homework, or committing plagiarism” in the United States of America (US). Similarly, the situation in the United Kingdom (UK) is not different. According to The UK’s Office of Qualifications and Examinations Regulation (Ofqual, 2019) there were “2,735 number of penalties issued to students in 2018 (the same as in 2017)” for various offences of academic dishonesty.

The situation and figures reported in the preceding paragraphs about the US and UK are grim enough but what about the situation in Nigeria. Though data on the incidences of examination malpractice in Nigerian higher institutions are not available but reports from the examination bodies such as West African Examinations Council (WAEC); National Examinations Council (NECO); and Joint Admissions and Matriculation Board (JAMB) as well as the mass media gives indications of the magnitude of the problem in the country. For example, Omeri (2012) who was the Director General National Orientation Agency (NOA) reported that Nigeria ranked number one in the world’s examination malpractice index because the average annual examination malpractice index was 12 per cent. Table 1 shows the data of examination malpractice cases in WAEC, NECO and JAMB examinations in the past 12 years compiled from reports by Atueyi (2019) and results release announcements by the examination bodies from 2008 to 2019. Table 1 shows the rampancy of the examination malpractices in the country. The situation is such that no examination is free from the menace. In fact, the data reflects only those who were caught. In actual fact the cases of examination malpractices in WAEC, NECO and JAMB examinations may be triple or quadruple of the numbers reported. Magaji (2019) suggested that most societal ills in Nigeria such as quack

engineers, medical doctors, armed robbers, drug traffickers, terrorists, kidnappers and so on are products of examination malpractices.

Table 1: Data of Examination Malpractice Cases in WAEC, NECO and JAMB Examinations in Nigeria from 2008 – 2019.

S/N	Year	WAEC			NECO			JAMB		
		Candidates enrolled	Malpractice Cases	%	Candidates enrolled	Malpractice Cases	%	Candidates enrolled	Malpractice Cases	%
1	2008	1,369,142	74,956	5.47	1,166,118	88,884	7.62	1,174,935	158,784	13.51
2	2009	1,373,009	109,201	7.95	1,184,907	32,000	2.70	1,306,193	23,819	1.82
3	2010	1,351,557	77,168	5.71	1,132,357	615,010	5.74	1,433,268	20,780	1.45
4	2011	1,540,250	81,573	5.30	1,160,561	51,312	4.42	1,493,604	15,160	1.02
5	2012	1,672,224	112,000	6.70	1,087,627	NA	-	1,503,931	27,266	1.81
6	2013	1,689,188	112,865	6.68	1,034,263	8,308	0.80	1,644,110	68,309	4.16
7	2014	1,692,435	145,795	8.61	978,886	4,307	0.44	1,015,504	38,658	3.81
8	2015	1,593,442	118,101	7.41	969,491	1,066	0.11	1,475,600	NA	-
9	2016	1,552,758	137,295	8.84	1,022,474	43,905	4.29	1,592,905	NA	-
10	2017	1,559,162	214,952	13.79	1,051,472	50,586	4.81	1,722,236	76,923	4.47
11	2018	1,572,396	NA	-	1,032,729	20,181	1.95	1,653,127	NA	-
12	2019	1,590,173	180,205	11.33	1,151,016	40,630	3.53	1,792,719	34,120	1.90

This research, therefore, focused on developing a diagnostic instrument for determining the propensity of students in tertiary institutions to involve themselves in examination malpractices so as to reform them before the actual examination takes place. The rationale for the research is premised on the need for preventive measures against the incidences of cheating in examinations in Nigerian higher institutions since the punitive measures in place seems to have limited success. Whereas various governments and examination authorities around the world have applied punitive approaches to tackle academic dishonesty, the incidents of examination malpractices have taken different dimensions and structure to evade detection and sanctions. For instance, quite recently, information and communication technology (ICT) devices are employed to facilitate the process of cheating in examinations (Ossai, 2018; McCabe and The International Center for Academic Integrity, 2020). It includes use of programmed wrist watches, electronic calculators, pens and such other gadgets that could receive worked answers to examination questions from remote sources outside the hall. It is imperative, therefore, that preventive approach to tackle the menace of cheating in examination halls be devised such as an instrument that could be used to diagnose students' disposition towards cheating. The possibility of such an instrument is very feasible as inferred from the works of Coren (2012); Chudzicka-Czupala, Grabowski, Mello, Kuntz, Zaharia, Hapon, Lupina-Wegener, Börü (2016).

### Objectives of the Study

The major aim of the research was to develop a valid, reliable and standardized instrument for measuring the likely examination behaviour of students in tertiary institutions in Nigeria. In order to achieve this goal, the following objectives guided the research:

- i. Construct a test blue print for the Tertiary Examination Behavior Inventory (TEBI);
- ii. Develop items to measure examination behaviour of students in tertiary institutions in Nigeria;
- iii. Subject the items of the TEBI to reliability and validation procedures and analysis;

- iv. Standardize the TEBI instrument through national 'norming'.

### **Theoretical and Conceptual Framework**

A plethora of theories have been adduced to explain the concept of examination malpractices or students' cheating behaviour such as the ones listed by Madara, Namango and Katana (2016) which includes: system theories, psycho-dynamic theory, social learning theory, conflict theory, Kohlberg's theory of moral development, theory of cognition, trans-personal theories of human development, stage theories, self-presentation theory, learning theories, theory of reasoned action, theory of planned behaviour (TPB), modified theory of planned behaviour, neutralization theory, etc. The authors find the Theory of Planned Behaviour (TPB) and Modified Theory of Planned Behaviour (MTPB) suitable for the present research. In earlier research studies by Ossai, Ethe, Edougha and Okwuedei (2014); Bagraim, Goodman and Pulker (2014); Hendy and Montargot (2019), TPB formed the basis for determining or predicting students' academic cheating behaviour. The development of Examination Behaviour Inventory (EBI) for secondary school students by Ossai, Ethe, Edougha and Okwuedei (2014) was hinged on TPB. The same conditions are also applicable to the development of TEBI. Theory of Planned Behaviour (TPB) as propounded by Ajzen (2006) has been modified by inclusion of three components, namely, Moral Obligation, Moral Reasoning and Demographic Factors such as Age, Gender, and Past Behaviour [cheating in previous educational level] (Madara, Namango and Katana, 2016; Harding, Mayhew, Finelli & Carpenter, 2007; Passow, Mayhew, Finelli & Carpenter, 2006).

The modification of TPB arose from observations that there are other variables that determine the tendency of an individual to engage in the target behaviour and these variables contribute to enhancement or inhibition of the elements of TPB. For example, moral upbringing, past experience and personality factors could expand or confound the tendency to engage in the target behaviour. In other words, the three original elements of TPB which comprised of Attitude towards Behaviour (ATB), Subjective Norms (SN) and Perceived Behavioural Control (PBC) could be influenced by demographic factors, moral obligation and moral reasoning hence these variables were accommodated in the development of TEBI. Thus, the phenomenon of examination malpractice is not just a spontaneous event but an activity that is planned, coordinated and executed. That being the case, it is therefore possible to intervene in or intercept the process of moral reasoning, attitude formation, perception of the ease of execution and the actual execution through administration of diagnostic instrument such as TEBI to prospective candidates.

In addition to the framework of the MTPB discussed in the preceding paragraph, the Item Response Theory (IRT) is also applicable to the present study. IRT provides explanation for predicting a candidate's latent trait such as tendency to indulge in examination malpractices based on responses to items in a scale relevant to such measurements (attitudes, exam anxiety, interests, study habits, etc). Zanon, Hutz, Yoo and Hambleton (2016) provided the rationale for adoption of IRT models in educational and psychological research. He explained that IRT provides suitable basis for the determination of latent variables in an individual based on their response patterns to items in a measurement scale such as aptitudes, interests, attitudes, habits and so on. Therefore, IRT applies to the present study in that the students' latent trait (tendency to engage in examination malpractices or cheating in examinations) are measured with an instrument (TEBI) which composition encapsulated variables such as examination anxiety, study habits, attitude towards examination malpractices and examination ethics or rules and regulations governing the conduct of examinations.

### **Methodology**

*Research Design:* The ex-post facto survey design was used in the research because there was no interference by the researchers on the characteristics of the human participants (Silva, 2010). This design is most appropriate for the research since it involved self-report by the subjects on their examination behavior. In other words, the subjects voluntarily reported their dispositions towards examination conditions and practices without being coerced or manipulated. To prevent faking of responses, the items were constructed in such a way that actual determination of right or wrong responses may not easily be discernable by the respondents. Such techniques have been used

successfully in research studies in education and the social sciences by Ossai (2004a, b, 2011, 2012, 2014); Ajzen (2006); Ossai, Ethe, Okwuedei and Edougha (2014a, b) and Okorodudu (2016).

*Population and Sample:* The population consisted of all students in tertiary institutions in Nigeria. It is not possible to get a definite number of the population and in such situation a large sample size (1000 and above from the population suffices for the purpose of development and standardization of an inventory applicable to the population (Pareek 2005). Therefore, proportional stratified sampling technique was used to select a sample of 1000 students from tertiary institutions in the six geo-political zones of Nigeria for the validation of the instrument and 3500 students for standardization (establishment of national norms). The populations were made up of 60% males and 40% female students.

*Instruments, Data Collection and Analysis:* TEBI was structured on a 1 - 4 point format and consisted of an initial draft of 50 items covering the major domains of examination behaviour, namely, examination anxiety, examination ethics, study habits, and attitude towards cheating in examinations on the one hand and the phases (prior, during and after examinations) on the other hand. Items were stated in such a manner that scoring proceeds with Strongly Agree (SA) = 1, Agree (A) = 2, Disagree (D) = 3, and Strongly Disagree (SD) = 4 except item numbers 1, 10, and 20 that are scored in reverse order because they are positively toned. Principal Component Analysis was used to extract major factors of examination behavior covered by TEBI and Cronbach Alpha index was computed for the items to determine internal consistency as it relates to reliability and validity.

The researchers personally administered the TEBI to the sample in order to ensure high rate of return and compliance with the procedures for responding to the items. This procedure helped to guard against faking responses as well as prevent high rate of attrition. Data analysis was done with the Statistical Package for the Social Sciences (SPSS).

## Results

A Table of Test Blueprint to cover the components of examination behaviour was constructed for the Tertiary Examination Behaviour Inventory (TEBI) as presented in Table 2.

Table 2: TEBI Test Blue Print

CONSTRUCT DOMAINS	PHASE DIMENSION			
	Pre-exam	During Exam	Post-exam	Total
1. Examination Anxiety	3	3	2	08
2. Examination Ethics/Rules and Regulations	2	8	2	12
3. Study Habits	6	-	-	06
4. Attitude towards Examination/Exam Malpractices	3	1	5	09
Total	14	12	09	<b>35</b>

The items on the construct domains of the TEBI were derived from adaptations from standardized inventories on the variables such as Test Anxiety Inventory (TAI) by Spielberger (1987) which was revalidated with Nigerian undergraduates by Ossai (2004, 2013); Study Habits from Study Skills Checklist (Cook Counselling Center, 2020); Examination Ethics/Rules and Regulations from rules and regulations guiding the conduct of examinations in a Higher Institution in Nigeria (Delta State College of Education, Mosogar, 2019); and Attitude towards Examination Malpractices from Ossai (2004, 2013). A total of 50 items were initially constructed but these were prone down to 35 after initial analysis from the pilot study and expert judgment of Colleagues in educational measurement and evaluation. The items that measure each domain of examination behaviour are specified in Table 3. The 35 items TEBI is attached as *Appendix 1*.

Table 3: Construct Domains and Their Item Specifications.

S/N	Construct Domains	Item Numbers	Total Items
1.	Examination Anxiety	1,2,3,4,5,6,7,32.	08
2.	Examination Ethics/Rules and Regulations	21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32.	12
3.	Study Habits	9, 10, 11, 12, 13, 14.	06
4.	Attitude towards Examination Malpractices	8, 15, 16, 17, 18, 19, 20, 34, 35.	09
			<b>35</b>

Standardized Cronbach Alpha ( $\alpha = .78$ ). This  $\alpha$  is more than the .70 benchmark considered acceptable in education and social science researches (Institute for Digital Research and Education, UCLA, 2013). Moreover,  $\alpha$  of each of the 35 items did not fall below .75 as shown in Table 4. This is an indication that each item contributed significantly to the internal consistency, reliability and validity of the TEBI. Reliability over time was determined through test-retest over a period of four weeks on a sample of 60 students and Pearson correlation ( $r$ ) for the two administrations is .80. None of the scaled mean score for the items is below 81 as contained in Table 4. This is indicative that the TEBI has high degree of stability.

Table 4: Contribution of Each Item to the Overall Cronbach Alpha of .78

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
1*	81.80	116.89	-.08	.39	.78
2	82.06	112.58	.16	.39	.77
3	82.10	111.53	.22	.32	.76
4	81.75	109.59	.36	.37	.76
5	82.08	109.86	.33	.32	.76
6	82.12	110.48	.29	.28	.76
7	82.61	110.92	.31	.30	.76
8	82.65	112.18	.24	.21	.76
9	81.78	109.68	.30	.30	.76
10	83.23	115.75	.04	.17	.77
11	82.69	111.56	.27	.26	.76
12	81.54	109.46	.36	.40	.76
13	81.94	108.05	.40	.39	.75
14	81.30	112.85	.13	.17	.77
15	81.61	112.47	.11	.17	.77
16	81.55	109.36	.25	.23	.76
17	81.23	111.42	.20	.24	.76
18	82.14	111.25	.21	.13	.76
19	82.71	114.52	.05	.38	.77
20	82.51	115.58	-.01	.39	.77
21	81.33	112.14	.18	.24	.76
22	81.66	107.67	.39	.31	.75
23	81.18	110.14	.27	.31	.76
24	82.03	107.54	.39	.31	.75
25	81.85	108.38	.37	.35	.76
26	81.99	108.61	.40	.29	.76
27	81.60	109.86	.28	.28	.76

28	82.28	110.95	.24	.23	.76
29	82.08	106.49	.48	.34	.75
30	82.10	108.99	.39	.45	.76
31	82.14	106.61	.50	.48	.75
32	82.30	103.33	.26	.16	.77
33	81.51	108.15	.36	.42	.76
34	81.55	107.41	.43	.38	.75
35	82.52	113.15	.14	.14	.77

\*Item Serial Numbers.

Factor Analysis using Principal Component Analysis (PCA) was applied to the data generated to further confirm the validity of TEBI. The output is presented in Table 5. Thirteen (13) factors were extracted and they contributed 62.73% variance in the TEBI items.

Table 5: Principal Components Extracted from the 35 Item TEBI

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.89	13.98	13.98	4.89	13.98	13.98	2.39	6.84	6.84
2	2.48	7.08	21.05	2.48	7.08	21.05	2.16	6.17	13.01
3	2.05	5.87	26.92	2.05	5.87	26.92	2.07	5.92	18.93
4	1.86	5.33	32.24	1.86	5.33	32.24	2.04	5.82	24.76
5	1.48	4.22	36.46	1.48	4.22	36.46	1.91	5.46	30.22
6	1.28	3.67	40.13	1.28	3.67	40.13	1.85	5.28	35.49
7	1.26	3.61	43.74	1.26	3.61	43.74	1.61	4.59	40.08
8	1.25	3.56	47.30	1.25	3.56	47.30	1.39	3.98	44.06
9	1.19	3.39	50.69	1.19	3.39	50.69	1.36	3.88	47.94
10	1.11	3.18	53.87	1.11	3.18	53.87	1.34	3.83	51.77
11	1.08	3.10	56.97	1.08	3.10	56.97	1.34	3.82	55.59
12	1.02	2.90	59.87	1.02	2.90	59.87	1.30	3.71	59.29
13	1.00	2.86	62.73	1.00	2.86	62.73	1.20	3.44	62.73
14	.93	2.65	65.38						
15	.89	2.54	67.92						
16	.83	2.36	70.28						
17	.80	2.30	72.58						
18	.80	2.27	74.85						
19	.75	2.15	77.00						
20	.73	2.08	79.09						
21	.69	1.98	81.06						
22	.67	1.92	82.99						
23	.62	1.77	84.75						
24	.58	1.64	86.39						
25	.58	1.64	88.04						
26	.56	1.61	89.64						
27	.52	1.49	91.13						
28	.50	1.43	92.56						
29	.45	1.28	93.84						
30	.43	1.21	95.05						
31	.39	1.12	96.17						
32	.38	1.08	97.25						
33	.35	.99	98.24						
34	.32	.90	99.14						
35	.30	.86	100.00						

In order to establish the national norms for the TEBI, a sample of 3500 students from the six geo-political zones of the Nigeria and the Federal Capital Territory of Abuja was used. This consisted of 60% males and 40% females.

According to Pareek (2005, p. 37) a large sample of 1000 and above is sufficient for generating data for calculation of “norms” which normally consists of means and standard deviations against which scores generated with an instrument could be judged. These national norms are useful in determining whether a student’s TEBI score is indicative of negative or positive disposition towards indulging in examination malpractices. The national norms are presented in Table 6.

Table 6: National Norms of the TEBI

Gender	Mean Age	Mean TEBI score	S. D.	Std. Error of Mean	Median Score
Male	21	84.19	11.43	.61	83.00
Female	20	82.82	10.74	.43	81.00

The numerical values scored on each item are added up to get a total score for each test taker. The minimum and maximum scores obtainable are 35 and 140 respectively. An individual’s total score is interpreted by either comparing it with the national norms presented in Table 6 or using the statistically calculated cut-off score of 87.50. The national mean score for male students as contained in Table 6 is 84.19 while that of female students is 82.82. The statistically calculated cut-off score of 87.50 was derived from adding the lowest score possible to the highest score attainable and then dividing by 2, thus:  $(35+140) \div 2 = 175 \div 2 = 87.50$ . A Score above the national mean is indicative of negative tendency to be involved in examination malpractice behaviour while a score below the national mean is an indicator of a positive disposition towards engaging in examination malpractices. Similarly, if you want to use the derived mean of 87.50 as the cut-off, any score below it is an indicator of a positive disposition towards engaging in examination malpractices or academic dishonesty and vice-versa.

## Discussion of Results

TEBI is a validated and standardized testing instrument for determining the tendency of students in tertiary institutions to engage in academic dishonesty. The essence is to reform those who are positively disposed towards the dishonest behaviour of cheating in examinations or engaging in other forms of academic dishonesty. Therefore, the usefulness of TEBI could be looked at from different perspectives. It is a tool for proactive action against examination malpractices because it will help to identify students who are prone to engaging in academic dishonesty so that corrective counselling could be administered on them before they sit for examinations. Research on application of counselling therapies to curb incidences of academic dishonesty as a preventive approach indicates significant results. For instance, Ahmad (2017) found that guidance and counselling efforts of teachers could result in preventing cheating behaviour among students. Moreover, Mckenzie, Murray K., Murray A. and Richelieu (2015); Wijayanti, Sugiharto and Wibowo (2019) in their respective studies found that counselling services and therapies are very effective in the treatment of students against academic dishonesty. Wijayanti, Sugiharto and Wibowo (2019) applied Rational Emotive Behaviour Therapy (REBT) to treat students who were identified through a cheating behaviour scale to have tendencies for cheating in examinations and they found the counselling therapy to be very effective in reducing students’ academic cheating behaviour. Other counselling strategies such as Cognitive Behaviour Therapy (CBT) and Video therapy (VDT) were also established by Ossai and Omoni (2006) as effective therapies for tackling students’ examination cheating behaviour. The results of the study showed that CBM and VDT were equally effective in the treatment of corrupt examination behaviour. Therefore, it was recommended that counsellors should use both CBM and VDT to treat students who show tendencies of being disposed to corrupt examination behavior. Video therapy counseling technique should be included in the curriculum of counsellor education because movies, videos or films have very powerful impact on both children and adults. The use of video technology in counselling therapeutic practice impacts positively on the social and academic behaviour of students. Video clips of the prohibited acts of examination malpractices as well as their consequences are also useful in counselling interviews against academic dishonesty as demonstrated in the Ossai and Omoni (2006) study. On the other hand, applications of CBM in Counselling interventions are well documented in the training module for guidance counselors by UNESCO (2000a).

Another approach is to target the study habits and examination anxiety of the students. Some of the TEBI items focus on these two aspects (study habits and examination anxiety of the students). Items 1, 2, 3, 4, 5, 6, 7, 32 of TEBI measure the examination anxiety level of students while items 9, 10, 11, 12, 13, 14 assess their study habits. The essence is that studies have shown that the two variables have significant relationships with students' attitude towards cheating in examinations as well as academic performance (Ossai, 2004, 2011, 2012, 2013; Numan & Hassan, 2017). Therefore, one way to tackle academic dishonesty among students is to isolate those whose scores on those items indicate poor study habits and high examination anxiety so as to subject them to treatment before they write examinations. UNESCO (2000a, b) showed that guidance and counselling programmes is essential for helping students improve their study habits and normalize high examination anxiety.

Academic dishonesty constitute mortal threats to the life wire of the every nation. Education is the life wire of any nation. According to Ossai (2018) "no nation can rise above the level of her educational system. To destroy a nation requires weakening her educational system and values. This leads to political anarchy, economic degeneration and social maladies". Therefore, concerted efforts must be made by the government and people of all nations to rise up and adopt proactive measures to tame the monster called "examination Malpractices" or academic dishonesty which is now a pandemic that has defied solutions over the decades (McCabe, Trevino and Butterfield, 2001; Walker, 2012). The governments and school authorities should not be contented with enactment of laws against examination malpractices but should equip schools with the necessary tools such as TEBI which could be used to identify and reform students who have the tendency to engage in academic dishonesty. Sanitization of the educational system may not be successful if it is not rooted in the holistic effort to end corruption in the larger society. Every well-meaning citizen of a country must be concerned and contribute to the war efforts realizing that "if we do not kill corruption, corruption will kill us". The time has come, therefore, for all stakeholders in education to contribute towards taming and eventual elimination of this educational monster in the school system. Punitive measures alone cannot tame the educational monster as to render it impotent. Preventive measures advocated in this study should be considered and applied, first, as complimentary to the punitive sanctions that are already in practice and subsequently as the most effective antidote to the menace of the monster. Therefore, TEBI is recommended for use by teachers and researchers in all educational systems as a veritable tool for diagnosing students who may have the attitude and behavioural tendencies towards engaging in academic cheating behaviour. TEBI could be revalidated and used in other countries of the world.

## Conclusion

Tertiary Examination Behaviour Inventory (TEBI) is a validated and standardized instrument for measuring the behavioural disposition of students towards academic dishonesty in higher educational institutions. It is a veritable tool that could be used to diagnose students' tendencies to cheat in examinations. The essence is to refer such identified students to counsellors for reformation. It is hoped that the instrument will help stakeholders in education to adopt preventive rather than the punitive measures to tackle, tame and eventually eradicate the phenomenon of academic dishonesty from educational systems in the world.

## Acknowledgement

This research work was supported by grant from Tertiary Education Trust Fund of Nigeria (TETFund) Grant Number TETFUND/DESS/COE/MOSOGAR/IBR/2015/VOL.1.

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**APPENDIX 1****TERTIARY EXAMINATION BEHAVIOUR INVENTORY (TEBI)**

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**INSTRUCTION: Indicate your age, gender and course in spaces below and respond to the items by ticking the appropriate column from SA=Strongly Agree, A=Agree, D=Disagree and SD=Strongly Disagree.**

Gender: \_\_\_\_\_ Age: \_\_\_\_\_ Course: \_\_\_\_\_

S/N	ITEM	SA	A	D	SD
1.	Examination does not bother me at all				
2.	I worry so much about examinations				
3.	Thoughts about impending examinations disturbs me				
4.	I always forget answers to questions in examination				
5.	During examination I feel very tensed up				
6.	Most time I don't finish attempting required number of questions				
7.	After examination I always worry about the grade I will make				
8.	I wish lecturers are always lenient when marking examination scripts				
9.	Other activities always interfere with my study schedule for examinations				
10.	I often wish I could read faster				
11.	The best way to pass examination is to prepare well for it				
12.	I usually lose concentration in class				
13.	I become tired or distracted quickly when studying				
14.	I usually study with the radio, TV or music on				
15.	Examination is not a true test of one's knowledge				
16.	The essence of schooling is to pass examinations				
17.	Examinations should be abolished in the school system				
18.	Assignments should carry more marks than tests and examination				
19.	Examination malpractice is a risk like any other risk in life				
20.	Examination malpractice is one of the worst crimes against humanity				
21.	Lobbying for mark is not examination malpractice				
22.	It is not bad to take advantage of leaked examination questions if one gets them by chance				
23.	Influencing an invigilator before examination begins is not examination malpractice				
24.	I sometimes borrow materials such as pencils, eraser, ruler, calculator from other candidates in examination hall				
25.	Talking to other candidates in the examination hall should be allowed				
26.	Sometimes I do not stop writing when we are told to do so				
27.	I always read the questions before we are asked to do so				
28.	Submission of answer booklets should be optional				
29.	Candidates who come 30 minutes after commencement of examination should be allowed to take the examination				
30.	Sometimes I receive assistance from colleagues in the examination hall				
31.	Sometimes I help my colleagues in the examination hall				
32.	After examinations, I find it difficult to cope with awaiting result anxiety				
33.	Influencing marks after examination should not be considered as examination malpractices				
34.	I wish I had someone who would influence my examination results				
35.	The end justifies the means in examination issues.				

Sponsor: Tertiary Education Trust Fund (TETFund) Through Delta State College of Education Mosogar.

# Single-Parent Teachers' Work-Life Balance and Job Productivity in Edo State Public Senior Secondary Schools

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## Abstract

Work-life is believed to have either positive or negative effect on employees' job productivity especially among single-parent workers. The study investigated the relationship between single parent-teachers and their level of job productivity in public senior secondary schools in Edo State. To achieve this objective, four research questions were raised while three hypotheses were formulated therefrom. Two hundred and twenty-five single-parent teachers were purposively selected across the State-owned secondary schools in Edo State, Nigeria. Data were obtained through a structured questionnaire which was validated and tested for reliability level. The data collected were analyzed with the aid of descriptive and inferential statistics. Results obtained in the research indicated that single-parent teachers have low level of job productivity while their work-life balance was relatively less stressful. It was however found that there was no significant relationship between work-life balance and job productivity of single parent-teachers. Consequent upon this, it was recommended amongst others that school leadership should show more consideration to the personal and family needs of single-parent teachers especially; they should be innovative by using modern pedagogical tools for teaching and learning. Principals should step up their instructional supervisory roles, also, they should improve on their commitment to the welfare and working conditions of their staff members, especially the single parent teachers for improved job productivity.

**Keywords:** Single Parent Teachers, Work-Life Balance, Job Productivity, Edo State

## Introduction

Organizations irrespective of purpose and goals need human resources to drive their vision and mission. The effectiveness of the employees in the performance of organizational tasks is often times predicated on the volume of work assigned besides the supervisory skilled of the superordinate. Nevertheless, the productivity of employees—the labour force in organizations in the contemporary times is fundamentally associated with rational management of their personal needs and the organization's needs. In other words, workers should reasonably reconcile their personal home demands and organization's needs for them to be productive.

Work-life balance is therefore a critical issue to every employee at different levels; be it public or private organizations (Abioro, Oladejo & Asogbon, 2018). A conflict in work life balance will ultimately affect negatively the job output of a worker. Hence, Ojo, Salau & Falola (2014) warn that productivity of employees will be compromised in the long run if they do not properly manage their work life balance.

Attaining an effective work life balance among single parents in an organizations could be more challenging. Besides economic survival, they have psychological and social issues to contend with. The demography of personnel in modern organizations in contemporary times revealed that majority are single parents who occupy various positions. It is therefore of interest to investigate their work-life balance and level of productivity in their work place.

Secondary education in Nigeria occupies a very critical and strategic place in the learner's quest for knowledge, skills acquisition and functional training needed for enduring national growth and development. It serves as the connecting rod between primary and tertiary institutions (Belo, 2017). It is also an arm of the educational systems that consumes a great number of skilled labour force (teachers) used to realize curricular and pedagogical activities.

The productivity level of the teaching staff is of great significance to the goals of secondary education. The workforce at the secondary level of education in Edo State is characterized by staff members who have different family structure. Majority of them are single parents. It is therefore of importance to determine the relationship between single parent-teachers' work-life balance and job productivity in Edo State public senior secondary schools.

The specific objectives of the study were to:

- i. determine the level of job productivity of single parent-teachers in public senior secondary schools;
- ii. establish the difference in job productivity level of single-parent teachers based on location;
- iii. investigate the influence of single-parent teachers work-life balance on job productivity in Edo State public senior secondary schools; and to:
- iv. determine if there is a difference in relationship between single parent-teachers' work-life and job productivity based on gender.

### Research Questions

1. What is the level of single parent-teachers' job productivity in public senior secondary schools in Edo State?
2. Is there a difference in the level of job productivity between single parent-teachers in urban and rural public senior secondary schools in Edo State?
3. Is there a relationship between work life balance and job productivity of single parent-teachers in public senior secondary schools?
4. Is there a significant difference in the relationship between single parents' work-life balance and their job productivity based on gender in public senior secondary schools in Edo State?

### Hypotheses

While research question 1 was answered the rest were turned into null hypotheses as follows:

**HO<sub>1</sub>:** There is no significant difference in the level of productivity between single parent-teachers in urban and rural public senior secondary schools in Edo State.

**HO<sub>2</sub>:** There is no significant relationship between work-life balance and job productivity of single parent-teachers in public senior secondary schools in Edo State.

**HO<sub>3</sub>:** There is no significant difference in the relationship between single parent-teachers' work-life balance and their job productivity based on gender in public senior secondary schools in Edo State.

## Theoretical Foundation

The theories upon which this study is anchored are: role theory, role conflict theory and spillover theory. The role theory addresses the personal conflict arising from the multiple roles an individual performs either as a spouse, parent, and employee or as an apprentice (Casheena, 2004). The theory explains that there are bound to be pressure as an individual grapple between satisfying his/her personal needs as well as the expectations demanded by an organization based on responsibilities.

According to Nabavi & Shahryari (2012), role theory predicts that multiple life roles result in inter role conflict as individual experience difficulty performing each role successfully because of conflicting demand. The dynamics of family structure has changed such that roles performance are no longer gender-based. A man is no longer a breadwinner, but may also play the role of a mother in some circumstances. Ditto, a woman no longer rears and raises children alone but also has the responsibility to working and fending for them. In a single-parent situation an employee lacks the opportunity of sharing the financial and domestic responsibility with a spouse. This theory therefore links works and family needs conflict to the amount of time an individual spend in home life and work place.

The role of conflict theory is an extension of role theory. The theory explains the simultaneous occurrence of two (or more) sets of pressures such that compliance with one would make more difficult compliance with the other (Kahn, Wolde, Quinne, Snock & Rosenthal, 1964). The role conflict suggests that one role will take precedence over others and that there is a direct relationship between energy transfer from role to another (Greenhans & Beufell, 1985). It implies that if a single parent; male or female pays much attention to family needs, there might be a depletion of energy to assure the full responsibility for the work role as demanded. An attempt to find equilibrium between work and family could lead to role strains which might affect job productivity.

The spillover theory was postulated by Guest (2002). The theory asserts that work-life balance may have positive and negative impact on either work on the family life or the family life on the work. A negative spillover effect would result if work-family connections are strictly and rigidly designed in space and time (Abioro *et al.*, 2018). However, when there is flexibility that allows individual, in this case a single parent participate and combines family responsibilities with work duties effectively, it will bring about positive spillover. It is a kind of work life balance. A positive spillover could promote workers' productivity. Nevertheless, Robbins & McFadden (2003) state that a working single mother is prone to negative spillover. This could be as a result of the stress associated with her work life as a single parent such as and fear coping with family and financial constraints, rigid working hours, emotional stress arising from gap in family style and poor self esteem. The theory expects both the employee and organizational leaders to strike a perfect balance between work life and personal needs in order to achieve high level of job productivity.

## Reviewed Literature

### Work-Life Balance

There are plethora of definitions to the meaning of work-life balance but all translate to the equilibrium or degree of satisfaction an employee has in relation to his/her personal family life and career life. A perfect work-life balance can hardly be attained but the extent to which both an employee and organizational leaders can manage personal interest and while family interest as well as organization interest. Work-life balance is therefore the process of regulating the work designs to permit staff to join work with other duties like child care or aged family member (Upadhaya, Munir & Blount, 2004). According to Abioro *et al.* (2018), work-life balance is the aggregate time an individual uses to carry out his work in comparison with the aggregate time spent with relations and other individual's engagement. To attain an equilibrium between work and personal life, every organization should have a mechanism of maintaining optimum balance between job performance and personal lives of employees. In light of this, Reddy (2012) defines work-life balance as the relationship between work that an individual is being paid for and the lives individuals live outside of their paid employment.

For the purpose of this study, work-life balance can be viewed from an employee's perspective especially single parents as the act of fulfilling job responsibilities in a world of work while striving to cope with personal and family obligations. An organization like education institution would perceive work-life balance as the process of establishing a work schedule that is supportive towards staff in order to achieve high job productivity (Lockwood, 2003). Work-family conflict on the other hand, is the push and pull effect experienced between work and family responsibilities (Kumari, 2012). If this is not properly managed, it could have adverse effect on organizational goals attainment. However, there are work-life balance strategies that can be adopted for both organization and employees' benefit. They are:

- i. **Flexitime:** It is also referred to as self-rostering which covers flexible start and finish times with a possibility for employee to request specific working hours on a regular basis. It implies that flexitime enables an employee to negotiate their work schedules. Pierce & Gardner (2004) opine that a job that is flexible in nature will reduce workers' absenteeism and is capable of increasing level of job satisfaction among employees. However, not every job can have flexible working hours because of the nature of their activities. Example is teaching in a formal school system. Its curricular activities are planned according to time, space and programmes. However, online teaching may allow flexibility of time especially in period of pandemic.
- ii. **Telecommunication:** Telecommunicating allows a worker to work from home in order to achieve personal or family need without a negative effect on his/her work life. It is also known as telework. According to Yeandle, Crompton, Wigfield & Dennett (2002) cited by Abioro *et al.* (2018), it is a work-life balance strategy aimed at assisting employees to build their family and personal life around their work in order to reduce expenses related to work in a less disruptive and stress-free zone.
- iii. **Compressed work weeks:** It is a situation whereby a worker compressed work schedules with fewer, but longer workdays. This strategy allows more days without work to an employee, less commuting time but longer workdays (Banbram Whitehead, Sowden, Akers & Petticrew, 2008). Compressed work week might not be a strategy for work-life balance in an educational institutions because of the rigidity of their work plan and schedules of pedagogical activities.
- iv. **Part-time:** It is a way of reducing working hours in order to improve work-life balance. This approach favours individuals who are engaged in casual job unlike a full-time employment. However, this approach is capable of increasing workload, career growth and opportunities.
- v. **Job sharing:** Job sharing permits two or more workers to have an understanding of sharing responsibilities between and among themselves (Hayman, 2012). The purpose of job sharing is to enable workers meet their personal or family needs which sometimes conflict with their work life. A single parent who has pressing family and social needs may be ready to share responsibilities.

The performance and productivity of an organization is particularly influenced by work-life balance of the employee. As a result, organizations should always endeavour to reduce work-life conflict for a more balanced work-life that can stimulate high level of staff productivity.

### **Job Productivity**

In the parlance of an educational organization, productivity is the level at which all the teaching and learning inputs are used to produce the expected outcome. In other words, the extent to which the goals of the school are measured is dependent on the efficiency and effectiveness of the teachers and other supporting staff in the system. The responsibilities of employees in an organization is a measure of job productivity (Chris & Awonusi, 2004). Productivity simply means a measure of job performance. The commitment to the goals attainment of an organization determines an employee's level of productivity (Nakpodia, 2011).

Consequently, school organizations continually needs committed, dedicated and productive teachers for effective teaching and learning needed to bring about positive change in the society. However, Oswald (2012) is of the view that individual will contribute to the development of their organizations when they enjoy a work life balance. It suggests that a nexus exists between workers' productivity and their work-life balance. The leadership of every organization needs to strategically ensure that there are mechanisms toward ensuring employee's work-life balance.

## Single Parents

Single parent family structure is one of the recent changes in the ecology of family structure in the society today (Michelle, 2012 and Ketheringham, 2017). It is a kind of family where a person: either male or female lives or raises a child/children without a spouse. Single parenting according to Henslin (1985) is a situation in which a one of the two individuals, involved in the conception of the child is being responsible for the upbringing of the child. Single parenthood may also arise when either the male or female decides to produce and bring up a child or children outside wedlock.

In Nigeria, hitherto, single parenting was strange and unknown. Nowadays they are fast growing family patterns (Nwachukwu, 1998). As a result, many of such parents are employees in different organizations including educational institutions. This might pose a sort of double responsibilities requiring personal time, attention and money together with the challenge of official work responsibilities. Perhaps, this explains why Osagiobare (2017) succinctly remark that single parenthood is associated with variety of stress. Striking a balance between family and work-life could be stressful. Buttressing this assertion, Coleman (1997) states that the challenges of single parenthood are economic, human and social. According to Casheena (2004), economic capital refers to the financial resources and asset available to single parent families; human capital is the supportive role other family member like a spouse should provide which they lack and the social capital is the relationship that ought to develop among single parent families. This ought to be a psychological and emotional boost for productive work life.

Osagiobare & Alonge (2017) observe that single parents experience social problem as well as their children. Worker needs social cloud and recognition for a productive interaction among their colleagues. It will also improves their sense of belonging. It is imperative therefore, to state that the economic, human and social capital challenges often experienced by single parents could affect their job productivity. Organizations therefore have a responsibility to ensure a symmetric balance between a worker's family and work-life for improved and sustainable productivity. Staff rights and privileges such as vacation holidays, sick leave, and casual leave approval, and other benefits that could help ensure healthy and productive workers' job performance especially single parents' work force should be implemented. This study is therefore intended to establish the level of productivity of single parent teachers in post primary institutions in Edo State, Nigeria and to establish the relationship between their work-life balance and job productivity.

## Methodology

In view of the purpose of this study, a descriptive survey was adopted as the main source of data collection. The target population was all the single-parent teachers from a total of 8,436 teachers across the 309 public senior secondary schools in Edo State. The distribution of teachers across the three senatorial district in Edo State at the time of the study was: Edo North, 2,425; Edo South, 4,064 and Edo Central, 1,947 (Edo State Ministry of Education, 2019). A deliberate sampling technique was used to select 225 (male = 86; female = 139) single parent teachers which constituted the study sample. A questionnaire tagged: Single Parents Work-Life Balance and Teachers' Job Productivity Questionnaire (SPWLBTPQ) was used to collect relevant data for the study. The questionnaire consists of two main sections: Section A and B. Section A contain demographic information of the respondents while section B was based on items relating to job productivity and work-life balance. The instrument was patterned along the 4 point Likert rating scale of Strongly Agree – 4; Agree – 3; Disagree – 2; and Strongly Disagree – 1. The instrument was validated by a senior academic staff in the Department of Educational Evaluation and Counselling Psychology, University of Benin and Chief Inspector of Education, Oredo Local Government Area of Edo State. The Cronbach Alpha statistics was used to ascertain the reliability of the instrument after a test-re-test of the instrument was administered on some single parent teachers who were not part of the main study. The  $r$  value of 0.87 was obtained and thus considered reliable. Data generated were analyzed with the aid of descriptive and inferential statistics.

## Results

Table 1: Descriptive statistics of single parents' work-life balance and level of job productivity

S/N	Items	N	$\bar{x}$	SD	Criterion $\bar{x}$
<b>Work-Life Balance</b>					
1	The weekly breaks and terminal holiday enable me to attend to my personal family life	225	3.867	1.089	2.50
2	I am happy about my current working hours in the school	225	2.756	1.344	2.50
3	I wish to work from home	225	1.307	1.942	2.50
4	My extra-curricular assignments in school often conflict with my private life	225	2.243	1.861	2.50
5	I am bored by repetitive nature of my teaching job	225	2.231	1.615	2.50
6	I am willing to compress my teaching periods to enable me attend to my personal needs	225	2.631	1.582	2.50
<b>Average</b>			<b>2.505</b>		
<b>Job Productivity</b>					
7	Lesson notes preparation and delivery	225	2.143	0.476	2.50
8	Evaluation of students' learning processes	225	1.948	1.891	2.50
9	Management of students' disciplinary behaviour	225	2.741	0.576	2.50
10	Invigilation and supervision of examinations	225	2.571	1.304	2.50
11	Conduct of morning assembly	225	1.685	1.352	2.50
12	School community relationship	225	2.315	1.420	2.50
<b>Average</b>			<b>2.53</b>		
<b>Total Average Mean (<math>\bar{x}</math>)</b>			<b>2.369</b>		

Source: Researcher's field work (2020)

Table 1 presents the descriptive statistics of single parents' work-life balance and their level of job productivity in Edo State public senior secondary school. The total average mean of single parents' work-life balance and level of job productivity was computed to be 2.369 while the criterion mean was 2.50. Juxtaposing the two values, it reveals that the total average mean is lesser than the criterion mean which means that the level of work-life balance and job productivity of single parents was generally low.

However, table 1 also reveals that the work-life balance of single parents in public senior secondary schools was high with an average mean of 2.505 when compared against the criterion mean of 2.50. this implies that they experience a less conflict work-life balance.

## Test of Hypotheses

**HO<sub>1</sub>:** There is no significant difference in the level of productivity between single parents in urban and rural public senior secondary schools in Edo State.

Table 2: Z – test analysis of job productivity level of single parents in urban and rural areas in Edo State

Variables	N	$\bar{x}$	SD	df	Z – value	P-value	Decision
Urban	123	18.26	2.21	323	1.84	.41	Accepted
Rural	102	13.41	2.14				

$P < 0.05$

The results of Table 2 shows the summary of Z – test analysis of job productivity level of single parent teachers in Edo State public senior secondary schools. The table presents a Z – value of 1.84 as productivity value between

the variables while p value is .41 which is greater than the significant level of 0.05. Therefore, there is no significant difference between the mean responses of single parents in urban and rural areas in relation to their level of productivity.

**HO<sub>2</sub>:** There is no significant relationship between work-life balance and job productivity of single parents in public senior secondary schools in Edo State.

Table 3: Correlational analysis of single parents work-life balance and job productivity of single parents in public senior secondary schools in Edo State

Variables	N	$\bar{x}$	SD	R	p	Rank	Decision
Work-life balance	225	2.51		0.93	.03	Sig	Reject HO <sub>1</sub>
Job productivity	225	2.34					

P > 0.05

As presented in Table 3, there is a moderate and significant relationship between single parents' work-life balance and job productivity of senior secondary school teachers in Edo State ( $r(235) = 0.93$ ;  $P > 0.05$ ). Consequently, the null hypothesis which states that there is no significant relationship between work-life balance and job productivity of single parent teachers in public senior secondary schools in Edo State is rejected.

**HO<sub>3</sub>:** There is no significant difference in the relationship between single parent teachers' work-life balance and job productivity based on gender in public senior secondary schools in Edo State

Table 4: Fishers' Z – test of difference in the relationship between single parent-teachers' work-life balance and job productivity based on gender

Variables	N	r	Zr	Cal. Z	Crit. Z
Male	86	0.28	0.51	0.65	1.96
Female	139	0.83	0.82		

P < 0.05

As indicated in Table 4, male single parents have r value of 0.28 and transformed z value (Zr) of 0.51. While female single parent female teachers have r value of 0.83 and transformed Z value (Zr) of 0.82 thus yielding a calculated Z – value of 0.65 which is less than the critical Z – value of 1.96 at 0.05 alpha level. To this end, the hypothesis is retained. This suggests that there is no significant difference in the relationship between male and female teachers' work-life balance and job productivity in Edo State public senior secondary schools.

## Discussion of Findings

Findings in Table 1 indicates that the average mean of single parent teachers' work-life balance is 2.505, this implies that single parent teachers in Edo State public senior secondary schools do not experience serious conflict while meeting their personal needs as well as fulfilling their professional duties as practicing teachers. The finding therefore negates the opinion of Osagiobare (2017); Coleman (1997) that single parents express great stress and challenges in a bit to attaining work-life balance. With regard to the level of job productivity of single parent-teachers, findings in Table 1 however reveals that it is low. It suggests that single parent-teachers are not committed to the performance of their academic tasks and responsibilities. Teachers' job performance and commitment to goal attainment of the educational system has always been a major worry to education stakeholders. This perhaps justifies the reason why Nakpodia (2011) states that school organizations continually needs committed, dedicated and productive teachers for effective teaching and learning. Single parent teachers are not exempted from this noble responsibilities if secondary education must be functional and meaningful to the learners and the society.

In Table 2, the finding shows that there is no significant difference in the productivity level of single parent teachers in urban and rural areas. The finding further confirms the general apathy of teachers especially those who are single parents irrespective of their location to teaching as a profession. This has invariably affected their job commitment. Supporting this finding, Nwachukwu (1998) added that double responsibilities faced by single parents which requires time, attention and the crisis of financial obligations might account for their poor performances. Also, lack of support and assistance from a spouse in the face of economic challenges coupled with poor working conditions that characterized most schools in both rural and urban areas are probable reasons for job productivity of single parent teachers.

In Table 3 and 4, results of the analyses indicate no significant relationship between work life balance and job productivity of single-parent teachers; and no significant difference in the relationship between male and female single-parent teachers respectively. The findings agree with the postulation of Guest (2002) since teachers' productivity is very significant to school goals attainment, school leadership should endeavour to create a more satisfying work-life balance for its work force. School heads could adopt transactional leadership which can stimulate productive work-life balance among staff especially single parent-teachers in the system. Supervision, and punishment should be used to motivate teachers towards high job productivity.

The findings pose a challenge to the stereotyped and traditional mode of teaching and learning activities in Sub – Sahara Africa and Nigeria especially. The COVID – 19 experience coupled with socio-political; economic; cultural and religious crisis plaguing the society calls for innovation. The application of modern pedagogics, telework, compressed work weeks and job sharing practices could be adopted for the purpose of work-life balance and job productivity.

## **Conclusion**

Secondary school is a social system which consists of men and women (staff) of varied marital and demographic background who work cooperatively to achieve school goals. The study, therefore, investigates the relationship between work-life balance of single parent-teachers and their job productivity. Though there is no significant relationship between work-life balance and job productivity level of single parent-teachers, the study found that the job productivity level of teachers who are single parents is low. The study found that single-parent teachers however experience a relatively less conflict in their work-life balance.

## **Recommendations**

Based on the results of the findings, the following recommendations are made:

1. School authorities should show more consideration to personal needs of their staff especially single parent teachers. This will increase their work-life balance and job satisfaction for a positive impact on their productivity level.
2. School leadership should introduce innovative pedagogical tools in schools such as telecommunicating, virtual teaching, zoom interactive teaching and the use of e-learning mode to complement physical teaching.
3. Policies that encourage improved work-life balance for single-parent teachers should be put in place by the State Post Primary Education Board. Such policies should allow job sharing, employment of single parents as part-time teachers. This will enable them have flexible time for the management of their personal and work-life activities.
4. Monitoring and supervision of instructional activities in schools by principals and other relevant stakeholders should be intensified for increased and sustainable job productivity of teachers especially those who are single parents.
5. Working conditions such as provision of teaching and learning facilities, regular payment of salaries and allowances, creation of social welfare schemes by government and school management board should be given priority. This will boost the psychological and emotional morale of single parent teachers.

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# Impact of Quality Assurance on Quality Teaching among Teachers in Oman Higher Education

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## Abstract

The study aims to investigate the internally driven factors that should contribute to quality in the teaching process in order to inform the current measures of teacher performance in higher education. Previous studies reported ambivalent views and reactions towards measures of quality which raised the presumption that quality processes were not teacher-driven but imposing. Hence, a sequential mixed study research was employed that included both qualitative and quantitative methods of data collection. The methods are seven interviews with academic faculty from higher education and a questionnaire which was distributed to 154. The findings of this study indicate an average level of teachers' perceptions towards practices of quality assurance and their impact on quality teaching. This study recommends empowering teachers to take active part in quality teaching protocol and a model of internally driven factors is recommended.

**Keywords:** Quality Measures, Teaching Quality, Evaluation of Teaching, Professional Development, Student Evaluation Forms, Peer Evaluation

## 1. Introduction

Quality teaching is arguably one of the most prominent aspects of current educational policy in Higher Education. Within the local context of Oman higher education, quality teaching is defined as follows:

The HEI [Higher Education Institution] ensures teaching enables students to fully develop as learners in their chosen field(s) of study and to achieve the learning outcomes for their program and the HEI's generic graduate attributes. Quality teaching is assured through a range of mechanisms including: implementation of defined and appropriate teaching and learning methods; the recruitment and appointment of appropriately qualified and experienced staff; the ongoing evaluation of teaching effectiveness; and the maintenance of appropriate staff/student ratios." (OAAA manual, p. 35)

According to the Oman Accreditation Authority (OAAA), quality teaching is an outcome-driven towards achieving particular learning assets that is composed of essential elements: sound teaching and learning methods, qualified teaching staff, monitoring systems and suitable teacher/student ratio. Of particular interest is ensuring 'teaching effectiveness'. This merits further discussion in the light of the dynamic and ever-changing cultural forces that may impact education with particular emphasis on the notion that teaching practices always change, as Biggs (2001) acknowledges. Hence, quality teaching and effectiveness of teaching need to be situated within the relevant cultural context.

Within the cultural context in Oman higher education (HE), the quality assurance movement has been initiated for the purpose of developing quality education. The Oman Accreditation Council was established in 2001 by a royal decree which was superseded by the Oman Academic Accreditation Authority (OAAA) in 2010 (Carroll et al., 2009). The OAAA has sought to promote a culture of quality across all the higher education institutions in Oman. It is the accountable unit for setting the general quality framework to be attained by HEIs in Oman, monitoring and evaluating their performance (OAAA, 2020). The process of supervision of Omani HE is indeed crucial to their permanence whereby all undergo an institutional accreditation and academic programs accreditation in a two-stage process, namely quality audit report and standards assessment outcomes. The result of which is made available to the public in the QAAA official website (Carroll et al., 2009).

Cognizant of the need to nurture a culture of quality that include teachers, Hénard (2010) classifies quality teaching endeavours in the OECD institutional management HE project into three interrelated levels: institutional (system, policies, designs, and plans), programme (department or school content and subjects), and individual (initiatives to support teachers). He describes those quality teaching endeavours as diverse and engendering effective quality teaching as long as they are followed up at the departmental level. In Oman at Sultan Qaboos University, Al Barwani and Osman (2010) report a successful model for teachers' engagement in quality improvement at the course level the teachers were teaching as part of the sustainable curricula development. A similar initiative is reported by Huson (2015) in GUtech at Oman HE wherein the students were included in evaluating programmes in order to inform institution-wide decision making. Huson described the process as an attempt to achieve better teaching and learning quality experiences. Overall, it appears that efforts to forge an interrelationship between the three levels of quality teaching endeavours indeed exist locally at Oman.

By and large, there are four components of teaching quality in HE, namely teachers' perceptions of teaching, alignment of learning outcomes, monitoring mechanisms on teaching, and professional development (Biggs, 2001). First, teachers' perceptions of teaching is acknowledged as impacting students' performance and achievement (Abu and Olatundun, 2007). How teachers actually interpret teaching is apparent in the way of teaching (Akerlind, 2004), organization of content and choice of assessment tasks (Zerihun, Beishuizen and Os, 2011). Second, a bird's-eye view on learning outcomes, that have already been institutionally approved, are set in a plan (Schoenfeld, 1998). However, achieving the learning outcome is also a shared responsibility among teachers and students. As Biggs (2003) affirmed, learning is championed by students. Third, constantly reviewing the current practices is essential (Biggs, 2001). Certainly, a review mechanism should place teachers at the heart of the process of evaluating their own teaching practices. Parallel to self evaluation is peer review which may lead to positive sharing of good practices if perceived with positive attitudes (Lomas and Nicholls, 2005). Furthermore, students evaluation forms is another measure that is widely used in higher education institutions (Goos and Salmons, 2016). This tool was positively correlated with peer review and self-evaluation through a large-scale study (Goos and Salmons, 2016). Fourth, professional development (PD), arguably, contributes to promoting quality in teaching practices (Hammond, 1997, Biggs, 2001). PD is conditioned with well-structuredness (Hammond, 1997) and provision of incentives (Hutchings 1994 as cited in Lomas and Nicholls, 2005) such as promotion.

Notwithstanding the importance of the four above-mentioned elements of quality teaching, the concept has failed to sufficiently take into consideration how professional 'growth' of teachers through quality assurance practices can be demonstrated from the empirical studies. Hénard (2010: 5) reports in the OECD institutional management HE project review a concern related to "the impacts of quality teaching on teaching, research and institutional quality culture". Contrary to the link assumed by Tavares et al. (2017: 1294) that "[i]nternal quality assurance is

expected to improve the institutions' core missions: teaching and learning, research and activities related to community engagement", Anderson's (2006) study shows the negative impact of quality on teaching. His study draws on a case study conducted by interviewing *30 academics from 10 Australian universities*, concluding that there is a clash between how quality assurance operates and teachers' academic trajectory. This exposes the need for a mutually agreed mechanism aimed at redressing staff resistance to QA processes. His study participants objected to staff appraisal as it constitutes a surveillance tool for their work and "impugned their own sense of professionalism" (p.167). Staff appraisal also caused ambivalent feelings such as anxiety and stress. With regards to students evaluation of the course, it was found that students are "privileged" and treated as "client, consumer, or customer" which turns the table of the existing relationship between a teacher and student in the classroom. Moreover, the study participants queried how well-prepared the students were to be able to judge some aspects of teaching. Similarly, Tavares et al. (2017) conducted a study to examine the perception of Portuguese academics of the impact of QA on teaching and learning. The study revealed negative perceptions among Portuguese academics due to the non-academic tasks that teachers should complete which leave less time for their main teaching tasks. Huusko and Ursin (2010) stated that QA can lead to bureaucracy which might threaten academic freedom. It is apparent that several studies have characterized actual quality teaching policy as imposed outwardly from the institution, resulting in it being considered as a burden.

Hence, the impetus of the current study is to shift the narrative so that quality teaching becomes teacher-driven and built upon consensus. It intends to move beyond the existing body of studies which showed that the processes were driven by assumption that teaching is managed externally through student evaluation, peer observation and line managers. Indeed, the existing research papers investigated the status of quality as merely top-down procedure such as Anderson (2006), Scott and Scott (2016), and Tavares et al. (2017); hence, running the danger of overreliance on measures to monitor rather than reinforcing teachers' professional growth. With a view to avoiding these pitfalls, the present paper aims to investigate internal uptake by teachers of quality teaching elements. The contribution of this study to knowledge is to form a questionnaire from the introspective insights of the teachers that will support constructing a thorough model for sustaining teacher development as part of quality teaching. The model is based fundamentally on teacher awareness, teacher self evaluation and reflection, continuous development, and top-down monitoring -- the fundamental concepts that are addressed by Schoenfeld (1998), Biggs (2001), Abu and Olatundun (2007), and Goos and Salmons (2016). Hence, the question of the active intrinsic role of teachers in quality teaching remains to be investigated.

## 2. Methodology

This study aims to investigate the impact of the manner teachers engage with the current quality teaching measures on their own teaching profession in order to develop a framework for sustaining quality teaching. Hence, the research question is: What are the effective internal factors for teaching quality? The sub-questions are:

1. What is the impact of the current evaluation measures for teaching quality on the teaching profession?
2. What are the personal practices of teachers to ensure teaching quality
3. What are the challenges for teaching quality as practised in the Omani context?

The methodology of this study is a sequential mixed methods design that included two stages: qualitative data collection (via interviews) then analysis of the data that fed into the second stage which is quantitative data collection (via a questionnaire). All sub-questions will be directly investigated in the two stages. However, the second stage will attempt to verify the interview findings at large. The process of data collection lasted for six months. Data of both qualitative and quantitative methods are triangulated for validity.

### 2.1 Sampling

There have been two means for sampling: purposive and random. The purposive sampling is utilized in the first stage of the qualitative data collection for the interviews that included seven practitioners who are academic staff and were involved in the process of quality assurance in order to give introspective insights based on their background in the field. The selection of those practitioners was due to their involvement in quality assurance procedures at their institution. The second sampling is a random one used for distributing the questionnaire at three

institutions in Oman higher education. The response rate was initially low and was repeated so that it eventually received 154 responses from faculty members of multiple nationalities, different professional backgrounds, and different academic departments, i.e. Departments of English, Math, Science, and Biology, Department of Business and Department of IT, and Department of Engineering.

## 2.2 Instruments

The study instruments are two: face-to-face individual interviews and a questionnaire. First, the interview questions were developed in line with the main themes discussed in the review of literature, particularly concepts of evaluating teaching and their impact on teaching quality. The interviews lasted 30 minutes to one hour, see Appendix 1. Based on the themes and sub-themes emerging from the interview data, the questionnaire items were written as statements or sub-statements, related to teachers' involvement with monitoring systems, professional development, teaching style, and context of teaching. The questionnaire was administered online via Google doc, and responses were automatically collected.

## 2.3 Analysis

Two means of analysis were employed. Data elicited from the interviews were analysed qualitatively via Nvivo for thematic coding whilst the questionnaires were directly analysed for frequency in Google Forms and data are reported in percentages. The resulting categories of the interviews were inventoried in a questionnaire as sub-statements to be checked, see Appendix 2. For the analyses of checkpoint statements, the responses for each were considered as either yes if ticked or no if unticked.

## 3. Results and Discussion

The thematic analysis of the qualitative data in the first stage resulted in 27 themes. These are written in the questionnaire checkbox as statements or sub statements. Hence, this section presents each qualitative theme, yet with the quantitative frequency.

This section is organised into five main sub-sections: moral and financial support for developing and supporting course contents, teaching context and environment, nature of teacher-student interaction with text, active role of teacher in monitoring their own performance, and alignment to institutional vision, mission and values. Each code will be discussed below with reference to the questionnaire data.

### 3.1 Support on Course-level

With regards to implementing quality improvements of the courses, the qualitative interviews revealed five themes that highlight the need for practices in key areas where teachers should feel empowered to enact change at the course level, namely: teachers voice, adequate resources, continuous upgrading of teaching methods, content-assessment alignment and peer involvement in course teaching, see Table 1.

Table 1. Quality improvements on courses

Items	<i>N</i>	Mean	Std. Deviation
My voice regarding courses is heard	154	.3896	.48925
The course is adequately resourced	154	.3377	.47446
I am requested to update teaching methods	154	.3506	.47873

I am asked to align content with assessment	154	.5844	.49443
There is positive peer support on the course	154	.3896	.48925

The courses are not adequately resourced as it is low at mean (0.33), while other aspects are at medium level (ranging between mean = 0.35 to 0.58). This indicates better systematic structure is needed for inducing quality improvements in the courses. The National Commission on Teaching and America's Future asserted the need of teacher support and preparation (Hammond, 1997). To counter this, Biggs (2001) urges institutions to provide incentives and support structures for teachers to enhance their teaching and involve them in QA processes.

Table 2. Work environment that support quality teaching

Descriptive Statistics	N	Mean	Std. Deviation
⅓ of teachers share materials	154	.4221	.49550
Evenly distributed responsibilities	154	.3442	.47664
⅓ of teachers take part in initiatives	154	.3442	.47664
⅓ of teachers take part in mandatory department activities	154	.6364	.48262
Positive climate in department	154	.4545	.49955
None of above	154	.2013	.40228

Regarding the work environment, the qualitative interviews revealed five themes as indicated in Table 2. The statistical analysis shows there is a medium-level mean for the work environment. Work environment in higher education is widely acknowledged to be important to productivity; for instance, Elci and Alpkan (2009) found that “team interest, social responsibility, and principled climates” have a positive correlation with staff satisfaction (as cited in Narayanana et al. 2012, p. 24). Furthermore, in a study conducted in Oman, a strong correlation was found between work environment and teacher performance, i.e effective teaching (Narayanana et al. 2012), suggesting that more teacher involvement is required. Findings on the work environment suggest a greater need to share good practice on teaching style.

### 3.2 Teaching Style

Table 3. Teaching Style

Variable/Descriptive Statistics	N	Mean	Std. Deviation
PowerPoint presentations	154	.0260	.15958
Student presentation	154	.2922	.45626
Hands on task	154	.4156	.49443
Critical thinking	154	.5714	.49649
Q & A style	154	.4286	.49649

Contextualise learning content	154	.5325	.50057
Mixture	154	.6234	.48612

With regards to teaching style, there are varied styles as can be noted in Table 3. The statistical mean analysis is at a medium level for hands on task (at 0.4); it is slightly higher for involving critical thinking skills (at 0.57), contextualising learning to real life of the learners at 0.53 score, and slightly higher medium (0.62) for the use of mixture of teaching styles. Despite a variety of teaching styles, Akerlind (2004) explicates that the main roles assumed by teachers are either knowledge transmission or supporting understanding, whatever different teaching styles are used.

### 3.3 Alignment of learning outcome

Table 4. Achievement of learning Objectives (LO)

Descriptive Statistics	N	Mean	Std. Deviation
Monitoring LO	154	.5909	.49327
Adhering to course description	154	.5909	.49327
Aligning exam with LO	154	.5130	.50146
Coordinator checking LO alignment	154	.4870	.50146
GA monitoring	154	.3571	.48072
None of above, unneeded	154	.1039	.30612
Not of above, not teachers responsibility	150	.0533	.22545

With regards to aligning teaching with learning outcomes, there appears to be relatively good practice in teaching, assessment and monitoring at medium level ranging from 0.3 to 59. This finding chimes with Saunders and Saunders (1993) who stated that learning outcomes are considered as a judgmental factor for quality teaching (as cited in Roger, 1993). Boore (1993) also argued that achieving quality would be facilitated if teachers select appropriate teaching methods that would support achieving the learning outcomes (as cited in Roger, 1993).

### 3.4 Self monitoring of performance

As part of the QA process in the institution, different assessment tools were shouldered to monitor teachers' performance, among which are teacher self-evaluation form, peer evaluation, student evaluation form and staff appraisal form, see Table 5.

Table 5. Types of evaluation for teacher development

Descriptive Statistics	N	Mean	Std. Deviation
teacher_self_evaluation	154	.2857	.45323
peer_evaluation	154	.1494	35760
student_feedback	154.	.4481	.49892

staff_appraisal	154	.2792	.45008
none_have_impact	154	.3701	.48441

When the participants were asked whether they take different feedback forms seriously to improve their teaching, the results show: teacher self-evaluation form (low mean at 0.2), peer evaluation (low mean at 0.14), student evaluation form (medium at 0.4) and staff appraisal form (low at 0.2). This low uptake contradicts expected outcomes as self-evaluation is considered at the 'heart' of quality enhancement (Wilkinson, 2003, pp. 239–40 as cited Jacobs and Toits, 2006). It is obvious that teachers care relatively more about their students' feedback than other forms of feedback. Peer evaluation seems less popular among teachers which might be justified in light of improper schemes and negative attitudes where staff might not appreciate such feedback (Lomas & Nicholls, 2005). Strikingly, a relatively medium mean figure (at about 0.37) among participants points to a lack of value or willingness to accommodate the given feedback, which might be attributed to receiving them at the end of the year.

Table 6. Impact of student feedback in improving quality teaching

Descriptive Statistics	N	Mean	Std. Deviation
Student feedback is effective.	154	.6104	1.61007
Student feedback is constructive.	154	.6558	1.76153
Student feedback is inappropriately conducted.	154	.3247	.46978
It is invalid as students do not care to give valid feedback.	154	.6364	1.76316
It is conducted for administrative purposes.	154	.4481	.49892
Timing of obtaining feedback should be earlier than the end of semester.	154	.3766	.48612
It should be excluded from teacher appraisal protocol.	154	.5260	.50095
It should be locally managed.	151	.4901	.50156

With regards to employing students' feedback on teaching, there is a relatively medium level for the quality of student feedback as the means are medium for effectiveness and constructiveness of student feedback on teaching. Yet, student feedback was reported as also problematic with several constraints highlighted in terms of how it was written and delivered regarding inappropriately conducted, invalid and decentralised (at medium levels). To address these constraints, Chen & Hoshower (2003) asserted that student evaluation surveys should be designed so that students feel that they provide meaningful feedback to their teachers so that students feel that they provide meaningful feedback to their teachers (as cited in Anderson, 2006). Therefore, teachers are likely to be well-placed to improve the design of surveys for collecting student feedback on quality teaching.

### 3.5 Teacher quality-related practices

Table 7. Teacher role in quality teaching

Descriptive Statistics	N	Mean	Std. Deviation
Apply QA concepts in profession	154	.5779	.49550
Follow institutional policies	154	.4740	.50095
Benchmark teaching with colleagues	154	.5000	.50163
Carry critical self reflection	154	.4481	.49892
None of above, there is not enough time	154	.0714	.25838
None of above, unnecessary	154	.1039	.30612

When teachers were asked about the impact of quality assurance initiatives on their own practices (see Table 7), teachers perceived these at a medium level ranging from 0.44 to 0.57. This shows that teachers have good drive and uptake for quality teaching which can be better utilised for taking positive control of their own approaches for quality teaching. This result supports Jones and Saram's (2006) argument that teachers' attitude towards quality activities can be heightened by staff empowerment and embracing the quality culture. When this is not the case, Mcinnis (2000) argues that teachers may feel that stakeholders are not concerned about the everyday practices, which might hinder their teaching.

### 3.6 Initiatives of PD

PD initiatives are divided into three main categories: local and international workshops and conferences, relevance and usefulness of college-level initiatives, and research undertaken as part of personal PD, see Table 8.

Table 8. Professional development impact on quality teaching

Descriptive Statistics	N	Mean	Std. Deviation
Attending local PD workshops/conferences	154	.6688	.47217
Attending international PD workshops/ conferences	154	.4286	.49649
Personally paying for local conferences	154	.5195	.50125
Personally paying for international conferences	154	.3766	.48612
None of above	154	.0260	.15958
College workshops are linked to quality teaching	154	.3182	.46729
They helped understand teaching requirements.	154	.3182	.46729

They better changed my teaching practices.	1+-54	.2532	.43629
They elevated my teaching standards.	154	.2987	.45918
They were practical and contextual.	154	.3442	.47664
They highly contributed to quality teaching.	154	.2468	.43253
They were not useful.	154	.2597	.43992
I conducted research paper for developing teacher identity	154	.5519	.49892
I conducted a research paper for annual appraisal.	154	.5974	.49202
I conducted a research paper to develop my teaching quality.	154	.4545	.49955
I conducted a research paper to achieve institutional VMV (vision, mission, values)	154	.2468	.43253
Nothing of the above	154	.0260	.15958

At the conferences and workshop level, medium mean level is associated with attendance both locally (0.66), internationally (0.42), personal funding both locally (mean = 0.5) and internationally (mean =0.37). However, the level of the impact of the college-level PD initiatives on teaching quality was reported at low mean. Those college PD initiatives did not change teaching practices, elevated teaching standards, or improve quality teaching. With regards to conducting research papers, it was linked higher with personal development and appraisal at medium means (0.55 and 0.59 respectively), than with the institutional orientation (low mean at 0.24). It is worthwhile to cite Imrie (1998) who discussed various studies which showed that PD was a weak point in many higher education institutions as academics are not provided with training to practise their core tasks. Thus, Hammoud (1997) rightly argued that the kind and quality of PD activities really matter and the PD activities which are related to the curriculum are more likely to report reform practices.

Overall, the results show that there are positive perceptions towards concepts of quality assurance in the area of teaching quality, yet low impact regarding internal processes of the main parameters of teaching quality, namely; monitoring, teaching content and achieving learning outcomes, and PD activities. This may be attributed to classifying or branding quality practices as quality-related not relating to teachers' duties.

#### 4. Recommendations

The present study urges a conceptual reconfiguration of quality teaching towards a more teacher-oriented approach via the teachers themselves as active agents. Hence, teachers are not only the prime factor (Biggs, 2001), but – more importantly – actively shape the process and outcomes in quality teaching measures. In this way, the desired professional growth can be achieved through the different PD activities, reflection, monitoring, and informed teaching style (see Figure 1).

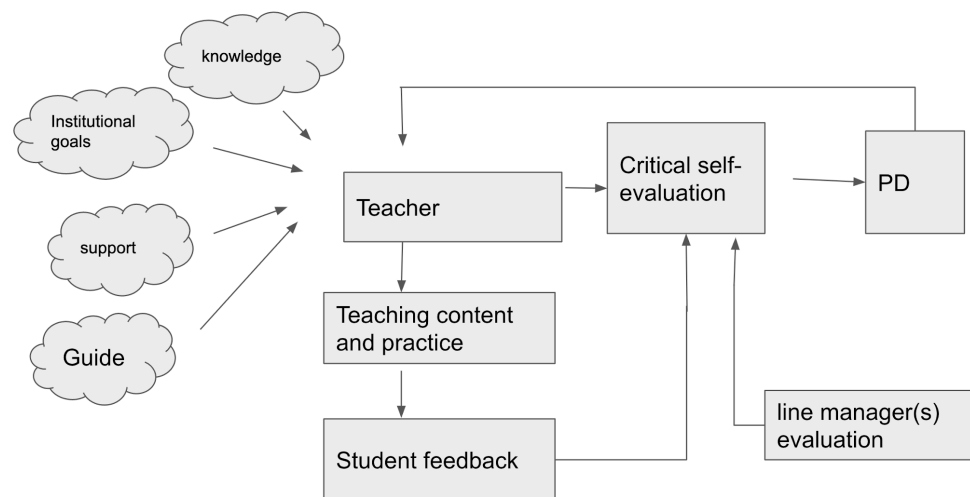


Figure1. Model of internally driven teaching quality

As depicted in Figure 1, factors related to quality teaching should be driven by the teachers themselves. Hence, all elements perceived by top management to be part of quality teaching such as forms of feedback, PD, and updated teaching methodologies, should be addressed and evaluated internally by the teacher prior to any endeavour for institution-wide evaluation. Teachers, as shown in this study, have higher ability and aptitude to take part in the quality processes, particularly for self development. Yet, different studies show their dissatisfaction with the top-down processes and management for controlling quality teaching (Anderson, 2006; Huusko and Ursin, 2010; and Tavares et al., 2017). In line with Archibald et al. (2011) who put forward active teacher learning as a key principle of effective PD, this study reveals the importance of giving greater emphasis to teachers in taking part in their own professional growth. Hence, placing all different forms of feedback at the centre of teacher reflection would improve the teacher learning. Concurrently, other forms of evaluation that are conducted externally such as through students and line managers should undergo personal evaluation in order to assess their impact regarding teaching quality. Hoban (2010) demonstrated that teachers were able to identify different teaching practices when screening recorded interviews of students' feedback, which is confirmed in this study. Effectively embedding peer evaluation can also provide teachers with valuable guidance and support to enhance quality teaching (Lomas & Nicholls, 2005). This monitoring performance system should not be an end by itself but should provide the needed input for further professional development activities, facilitating teacher empowerment. Hence, the external evaluation of teaching quality should be on the progress made via different forms, not as currently practised via forms. Indeed the shift would be from evaluation per se to the inherent concept of teaching, as argued by Biggs (2001), as a growing profession.

## 5. Conclusion

Overall, the present study attempted to explore the teacher-related factors that drive teaching quality in the Omani context. Previous studies exhibited a high rate of teacher dissatisfaction towards multiple monitoring methods which were conducted externally by the institution. As a result, ambivalent reactions towards quality teaching were seen. The present study focused on teachers' introspective interpretations of quality assurance. The analysis of the results showed that there is no significant impact of the followed QA measures on quality teaching. It also indicates that teachers are not satisfied with the top-down mechanism and would prefer to be more involved in the evaluation process. The evaluation forms have to be processed by the teacher internally who would decide and prioritise any professional development activity to undertake. Furthermore, the present study proposes a model that depicts several quality teaching elements which need to be given prominence and also linked in well-defined stages as currently each form stands alone. The current study is preliminary to future studies that empower teachers to determine their own quality teaching needs and develop their own profession accordingly. Our present study has some limitations including its focus on the current practices in Rustaq College which might make it difficult to be generalised to other contexts. Also, the themes for the survey might not be comprehensive as they came solely

from academic staff without injecting the voice of decision makers. However, the analysis of the results did not show any significant differences with what is mentioned in the literature as it clearly indicates that the QA procedures do not have a clear impact on the quality of teaching. It also devalues the use of top-down strategy on teacher evaluation which imposes changes on teachers, whilst acknowledging the high value of bottom-up strategies which meaningfully engage teachers.

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**Appendix: 1 Semi structured Interview Questions**

- 1- Please state your professional background.
- 2- Are you familiar with teaching quality?
- 3- What forms of feedback does your institution use for evaluating teaching quality? (prompts: students' survey? Any other?)
- 4- Do you use these feedback forms to reflect on your teaching? How
- 5- In what manner have Quality Assurance practices had an impact on you as a teacher?
- 6- Can you describe your teaching methods? How do you aim for supporting learners' learning process?
- 7- What role do you play in designing, updating, or achieving course objectives/ graduate attributes?
- 8- What professional development activities have you undertaken locally, internationally?

**Appendix 2: Questionnaire**

<p>ادوار المعلمين في تحسين جودة التدريس Teachers' roles in Enhancing Quality Teaching</p> <p>We are currently conducting a study on the roles and responsibilities of teachers in ensuring that teaching responds to Quality Assurance standards and processes. The questionnaire will take you approximately 15 minutes. Your responses will be kept confidential and used for research purposes only.</p> <p>يقوم الباحثون بعمل دراسة حول أدوار ومسؤوليات المعلمين في تحسين جودة التدريس استجابة لمعايير وعمليات ضمان الجودة . سيأخذ منك هذا الاستبيان مدة لا تتجاوز ١٥ دقيقة. كما سيتم معاملة اجاباتك بسرية واستخدامها لأغراض البحث فقط</p>
<p>Section 1:</p> <p>Do you grant us your kind permission to anonymously use your answers to the questions below for research purposes?</p> <p>هل توافق على استخدام اجاباتك لأسئلة هذه الاستبانة لأغراض البحث بصفة سرية؟</p> <p><input type="radio"/> B Yes نعم</p> <p><input type="radio"/> No لا</p>
<p>You are: هل انت:</p> <p><input type="radio"/> B an Omani male staff member أكاديمي عماني</p> <p><input type="radio"/> B an Omani female staff member أكاديمية عمانية</p> <p><input type="radio"/> B an expat male staff member اكاديمي غير عماني</p> <p><input type="radio"/> B an expat female staff member أكاديمية غير عمانية</p>
<p>You have been working in this College for..</p> <p>مدة عملك في هذه الكلية هي</p> <p><input type="radio"/> B 0-2 years سنة ٠-٢</p> <p><input type="radio"/> B 2-4 years سنة ٢-٤</p> <p><input type="radio"/> B 4-8 years سنة ٤-٨</p> <p><input type="radio"/> B more than 8 years أكثر من ٨ سنوات</p>
<p>Please, write your email for further contact (optional) لطفا اكتب ايميلك هنا للتواصل معك لاحقا -اختياري</p> <p>.....</p>
<p>Section 2: Perceptions of the QA-teaching relationship وجهة نظر لعلاقة ضمان الجودة بالتعليم</p> <p>We would like to know whether QA processes and procedures have a profound impact on teaching in HEIs in the Sultanate. نرغب بمعرفة إذا كانت لعمليات ضمان الجودة تأثير مباشر على التعليم في مؤسسات التعليم العالي بسلطنة عمان</p>
<p>2.1 The QA process in my College has had an impact on my teaching. As a result of it, ... عملية ضمان الجودة</p> <p>.....على النحو الآتي في الكلية أثرت على طرق تدريسي</p> <p>[check all boxes that apply]</p>

- my voice (opinion) has been heard regarding the needs of my courses and students. لقد كان رأي مسموع بما يتعلق باحتياجات المقرر الذي ادرسه والطلاب
- my course has been adequately resourced (e.g. in terms of materials, hours, internet access, etc.) تم تزويد المقرر الذي ادرسه بالمصادر المناسبة من مواد تعليمية وساعات مناسبة والولوج للانترنت
- I have been requested to update my teaching methods on a regular basis. بطريقة تم الطلب مني تحديث طرق تدريسي مستمرة
- I have been asked to consider the course learning objectives in teaching and exams. تم الطلب مني موائمة كل من الاختيارات والتدريس مع أهداف المقرر
- I have had positive peer support with regards to creating materials and delivering my courses. لقد كان لمساندة زملائي في القسم تأثير ايجابي علي تدريسي
- Other, please specify
- 
- 
- 

2.2 I take feedback forms seriously in order to improve teaching, especially the following forms: انا اخذ التغذية الراجعة بجدية من أجل تحسين التدريس، من أهم الطرق لتغذية المفيدة لي هي  
[check all boxes that apply]

- Teacher Self-Evaluation form استمارة التقييم الذاتي
- Peer Evaluation form استمارة تقييم الزميل
- Student Evaluation surveys استبانة الطلاب لتقييم المقرر
- Staff Appraisal form استمارة تقييم من المسؤول المباشر
- none of the above have impacted the way I teach (e.g. because I only receive feedback at the end of the year). ليس لأي استمارة علاقة بأدائي داخل الصف الدراسي لأنني استلم التقييم على نهاية السنة الدراسية.
- Other, please specify
- 
- 

2.3 Since we started concentrating on QA, ... منذ بدء عمل الكلية في نظم ضمان الجودة ...  
[check all boxes that apply]

- two-thirds of the teachers have generally been willing to share their teaching materials with colleagues. أكثر من ثلثي المدرسين كانوا متعاونين في مشاركة المواد التعليمية مع زملائهم
- the work has generally been well organized, and duties are distributed fairly and equitably among all the staff. العمل في القسم منظم ويتم تقسيم المهام بالمساواة.
- two-thirds of the staff members have generally volunteered to organize and facilitate different types of initiatives. تقريبا ثلثي الأكاديميين تطوعوا لتنظيم مبادرات متنوعة.
- two-thirds of the staff members have participated in all mandatory departmental activities (e.g. the compulsory monthly meetings of the Department Council) حوالي ثلثي الأكاديميين شاركوا في أنشطة القسم الإجبارية (كاجتماعات القسم)
- the work climate at the Department has generally been positive because two-thirds of the staff seem to have fully embraced their role and duties as educators and academics. جو العمل في قسمي مريح حيث الجميع يعمل على إنجاز المهام المنوطة له
- none of the above seems to have been happening. ليس من المذكور أعلاه
- Other, please specify
- 
- 

2.4 Teachers' teaching style can both contribute to and hinder the provision of qualitatively-good educational services at my Department. In my case, I would describe my teaching style since the start of our QA activities as follows. يمكن أن يسهم أسلوب تدريس المعلمين في تقديم خدمات تعليمية جيدة النوعية في القسم الخاص بي أو يمكن أن يعيق ذلك. في حالتي، أود أن أصف أسلوب التدريس الخاص بي منذ بدء أنشطة ضمان الجودة لدينا على النحو التالي  
[check all boxes that apply]

- I have taught my course mostly by using PowerPoint Presentations and lecturing based on them. انا استخدم عروض الباوربوينت و أسلوب المحاضرة في التدريس

**B** I have allowed my students to choose some of the course materials and to prepare presentations about them.

طلبت من طلابي اختيار جزء من المادة العلمية وتقديمها لزملائهم

**B** I have taught mostly interactively, and students have appropriated new knowledge or skills by means of hands-on tasks.

لقد درست بأسلوب تفاعلي بحيث يتعلم الطالب بالتدريب العملي

**B** I have tried to trigger critical thinking by asking challenging questions and including discussions in the classroom.

لقد حاولت ادراج التفكير النقدي في المادة العلمية عن طريق إدراج أسئلة تتطلب المناقشة

**B** I have mostly taught on the basis of questions and answers (the Socratic method).

لقد قمت بالتدريس في الغالب على أساس الأسئلة والأجوبة (الطريقة السقراطية)

**B** I have mostly guided my students through the textbook, linking it to concrete examples from real life

(especially schools), and helped them to summarize and take notes in class.

لقد ربطت المادة العلمية بحياة الطالب الحقيقية ومساعدته بمهارات التلخيص وأخذ الملاحظات

**B** I mix all of above methods depending on needs and levels of students

استخدمت مزيج من طرق التدريس المتنوعة المذكورة أعلاه

**B** Other, please specify -----

-----

Section 3: Monitoring performance ضبط وقياس الأداء

We would like to know to what extent QA-related activities have impacted teachers' performance.

نرغب بمعرفة مدى تأثير عملية ضمان الجودة على أداء المدرس

3.1 The QA process has impacted my work as a teacher as follows:

[check all boxes that apply]

اثرت عملية ضمان الجودة على عملي كمدرس على النحو التالي

**B** being aware of the need to monitor, analyze, and revise

اصبحت ادرك الحاجة للرصد والتحليل والمراجعة

**B** no much change - neither for the better or worse

لا يوجد تأثير - ليس للافضل او للاقل

**B** frustration due to QA duties taken me away from teaching

الإحباط بسبب واجبات ضمان الجودة أخذني بعيداً عن التدريس

**B** extra committees at college level

اللجان الإضافية على مستوى الكلية

**B** doing someone else's work

القيام بعمل شخص آخر

**B** little or no time left to keep my teaching up-to-date

لم يبق سوى القليل من الوقت أو لم يبق من وقت لأبقى تعليمي محدثاً

**B** no improvements as results of the QA process

لا توجد تحسينات نتيجة لعملية ضمان الجودة

**B** different parts of our College are not in sync

أجزاء مختلفة من كليتنا ليست متزامنة في انجاز مهام

**B** Other, please specify-----

-----

3.2 Students' feedback is a key component in the QA process. It (is):

[check all boxes that apply]

ملاحظات الطلاب هي مكون رئيسي في عملية ضمان الجودة. أنه:

**B** done in an efficient and effective way.

بطريقة فعالة وفعالة.

**B** constructive and used to improve my teaching.

بناءة وتستخدم لتحسين تدريسي.

**B** but not done appropriately.

يتم ذلك ولكن لم يتم بشكل مناسب.

**B** invalid, as students are not interested in quality education.

غير صالح ، لأن الطلاب ليسوا مهتمين بجودة التعليم

**B** done for administrative purposes only.

يتم لأغراض إدارية فقط.

**B** should be done earlier than at the end of the semester.

<p>يجب جمعها في وقت سابق من نهاية الفصل الدراسي.  <b>B should not be part of appraisal protocol.</b>          لا ينبغي أن يكون جزءا من بروتوكول التقييم.  <b>B needs to be managed locally, not at the Ministry.</b>          يجب إدارتها محليًا ، وليس في الوزارة.  <b>B Other, please add</b> -----          -----</p>
<p>3.3 I play role in quality teaching by ألعب دور في جودة التدريس بها [check all boxes that apply]</p> <p><b>B applying concepts of QA</b> تطبيق مفاهيم ضمان الجودة  <b>B applying all institutional procedures, policies, Vision, Mission, Values</b> تطبيق جميع الإجراءات والسياسات المؤسسية وقيم رؤية المهمة  <b>B keeping myself abreast of the latest teaching approaches</b> مواكبة أحدث أساليب التدريس  <b>B benchmarking my current teaching with a peer</b> قياس تدريسي الحالي مع الأقران  <b>B checking my teaching effectiveness through critical self evaluation</b> التحقق من فعالية تدريسي من خلال التقييم الذاتي النقدي  <b>B non, I don't have time</b> لا ، ليس لدي وقت  <b>B none, I don't need this.</b> لا شيء ، لست بحاجة إلى هذا.  <b>B Other, please specify</b>          -----          -----</p>
<p>3.4 Goals and learning objectives of the course that I teach are achieved through..          [check all boxes that apply] .. يتم تحقيق الأهداف والأهداف التعليمية للدورة التي أقوم بتدريسها من خلال ..</p> <p><b>B monitoring learning objectives weekly</b> رصد أهداف التعلم أسبوعيا  <b>B adhering to course description</b> الالتزام بوصف الدورة  <b>B exam questions alignment with learning objectives</b> محاذاة أسئلة الامتحان مع أهداف التعلم  <b>B checking exam questions alignment with course objectives by a coordinator</b> التحقق من توافق أسئلة الامتحان مع أهداف الدورة من قبل منسق  <b>B achieving Graduates Attributes (GA) is monitored systematically</b> يتم رصد تحقيق سمات الخريجين بشكل منهجي  <b>B none of the above as these are not my responsibility</b> ليس ما سبق لأن هذه ليست مسؤوليتي  <b>B Other, please specify</b>          -----          -----</p>
<p>Section 4: Professional Development التطوير المهني          We would like to know whether professional development has gained importance since the start of the QA process.          نرغب بمعرفة تأثير ضمان الجودة على الإهتمام الموجة للتطوير المهني</p>
<p>4.1 In order to develop myself professionally, I have من أجل تطوير نفسي مهنيًا ، لقد قمت          [check all boxes that apply]</p> <p><b>B participated in the college-wise workshops</b> بالمشاركة في ورش عمل الكلية  <b>B personally paid for local workshops/conferences</b> بالدفع شخصيا لورش العمل / المؤتمرات المحلية  <b>B personally paid for international workshops/conferences</b> بالدفع شخصيا لورش العمل / المؤتمرات الدولية  <b>B none of above</b> لا شيء مما سبق  <b>B Other, please specify</b>          -----          -----</p>

4.2 The workshops I attend at the college can be described as follows: يمكن وصف ورش العمل التي أحضرها في الكلية بأنها

[check all boxes that apply]

- directly linked to my teaching expertise مرتبطة مباشرة بخبرتي التعليمية
- have helped understand course requirements ساعدت في فهم متطلبات الدورة
- changed the way I teach غيرت طريقة التدريس
- elevated teaching standards معايير تدريس مرتفعة
- are practical and draw on real context عملية وتستند إلى السياق الحقيقي
- contributed to teaching quality ساهم في جودة التدريس
- none of the above لا شيء مما بالأعلى
- other, please specify

4.3 I have worked on a research paper because لقد عملت على ورقة بحثية لأن

[check all boxes that apply]

- part of my identity as a teacher جزء من هويتي كمعلم
- part of my annual appraisal جزء من تقييمي السنوي
- to develop my teaching لتطوير تدريسي
- to achieve my institution's Vision, Mission, and Values لتحقيق رؤية مؤسستي ورسالتها وقيمها
- none of the above لا شيء مما بالأعلى
- Other please specify

Section 5:

5.1 In order to enhance my teaching quality, I need more support (please complete)

من أجل تحسين جودة التدريس ، أحتاج إلى مزيد من الدعم (اكمل)

Thank you for your valuable time.

شكرا لوقتكم الثمين.



# Assessment of Mining Students' Perception of Industrial Attachment Programme at Malawi Polytechnic

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## Abstract

Industrial attachments were added to the engineering academic curriculum at the Polytechnic to ensure students are industry-ready when they graduate. The question that arises is how effective are these industrial attachments to the students. Present study seeks to address this question through a survey questionnaire utilizing a Likert Scale with “1” for “very poor”, “2” for “poor”, “3” for “good”, “4” for “very good” and “5” for “excellent” so as to gauge the students' perception of their three-month industrial attachment programme. There were six perception aspects comprising learning experience, pre-placement activities, student industrial attachment committee, host organization, evaluation process and supervisor-supervisee relationship. These six perception aspects had variables A1-A10, B1-B4, C1-C4, D1-D6, E1-E8 and F1-F4 respectively. In total, 36 questionnaires were returned fully completed from a total of 44 questionnaires distributed (*a return rate of 82 percent*). The collected data was tabulated and analyzed using descriptive statistics such as frequency, percentage and mean in Microsoft Excel. The results indicated that majority of the Mining Engineering Department students' perception ranged from “good” to “excellent” with an overall mean score of 3.6 on the Likert scale. Overall, 88% of the students rated the industrial attachment programme favorably from “good” to “excellent” on the Likert scale while 12% rated it unfavorably from “very poor” to “poor”. Of particular concern were the variables “gain writing skills”, “well-structured training programme”, “lifetime learning capacity and entrepreneurial skill” and “attending to arising issue promptly” which had “poor” ratings of 33%, 17%, 25% and 17% respectively. Nevertheless, the students' favourable perception imply that the Faculty of Engineering curriculum aligns well with the needs of the industry thereby making the students to proactively acquire the work culture at host organizations. Industrial attachments in respective universities are tailored according to various industrial needs hence the findings from this research will benefit higher learning institutions, government institutions and host organizations with similar or different attachment training programmes for future improvement.

**Keywords:** Higher Education, Internship, Job Prospects, Universities, Work-Based Learning

## 1. Introduction

The industrial attachment programme is an essential part of the academic curriculum of all Faculty of Engineering (FoE) programmes at the Malawi Polytechnic. FoE has made it compulsory for its undergraduate students to undergo a three-month internship programme prior to the completion of their studies. When students complete

their program of study and get employed in an organization they are first trained on the job, but having gone through the industrial attachment, this session does not last long or may not be necessary (Andoh et al. 2016). According to Norina et al. (2012), employers and academic researchers had identified gaps between corporate needs and graduates' attributes which indicated that graduates had little real world experience, lacked communication, teamwork and problem solving skills as well as having poor working attitudes. There is a need to help students move from the "book and theories" to the "real clients and real work places" (Maistre and Pare, 2004). Host organizations are expected to provide adequate training, job skills and work experience to these students at the work place. The students on the other hand expect to acquire much practical knowledge, gain experiences and job skills from the training; the Malawi Polytechnic expects the host organization to provide training opportunities and also hopes the students acquire as much skills and knowledge in the training. According to Renganathan et al. (2012), the seven important dimensions that contribute towards developing well-rounded graduates are technical know-how, communication and behavioural skills, analytical and critical thinking, practical aptitude, solution synthesis ability, lifetime learning capacity and entrepreneurial skills.

Therefore, it can be implied that the main objective of an industrial attachment programme is to help students apply theoretical knowledge in real work situations or challenges thereby closing the gap on the mismatch of the quality of university graduates with that of industrial expectations. The Malawi Polytechnic' introduction of the attachment programme strengthened the employer's involvement in higher education activities of preparing students for employment and entrepreneurship in industry. The industrial attachment programme is faced with a lot of challenges and prominent among them is the placement of the students for attachment. According to Renganathan et al. (2012), unless there are industries that are ready to receive students on attachment, it is difficult for attachment programmes to contribute to the university instructional process.

This research seeks to find out how the undergraduate students perceive the effectiveness of this industrial attachment programme. In order to determine this, the students' perception regarding six perception aspects is assessed:

- i. Learning experiences during the industrial attachment;
- ii. Efficiency of the pre-placement activities for the industrial attachment;
- iii. Assistance and helpfulness provided by the Students' Industrial Attachment Committee (SIAC);
- iv. Support provided by the host organization (HO) during the industrial attachment;
- v. Evaluation process during the industrial attachment; and
- vi. Industrial supervisor-supervisee relationship.

It is hoped that the outcome of this research will help improve the delivery of the newly introduced mining programmes at Malawi Polytechnic thereby meeting the needs of the industry.

## 2. Methods and Materials

Data was collected through a survey questionnaire distributed to 44 fourth year students who are the first cohort in the newly established Mining Engineering Department (MED) to do their industrial attachments at various host organizations comprising Department of Mines, Geological Survey Department, Akatswiri Minerals, Terrastone Quarry, MotaEngil Quarry, Lafarge, Mining Solutions, Masterstone Breakers, Central Materials Laboratory, Sovereign Metals, Shayona Cement, Mchenga Coal Mine, Kaziwiziwi Coal Mine and Chombe Coal Mine.

In total, 36 questionnaires (refer to *Appendix*) were returned fully completed from a total of 44 questionnaires distributed (*a return rate of 82 percent*). The structuring of the questionnaire was based on the six perception aspects (*i-vi*) outlined above. A five-point Likert scale was used to measure the respondents' feedback, with "1" for "very poor", "2" for "poor", "3" for "good", "4" for "very good" and "5" for "excellent". Refer to *Tables 1-6* for the description of the variables that were used on the questionnaire to represent respondents' perceptions.

Table 1. Mining students' perception of their learning experience

Variables	Description (I am able to [...])	Likert scale				
		1	2	3	4	5
A1	Apply theoretical knowledge with practices in industry					
A2	Acquire industry work culture					
A3	Practice team work including multidisciplinary team					
A4	Gain writing skills					
A5	Develop oral or presentation skills					
A6	Execute problem-solving activities					
A7	Develop managerial skills					
A8	Appreciate the social and ethical responsibility					
A9	Attain business insightfulness					
A10	Aspire for future education and career					

Table 2. Mining students' perception of some pre-placement activities

Variables	Description	Likert scale				
		1	2	3	4	5
B1	The briefings were sufficient and informative					
B2	The guidelines were comprehensive					
B3	The placement procedures were efficient					
B4	The evaluation criteria were relevant					

Table 3. Mining students' perception of Student Industrial Attachment Committee (SIAC)

Variables	Description	Likert scale				
		1	2	3	4	5
C1	SIAC staff were helpful					
C2	SIAC staff were always available when required					
C3	SIAC staff attended to arising issue promptly					
C4	SIAC was able to maintain a good rapport with students and HO					

Table 4. Mining students' perception of their host organization (HO)

Variables	Description	Likert scale				
		1	2	3	4	5
D1	Training provided was related to my course					
D2	HO provided maximum opportunity for training					
D3	HO has a well-structured training programme					
D4	HO provided real job experience					
D5	HO was supportive of the attachment programme					
D6	Operational issues learnt in classroom are similar to industry					

Table 5. Mining students' perception of their evaluation process

Variables	Description	Likert scale				
		1	2	3	4	5
E1	Evaluation process was relevant					
E2	Evaluation process tested technical know-how					
E3	Evaluation process tested communication and behavioural skill					
E4	Evaluation process tested analytical and critical thinking skill					
E5	Evaluation process tested practical aptitude					
E6	Evaluation process tested solution synthesis ability					
E7	Evaluation process tested lifetime learning capacity					
E8	Evaluation process tested entrepreneurial skill					

Table 6. Mining students' perception of their industrial supervisor-supervisee relationship

Variables	Description	Likert scale				
		1	2	3	4	5
F1	Supervisor was helpful					
F2	Supervisor was always available when required					
F3	Supervisor attended to arising issue promptly					
F4	Supervisor was able to maintain a good rapport with students					

Mean scores were derived (see **Table 7**) to determine whether the students have positive (favourable) or negative (unfavourable) perception regarding the industrial attachment programme. Since a five-point Likert scale was used, a mean score of more than three indicates a favourable response while a mean score of less than three indicates an unfavourable response.

After collecting all the data, the students' responses were tabulated and analyzed using Microsoft Excel. Descriptive statistics such as frequency, percentage and mean of learning experiences; pre-placement activities; SIAC; HO; evaluation process; and industrial supervisor-supervisee relationship were derived. Thereafter, important implications were drawn so that relevant changes and improvements can be made to the industrial attachment programme.

### 3. Results and Discussion

Microsoft Excel was used to tabulate and analyze the Likert Scale data. Refer to *Appendix (Table 9 to Table 13)* for the frequency, percentage, mean score and graphs of student' perception on the various variables with respect to the six perception aspects.

Majority of the students' perception ranged from "good" to "excellent" with an overall mean score of 3.6 on the Likert scale. The average mean ratings for learning experience, pre-placement activities, student industrial attachment committee, host organization, evaluation process and supervisor-supervisee relationship are 3.8, 3.6, 3.7, 3.3, 3.4, 3.5 respectively. These findings imply that the MED students perceive the industrial attachment programme favourably and this indicates that The Malawi Polytechnic' industrial attachment programme is effective from the students' point of view. Host organization and Evaluation process gave the lowest mean scores

of 3.3 and 3.4 respectively implying the need to improve them further as compared to the other perception aspects. In order to get a better insight, the research analyzed the percentage of students' perception on each variable.

Table 7. Mining students' perception of industrial attachment programme

Serial No.	Perception Aspects	Mean score (/5)
1	Learning experience	3.8
2	Pre-placement activities	3.6
3	Student Industrial Attachment Committee	3.7
4	Host organization	3.3
5	Evaluation process	3.4
6	Supervisor-supervisee relationship	3.5

The following sections examine in detail the findings obtained on the variables of the six perception aspects identified in this study as contributing to the effectiveness and improvement of Malawi Polytechnic' MED industrial attachment programme:

### 3.1. Mining students' perception of their attachment learning experience

Table 8 and Figure 1 show that the variable A1 got the highest percentage of "67" for Good with "0" Poor ratings. This is important as it addresses the need of current employers who not only demand for graduates who are competent academically but also graduates who have developed the required core competencies at workplace. In addition, this shows that the MED curriculum aligns well with the needs of the industry and the students positively acquired the work culture hence the favourable ratings. Variables A4, A5, A6, A7, A9, and A10 had slightly Poor ratings requiring the need to improve further. The students need to be given more managerial tasks at HO so as to improve their writing skills, oral presentation skills and business insightfulness which in turn will make them aspire more for further education and career. This will ensure that the mining industry has a continuous supply of highly motivated graduates ready to tackle all industrial challenges. Also, variable A10 had a higher percentage of "50" showing the commitment and satisfaction of students with the MED programmes. Overall, the learning experience perception aspect was rated favorably by the students.

Table 8. Percentage of students' ratings for learning experience

Respondent ID	TOTAL	Very Poor (%)	Poor (%)	Good (%)	Very Good (%)	Excellent (%)	TOTAL
Learning Experience Variable A1	36	0%	0%	67%	25%	8%	100%
Learning Experience Variable A2	36	0%	0%	33%	33%	33%	100%
Learning Experience Variable A3	36	0%	0%	17%	42%	42%	100%
Learning Experience Variable A4	36	8%	33%	14%	36%	8%	100%
Learning Experience Variable A5	36	0%	25%	33%	25%	17%	100%
Learning Experience Variable A6	36	0%	17%	42%	25%	17%	100%
Learning Experience Variable A7	36	17%	19%	22%	14%	28%	100%
Learning Experience Variable A8	36	0%	0%	17%	42%	42%	100%

Learning Experience Variable A9	<b>36</b>	0%	19%	25%	22%	33%	<b>100%</b>
Learning Experience Variable A10	<b>36</b>	8%	8%	11%	22%	50%	<b>100%</b>

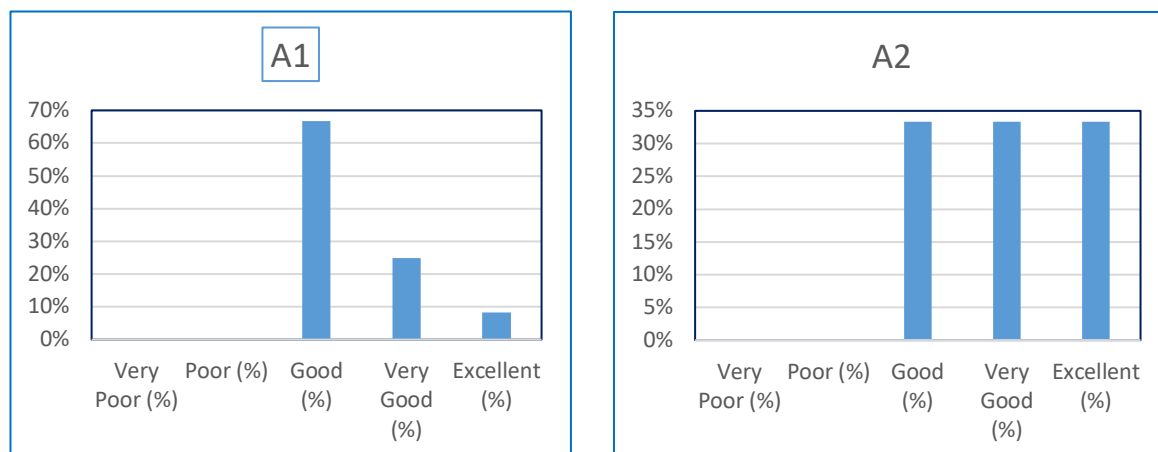


Figure 1. Graph of variable A1 “Apply theoretical knowledge with practices in industry” and A2 “Acquire industry work culture”

### 3.2. Mining students’ perception of some pre-placement activities

Table 9 shows that the 14% of the students rated variable B1 as Poor (Figure 2) showing that some students did not fully understand the briefings hence the need to improve on delivery. A solution might be to conduct more than one pre-placement meetings during the first semester and distribute the FoE students’ industrial attachment manual so as to give the students more time to prepare and ask further questions prior to the start of their attachment in the second semester of the academic calendar. Nevertheless, the pre-placement activities aspect was rated favorably by the students as higher percentages are observed in Table 9 from Good to Excellent.

Table 9. Percentage of students’ ratings for pre-placement activities

Respondent ID	TOTAL	Very Poor(%)	Poor(%)	Good(%)	Very Good(%)	Excellent(%)	TOTAL
Preplacement Variable B1	<b>36</b>	0%	14%	53%	25%	8%	<b>100%</b>
Preplacement Variable B2	<b>36</b>	0%	6%	47%	22%	25%	<b>100%</b>
Preplacement Variable B3	<b>36</b>	0%	8%	42%	17%	33%	<b>100%</b>
Preplacement Variable B4	<b>36</b>	0%	8%	42%	17%	33%	<b>100%</b>

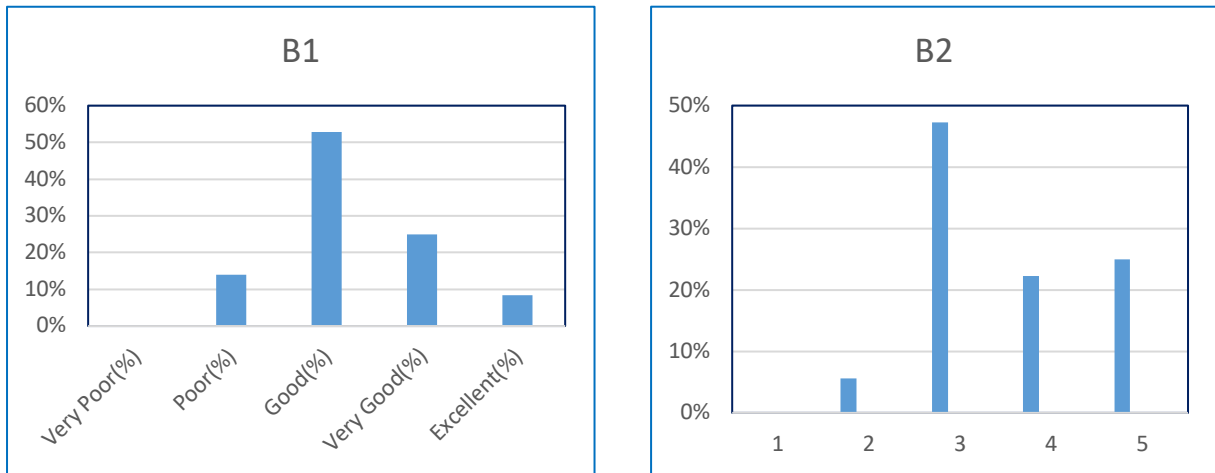


Figure 2. Graph of Variable B1 “The briefings were sufficient and informative” and B2 “The guidelines were comprehensive”

**3.3. Mining students’ perception of Student Industrial Attachment Committee (SIAC)**

Despite the few poor ratings for SIAC, the students highly appreciated the effort put by SIAC in collaborating with HO, finding attachment places and allocating them hence the higher percentages in Good to Excellent. This implies that the students favorably rated the SIAC (Table 10 and Figure 3).

Table 10. Percentage of students’ ratings for SIAC

Respondent ID	TOTAL	Very Poor(%)	Poor(%)	Good(%)	Very Good(%)	Excellent(%)	TOTAL
SIAC Variable C1	36	8%	6%	44%	8%	33%	100%
SIAC Variable C2	36	0%	6%	47%	22%	25%	100%
SIAC Variable C3	36	0%	8%	42%	17%	33%	100%
SIAC Variable C4	36	0%	8%	42%	17%	33%	100%

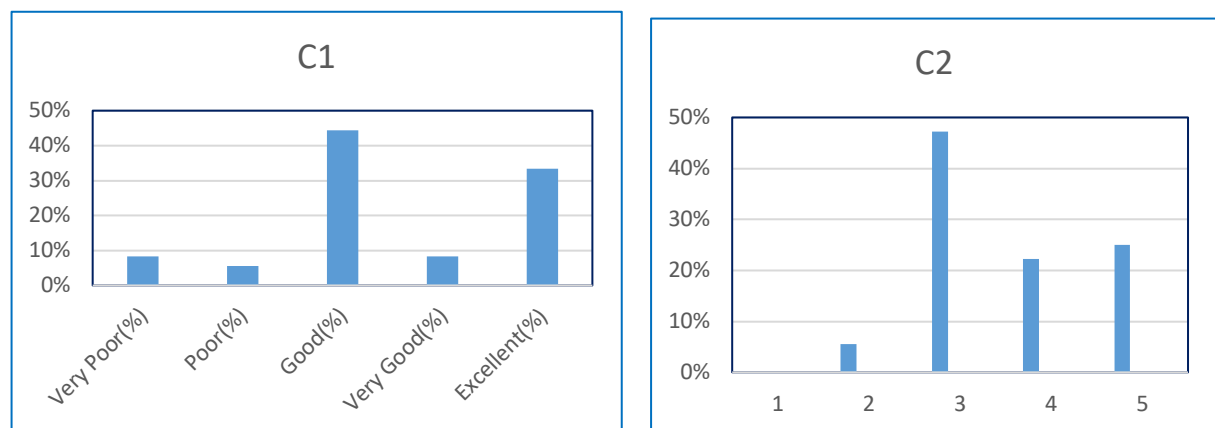


Figure 3. Graph of Variable C1 “SIAC staff were helpful” and C2 “SIAC staff were always available when required”

### 3.4. Mining students’ perception of their host organization (HO)

Though there were higher ratings in the Good to Excellent range, the frequency of Poor ratings is a cause for concern. Table 11 and Figure 4 shows that 8% to 17% of the students rated HO variables as Poor showing their dissatisfaction with the approach of the HO. It would be imperative if all HO had a well-structured training programme as this would actively keep the students on their toes and make them feel valued at the HO. The HO might also include mini-projects for the students to apply their theoretical knowledge to the work environment thereby closing the gap between theory and practice.

Table 11. Percentage of students’ ratings for host organization

Respondent ID	TOTAL	Very Poor(%)	Poor(%)	Good(%)	Very Good(%)	Excellent(%)	TOTAL
HO Variable D1	36	0%	8%	17%	33%	42%	100%
HO Variable D2	36	17%	8%	33%	17%	25%	100%
HO Variable D3	36	17%	17%	33%	17%	17%	100%
HO Variable D4	36	8%	17%	25%	25%	25%	100%
HO Variable D5	36	0%	17%	50%	8%	25%	100%
HO Variable D6	36	0%	17%	42%	17%	25%	100%

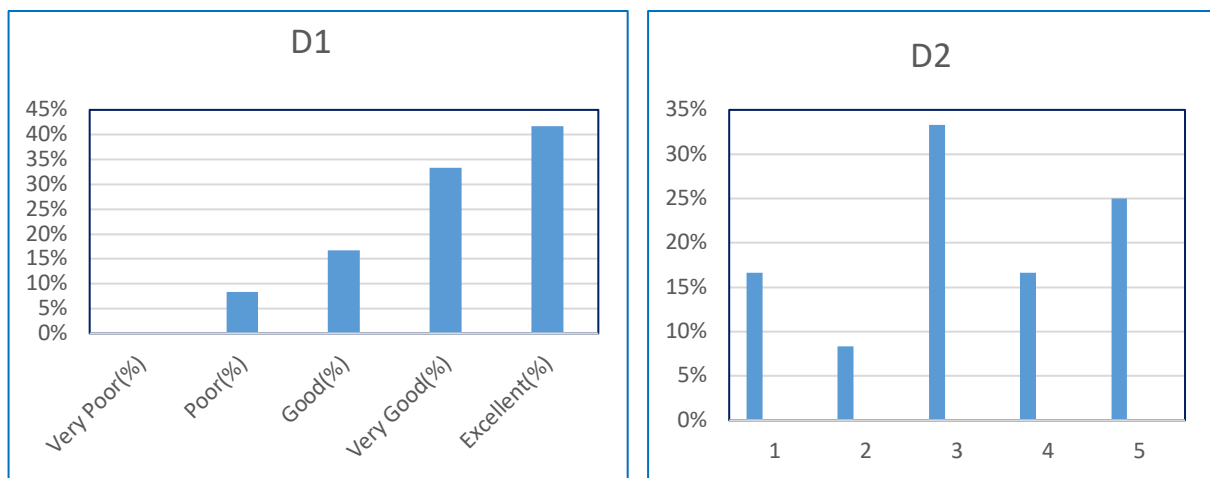


Figure 4. Graph of variable D1 “Training provided was related to my course” and D2 “HO provided maximum opportunity for training”

### 3.5. Mining students’ perception of their evaluation process

Table 12 and Figure 5 shows that the variables E7, E8 had a Poor rating of 25% and this shows the need to improve on lifelong learning capacity and entrepreneurial skill. The improvement will help the students develop constructive business ideas before they graduate. Nevertheless, majority of the students rated the evaluation process favorably due to higher percentages in Good to Excellent.

Table 12. Percentage of students’ ratings for evaluation process

Respondent ID	TOTAL	Very Poor(%)	Poor(%)	Good(%)	Very Good(%)	Excellent(%)	TOTAL
Evaluation Variable E1	36	0%	0%	33%	50%	17%	100%
Evaluation Variable E2	36	0%	17%	42%	25%	17%	100%

Evaluation Variable E3	36	0%	8%	17%	50%	25%	100%
Evaluation Variable E4	36	0%	8%	17%	67%	8%	100%
Evaluation Variable E5	36	8%	17%	42%	25%	8%	100%
Evaluation Variable E6	36	8%	17%	33%	25%	17%	100%
Evaluation Variable E7	36	0%	25%	42%	17%	17%	100%
Evaluation Variable E8	36	25%	8%	42%	17%	8%	100%

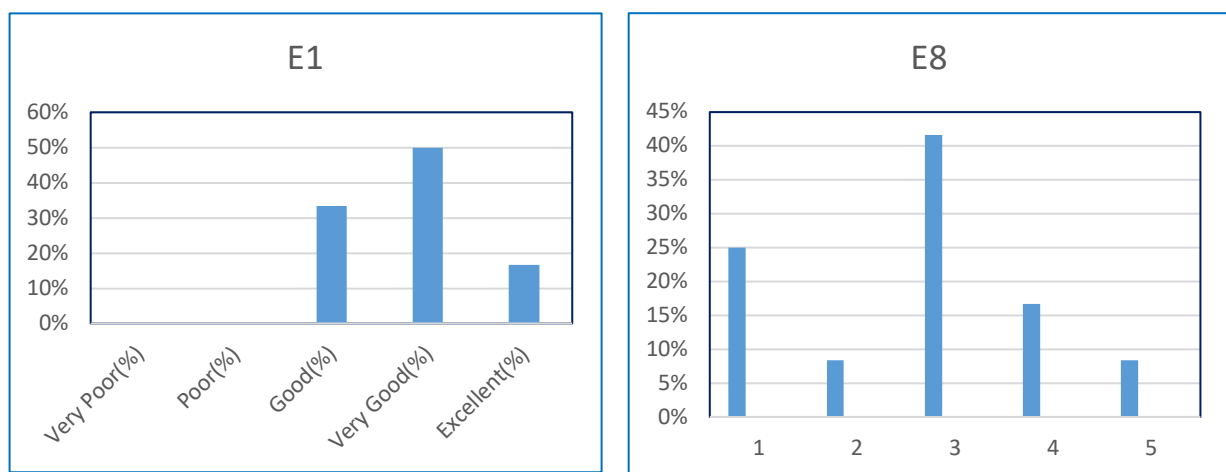


Figure 5. Graph of Variable E1 “Evaluation process was relevant” and E8 “Evaluation process tested entrepreneurial skill”

### 3.6. Mining students’ perception of their industrial supervisor-supervisee relationship

Majority of the students were satisfied with the performance of their industrial supervisors. Table 13 and Figure 6 shows that 8% to 17% of the students rated the relationship as Poor. Indeed supervisors are very busy people making sure the HO achieves its daily objectives but it would be helpful if students are attended to as the need arises so as to maintain a good rapport. Some students expressed concern that the supervisors allocated to them by the HO are of different disciplines to their field of study hence making it difficult for the students to understand and ask questions. It is therefore recommended that the HO should allocate supervisors who match the field of study of the students.

**Table 13.** Percentage of students’ ratings for industrial supervisor-supervisee relationship

Respondent ID	TOTAL	Very Poor(%)	Poor(%)	Good(%)	Very Good(%)	Excellent(%)	TOTAL
Relationship Variable F1	36	8%	8%	28%	14%	42%	100%
Relationship Variable F2	36	17%	8%	25%	25%	25%	100%
Relationship Variable F3	36	17%	17%	25%	17%	25%	100%

Relationship Variable F4	<b>36</b>	17%	8%	8%	25%	42%	<b>100%</b>
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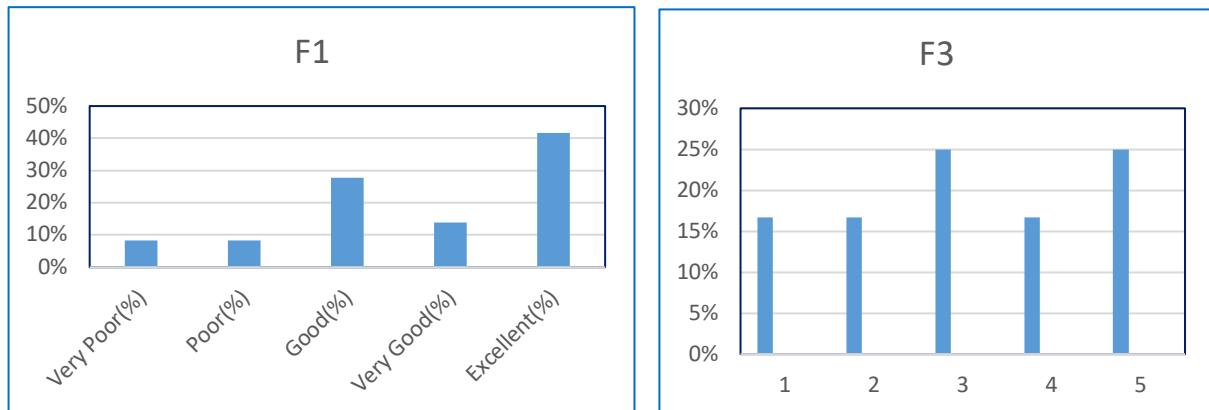


Figure 6. Graph of Variable F1 “Supervisor was helpful” and F3 “Supervisor attended to arising issue promptly”

## Conclusion

This research assessed the perceptions of mining students as regards to industrial attachment programme. Some variables were rated positively while others negatively. The findings show that the current delivery of the attachment programme is favourable to the students but there is still need for further improvement on the delivery of the attachment programme so as to fully close the gap between theoretical and practical knowledge of the students to ensure survival in the job market. Overall, the industrial attachment programme act as a bridge between undergraduates and the professional world; and its inclusion as part of their assessment methodology prior to graduation and joining the mining industry is highly rated.

Nevertheless, it is recommended to increase the sample size by carrying out further research on all other programmes that offer industrial attachment at the Malawi Polytechnic. In addition, future studies can include feedback from host organizations, industrial and academic supervisors. This will help the Malawi Polytechnic to understand the overall impact of the industrial attachment programme not only to students but also to industry; and help in its planning purposes for growth and improvement. Industrial attachment programmes are the future of student-centered learning which will accelerate the creation of industry ready-graduates thereby helping industry cut down on on-the-job training budgets.

## Conflict of Interest

The Author has not declared any conflicts of interest.

## Acknowledgements

The author would like to thank University of Malawi, The Polytechnic for supporting the case study.

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**Appendix**

Table 14 to 18 shows results of the frequency, percentage and mean of the perception variables done in Microsoft Excel sheets. Graphs of the variables are also included.

Table 14. Shows results of the frequency, percentage and mean of the perception aspect “Learning Experience” done in Microsoft Excel sheets. Some graphs of the variable are also included.

Respondent ID	Learning Experience Variable A1	Learning Experience Variable A2	Learning Experience Variable A3	Learning Experience Variable A4	Learning Experience Variable A5	Learning Experience Variable A6	Learning Experience Variable A7	Learning Experience Variable A8	Learning Experience Variable A9	Learning Experience Variable A10	
1	Good	Good	Good	Very Poor	Poor	Poor	Very Poor	Good	Poor	Very Poor	
2	Good	Good	Good	Very Poor	Poor	Poor	Very Poor	Good	Poor	Very Poor	
3	Good	Good	Good	Very Poor	Poor	Poor	Very Poor	Good	Poor	Very Poor	
4	Good	Good	Good	Poor	Poor	Poor	Very Poor	Good	Poor	Poor	
5	Good	Good	Good	Poor	Poor	Poor	Very Poor	Good	Poor	Poor	
6	Good	Good	Good	Poor	Poor	Poor	Very Poor	Good	Poor	Poor	
7	Good	Good	Very Good	Poor	Poor	Good	Poor	Very Good	Poor	Good	
8	Good	Good	Very Good	Poor	Poor	Good	Poor	Very Good	Good	Good	
9	Good	Good	Very Good	Poor	Poor	Good	Poor	Very Good	Good	Good	
10	Good	Good	Very Good	Poor	Good	Good	Poor	Very Good	Good	Good	
11	Good	Good	Very Good	Poor	Good	Good	Poor	Very Good	Good	Very Good	
12	Good	Good	Very Good	Poor	Good	Good	Poor	Very Good	Good	Very Good	
13	Good	Very Good	Very Good	Poor	Good	Good	Poor	Very Good	Good	Very Good	
14	Good	Very Good	Very Good	Poor	Good	Good	Good	Very Good	Good	Very Good	
15	Good	Very Good	Very Good	Poor	Good	Good	Good	Very Good	Good	Very Good	
16	Good	Very Good	Very Good	Good	Good	Good	Good	Very Good	Good	Very Good	
17	Good	Very Good	Very Good	Good	Good	Good	Good	Very Good	Very Good	Very Good	
18	Good	Very Good	Very Good	Good	Good	Good	Good	Very Good	Very Good	Very Good	
19	Good	Very Good	Very Good	Good	Good	Good	Good	Very Good	Very Good	Excellent	
20	Good	Very Good	Very Good	Good	Good	Good	Good	Very Good	Very Good	Excellent	
21	Good	Very Good	Very Good	Very Good	Good	Good	Good	Very Good	Very Good	Excellent	
22	Good	Very Good	Excellent	Very Good	Very Good	Very Good	Very Good	Excellent	Very Good	Excellent	

23	Good	Very Good	Excellent	Very Good	Very Good	Very Good	Very Good	Excellent	Very Good	Excellent	
24	Good	Very Good	Excellent	Very Good	Very Good	Very Good	Very Good	Excellent	Very Good	Excellent	
25	Very Good	Excellent	Excellent	Very Good	Very Good	Very Good	Very Good	Excellent	Excellent	Excellent	
26	Very Good	Excellent	Excellent	Very Good	Very Good	Very Good	Very Good	Excellent	Excellent	Excellent	
27	Very Good	Excellent	Excellent	Very Good	Very Good	Very Good	Excellent	Excellent	Excellent	Excellent	
28	Very Good	Excellent	Excellent	Very Good	Very Good	Very Good	Excellent	Excellent	Excellent	Excellent	
29	Very Good	Excellent	Excellent	Very Good	Very Good	Very Good	Excellent	Excellent	Excellent	Excellent	
30	Very Good	Excellent	Excellent	Very Good	Very Good	Very Good	Excellent	Excellent	Excellent	Excellent	
31	Very Good	Excellent	Excellent	Very Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
32	Very Good	Excellent	Excellent	Very Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
33	Very Good	Excellent	Excellent	Very Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
34	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
35	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
36	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
<b>Count (N)</b>	36	36	36	36	36	36	36	36	36	36	
<b>Not Answered</b>	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>	36	36	36	36	36	36	36	36	36	36	
<b>Very Poor</b>	0	0	0	3	0	0	6	0	0	3	
<b>Poor</b>	0	0	0	12	9	6	7	0	7	3	
<b>Good</b>	24	12	6	5	12	15	8	6	9	4	
<b>Very Good</b>	9	12	15	13	9	9	5	15	8	8	
<b>Excellent</b>	3	12	15	3	6	6	10	15	12	18	
<b>TOTAL</b>	36	36	36	36	36	36	36	36	36	36	

<b>Very Poor(%)</b>	0%	0%	0%	8%	0%	0%	17%	0%	0%	8%	
<b>Poor(%)</b>	0%	0%	0%	33%	25%	17%	19%	0%	19%	8%	
<b>Good(%)</b>	67%	33%	17%	14%	33%	42%	22%	17%	25%	11%	
<b>Very Good(%)</b>	25%	33%	42%	36%	25%	25%	14%	42%	22%	22%	
<b>Excellent(%)</b>	8%	33%	42%	8%	17%	17%	28%	42%	33%	50%	
<b>TOTAL</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
											Overall Mean Score
<b>Mean</b>	3.4%	4.0%	4.3%	3.0%	3.3%	3.4%	3.2%	4.3%	3.7%	4.0%	<b>3.7%</b>

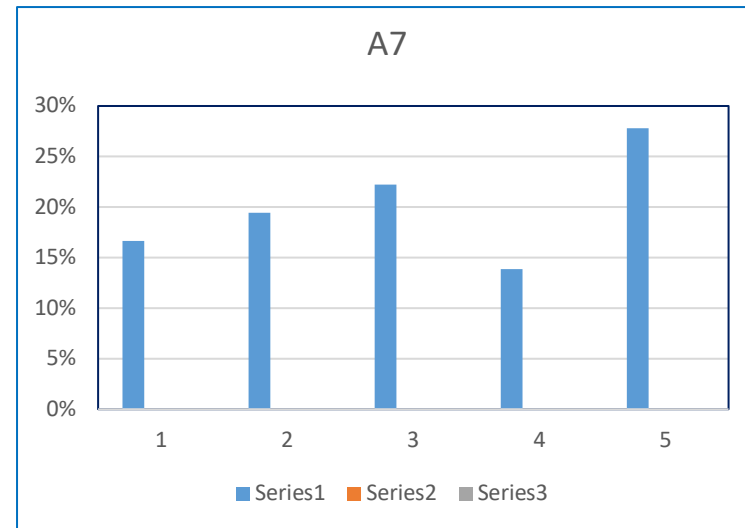
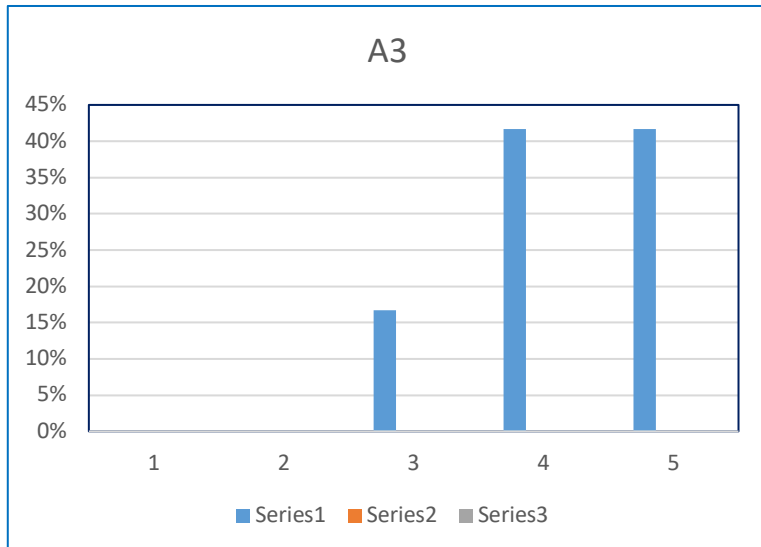


Figure 7. Graph of A3 and A7

Table 15. Shows results of the frequency, percentage and mean of the perception aspect “Pre-placement Activities” done in Microsoft Excel sheets. Some graphs of the variable are also included

Respondent ID	Preplacement Variable B1	Preplacement Variable B2	Preplacement Variable B3	Preplacement Variable B4	
1	Poor	Poor	Poor	Poor	
2	Poor	Poor	Poor	Poor	
3	Poor	Good	Poor	Poor	
4	Poor	Good	Good	Good	
5	Poor	Good	Good	Good	
6	Good	Good	Good	Good	
7	Good	Good	Good	Good	
8	Good	Good	Good	Good	
9	Good	Good	Good	Good	
10	Good	Good	Good	Good	
11	Good	Good	Good	Good	
12	Good	Good	Good	Good	
13	Good	Good	Good	Good	
14	Good	Good	Good	Good	
15	Good	Good	Good	Good	
16	Good	Good	Good	Good	
17	Good	Good	Good	Good	
18	Good	Good	Good	Good	
19	Good	Good	Very Good	Very Good	
20	Good	Very Good	Very Good	Very Good	
21	Good	Very Good	Very Good	Very Good	
22	Good	Very Good	Very Good	Very Good	
23	Good	Very Good	Very Good	Very Good	
24	Good	Very Good	Very Good	Very Good	
25	Very Good	Very Good	Excellent	Excellent	
26	Very Good	Very Good	Excellent	Excellent	
27	Very Good	Very Good	Excellent	Excellent	

28	Very Good	Excellent	Excellent	Excellent	
29	Very Good	Excellent	Excellent	Excellent	
30	Very Good	Excellent	Excellent	Excellent	
31	Very Good	Excellent	Excellent	Excellent	
32	Very Good	Excellent	Excellent	Excellent	
33	Very Good	Excellent	Excellent	Excellent	
34	Excellent	Excellent	Excellent	Excellent	
35	Excellent	Excellent	Excellent	Excellent	
36	Excellent	Excellent	Excellent	Excellent	
Count (N)	36	36	36	36	
Not Answered	0	0	0	0	
Total	36	36	36	36	
Very Poor	0	0	0	0	
Poor	5	2	3	3	
Good	19	17	15	15	
Very Good	9	8	6	6	
Excellent	3	9	12	12	
TOTAL	36	36	36	36	
Very Poor(%)	0%	0%	0%	0%	
Poor(%)	14%	6%	8%	8%	
Good(%)	53%	47%	42%	42%	
Very Good(%)	25%	22%	17%	17%	
Excellent(%)	8%	25%	33%	33%	
TOTAL	100%	100%	100%	100%	

					Overall Mean Score
Mean	3.3%	3.7%	3.8%	3.8%	3.6%

Table 16. Shows results of the frequency, percentage and mean of the perception aspect “Student Industrial Attachment Committee” done in Microsoft Excel sheets. Some graphs of the variable are also included

Respondent ID	SIAC Variable C1	SIAC Variable C2	SIAC Variable C3	SIAC Variable C4	
1	Very Poor	Poor	Poor	Poor	
2	Very Poor	Poor	Poor	Poor	
3	Very Poor	Good	Poor	Poor	
4	Poor	Good	Good	Good	
5	Poor	Good	Good	Good	
6	Good	Good	Good	Good	
7	Good	Good	Good	Good	
8	Good	Good	Good	Good	
9	Good	Good	Good	Good	
10	Good	Good	Good	Good	
11	Good	Good	Good	Good	
12	Good	Good	Good	Good	
13	Good	Good	Good	Good	
14	Good	Good	Good	Good	
15	Good	Good	Good	Good	
16	Good	Good	Good	Good	
17	Good	Good	Good	Good	
18	Good	Good	Good	Good	
19	Good	Good	Very Good	Very Good	
20	Good	Very Good	Very Good	Very Good	
21	Good	Very Good	Very Good	Very Good	

22	Very Good	Very Good	Very Good	Very Good	
23	Very Good	Very Good	Very Good	Very Good	
24	Very Good	Very Good	Very Good	Very Good	
25	Excellent	Very Good	Excellent	Excellent	
26	Excellent	Very Good	Excellent	Excellent	
27	Excellent	Very Good	Excellent	Excellent	
28	Excellent	Excellent	Excellent	Excellent	
29	Excellent	Excellent	Excellent	Excellent	
30	Excellent	Excellent	Excellent	Excellent	
31	Excellent	Excellent	Excellent	Excellent	
32	Excellent	Excellent	Excellent	Excellent	
33	Excellent	Excellent	Excellent	Excellent	
34	Excellent	Excellent	Excellent	Excellent	
35	Excellent	Excellent	Excellent	Excellent	
36	Excellent	Excellent	Excellent	Excellent	
<b>Count (N)</b>	36	36	36	36	
<b>Not Answered</b>	0	0	0	0	
<b>Total</b>	36	36	36	36	
<b>Very Poor</b>	3	0	0	0	
<b>Poor</b>	2	2	3	3	
<b>Good</b>	16	17	15	15	
<b>Very Good</b>	3	8	6	6	
<b>Excellent</b>	12	9	12	12	
<b>TOTAL</b>	36	36	36	36	

<b>Very Poor(%)</b>	8%	0%	0%	0%	
<b>Poor(%)</b>	6%	6%	8%	8%	
<b>Good(%)</b>	44%	47%	42%	42%	
<b>Very Good(%)</b>	8%	22%	17%	17%	
<b>Excellent(%)</b>	33%	25%	33%	33%	
<b>TOTAL</b>	100%	100%	100%	100%	
					Overall Mean Score
<b>Mean</b>	3.5%	3.7%	3.8%	3.8%	3.7%

Table 17. Shows results of the frequency, percentage and mean of the perception aspect “Host Organization” done in Microsoft Excel sheets. Some graphs of the variable are also included

Respondent ID	HO Variable D1	HO Variable D2	HO Variable D3	HO Variable D4	HO Variable D5	HO Variable D6	
1	Poor	Very Poor	Very Poor	Very Poor	Poor	Poor	
2	Poor	Very Poor	Very Poor	Very Poor	Poor	Poor	
3	Poor	Very Poor	Very Poor	Very Poor	Poor	Poor	
4	Good	Very Poor	Very Poor	Poor	Poor	Poor	
5	Good	Very Poor	Very Poor	Poor	Poor	Poor	
6	Good	Very Poor	Very Poor	Poor	Poor	Poor	
7	Good	Poor	Poor	Poor	Good	Good	
8	Good	Poor	Poor	Poor	Good	Good	
9	Good	Poor	Poor	Poor	Good	Good	
10	Very Good	Good	Poor	Good	Good	Good	
11	Very Good	Good	Poor	Good	Good	Good	
12	Very Good	Good	Poor	Good	Good	Good	

13	Very Good	Good	Good	Good	Good	Good	
14	Very Good	Good	Good	Good	Good	Good	
15	Very Good	Good	Good	Good	Good	Good	
16	Very Good	Good	Good	Good	Good	Good	
17	Very Good	Good	Good	Good	Good	Good	
18	Very Good	Good	Good	Good	Good	Good	
19	Very Good	Good	Good	Very Good	Good	Good	
20	Very Good	Good	Good	Very Good	Good	Good	
21	Very Good	Good	Good	Very Good	Good	Good	
22	Excellent	Very Good	Good	Very Good	Good	Very Good	
23	Excellent	Very Good	Good	Very Good	Good	Very Good	
24	Excellent	Very Good	Good	Very Good	Good	Very Good	
25	Excellent	Very Good	Very Good	Very Good	Very Good	Very Good	
26	Excellent	Very Good	Very Good	Very Good	Very Good	Very Good	
27	Excellent	Very Good	Very Good	Very Good	Very Good	Very Good	
28	Excellent	Excellent	Very Good	Excellent	Excellent	Excellent	
29	Excellent	Excellent	Very Good	Excellent	Excellent	Excellent	
30	Excellent	Excellent	Very Good	Excellent	Excellent	Excellent	
31	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
32	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
33	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
34	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
35	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
36	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	

<b>Count (N)</b>	36	36	36	36	36	36	
<b>Not Answered</b>	0	0	0	0	0	0	
<b>Total</b>	36	36	36	36	36	36	
<b>Very Poor</b>	0	6	6	3	0	0	
<b>Poor</b>	3	3	6	6	6	6	
<b>Good</b>	6	12	12	9	18	15	
<b>Very Good</b>	12	6	6	9	3	6	
<b>Excellent</b>	15	9	6	9	9	9	
<b>TOTAL</b>	36	36	36	36	36	36	
<b>Very Poor(%)</b>	0%	17%	17%	8%	0%	0%	
<b>Poor(%)</b>	8%	8%	17%	17%	17%	17%	
<b>Good(%)</b>	17%	33%	33%	25%	50%	42%	
<b>Very Good(%)</b>	33%	17%	17%	25%	8%	17%	
<b>Excellent(%)</b>	42%	25%	17%	25%	25%	25%	
<b>TOTAL</b>	100%	100%	100%	100%	100%	100%	
							Overall Mean Score
<b>Mean</b>	4.1%	3.3%	3.0%	3.4%	3.4%	3.5%	3.4%

Table 19. Shows results of the frequency, percentage and mean of the perception aspect “Evaluation process” done in Microsoft Excel sheets. Some graphs of the variable are also included

Respondent ID	Evaluation Variable E1	Evaluation Variable E2	Evaluation Variable E3	Evaluation Variable E4	Evaluation Variable E5	Evaluation Variable E6	Evaluation Variable E7	Evaluation Variable E8	
1	Good	Poor	Poor	Poor	Very Poor	<b>Very Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
2	Good	Poor	Poor	Poor	Very Poor	<b>Very Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
3	Good	Poor	Poor	Poor	Very Poor	<b>Very Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
4	Good	Poor	Good	Very Good	Poor	<b>Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
5	Good	Poor	Good	Very Good	Poor	<b>Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
6	Good	Poor	Good	Very Good	Poor	<b>Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
7	Good	Good	Good	Very Good	Poor	<b>Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
8	Good	Good	Good	Very Good	Poor	<b>Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
9	Good	Good	Good	Very Good	Poor	<b>Poor</b>	<b>Poor</b>	<b>Very Poor</b>	
10	Good	Good	Very Good	Very Good	Good	<b>Good</b>	<b>Good</b>	<b>Poor</b>	
11	Good	Good	Very Good	Very Good	Good	<b>Good</b>	<b>Good</b>	<b>Poor</b>	
12	Good	Good	Very Good	Very Good	Good	<b>Good</b>	<b>Good</b>	<b>Poor</b>	
13	Very Good	Good	Very Good	Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
14	Very Good	Good	Very Good	Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
15	Very Good	Good	Very Good	Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
16	Very Good	Good	Very Good	Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
17	Very Good	Good	Very Good	Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
18	Very Good	Good	Very Good	Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
19	Very Good	Good	Very Good	Very Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
20	Very Good	Good	Very Good	Very Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
21	Very Good	Good	Very Good	Very Good	Good	<b>Good</b>	<b>Good</b>	<b>Good</b>	
22	Very Good	Very Good	Very Good	Very Good	Good	<b>Very Good</b>	<b>Good</b>	<b>Good</b>	
23	Very Good	Very Good	Very Good	Very Good	Good	<b>Very Good</b>	<b>Good</b>	<b>Good</b>	
24	Very Good	Very Good	Very Good	Very Good	Good	<b>Very Good</b>	<b>Good</b>	<b>Good</b>	
25	Very Good	Very Good	Very Good	Very Good	Very Good	<b>Very Good</b>	<b>Very Good</b>	<b>Good</b>	
26	Very Good	Very Good	Very Good	Very Good	Very Good	<b>Very Good</b>	<b>Very Good</b>	<b>Good</b>	
27	Very Good	Very Good	Very Good	Very Good	Very Good	<b>Very Good</b>	<b>Very Good</b>	<b>Good</b>	

28	Very Good	Very Good	Excellent	Very Good	Very Good	<b>Very Good</b>	<b>Very Good</b>	<b>Very Good</b>	
29	Very Good	Very Good	Excellent	Very Good	Very Good	<b>Very Good</b>	<b>Very Good</b>	<b>Very Good</b>	
30	Very Good	Very Good	Excellent	Very Good	Very Good	<b>Very Good</b>	<b>Very Good</b>	<b>Very Good</b>	
31	Excellent	Excellent	Excellent	Very Good	Very Good	<b>Excellent</b>	<b>Excellent</b>	<b>Very Good</b>	
32	Excellent	Excellent	Excellent	Very Good	Very Good	<b>Excellent</b>	<b>Excellent</b>	<b>Very Good</b>	
33	Excellent	Excellent	Excellent	Very Good	Very Good	<b>Excellent</b>	<b>Excellent</b>	<b>Very Good</b>	
34	Excellent	Excellent	Excellent	Excellent	Excellent	<b>Excellent</b>	<b>Excellent</b>	<b>Excellent</b>	
35	Excellent	Excellent	Excellent	Excellent	Excellent	<b>Excellent</b>	<b>Excellent</b>	<b>Excellent</b>	
36	Excellent	Excellent	Excellent	Excellent	Excellent	<b>Excellent</b>	<b>Excellent</b>	<b>Excellent</b>	
Count (N)	36	36	36	36	36	<b>36</b>	<b>36</b>	<b>36</b>	
Not Answered	0	0	0	0	0	<b>0</b>	<b>0</b>	<b>0</b>	
Total	36	36	36	36	36	<b>36</b>	<b>36</b>	<b>36</b>	
Very Poor	0	0	0	0	3	<b>3</b>	<b>0</b>	<b>9</b>	
Poor	0	6	3	3	6	<b>6</b>	<b>9</b>	<b>3</b>	
Good	12	15	6	6	15	<b>12</b>	<b>15</b>	<b>15</b>	
Very Good	18	9	18	24	9	<b>9</b>	<b>6</b>	<b>6</b>	
Excellent	6	6	9	3	3	<b>6</b>	<b>6</b>	<b>3</b>	
TOTAL	36	36	36	36	36	<b>36</b>	<b>36</b>	<b>36</b>	
Very Poor(%)	0%	0%	0%	0%	8%	<b>8%</b>	<b>0%</b>	<b>25%</b>	
Poor(%)	0%	17%	8%	8%	17%	<b>17%</b>	<b>25%</b>	<b>8%</b>	
Good(%)	33%	42%	17%	17%	42%	<b>33%</b>	<b>42%</b>	<b>42%</b>	
Very Good(%)	50%	25%	50%	67%	25%	<b>25%</b>	<b>17%</b>	<b>17%</b>	

Excellent(%)	17%	17%	25%	8%	8%	<b>17%</b>	<b>17%</b>	<b>8%</b>	
TOTAL	100%	100%	100%	100%	100%	<b>100%</b>	<b>100%</b>	<b>100%</b>	
									<b>Average Mean Score</b>
Mean	3.8%	3.4%	3.9%	3.8%	3.1%	<b>3.3%</b>	<b>3.3%</b>	<b>2.8%</b>	<b>3.4%</b>

Table 19. Shows results of the frequency, percentage and mean of the perception aspect “Supervisor-supervisee relationship” done in Microsoft Excel sheets. Some graphs of the variable are also included.

Respondent ID	Relationship Variable F1	Relationship Variable F2	Relationship Variable F3	Relationship Variable F4	
1	Very Poor	Very Poor	Very Poor	Very Poor	
2	Very Poor	Very Poor	Very Poor	Very Poor	
3	Very Poor	Very Poor	Very Poor	Very Poor	
4	Poor	Very Poor	Very Poor	Very Poor	
5	Poor	Very Poor	Very Poor	Very Poor	
6	Poor	Very Poor	Very Poor	Very Poor	
7	Good	Poor	Poor	Poor	
8	Good	Poor	Poor	Poor	
9	Good	Poor	Poor	Poor	
10	Good	Good	Poor	Good	
11	Good	Good	Poor	Good	
12	Good	Good	Poor	Good	
13	Good	Good	Good	Very Good	
14	Good	Good	Good	Very Good	
15	Good	Good	Good	Very Good	
16	Good	Good	Good	Very Good	
17	Very Good	Good	Good	Very Good	
18	Very Good	Good	Good	Very Good	
19	Very Good	Very Good	Good	Very Good	

20	Very Good	Very Good	Good	Very Good	
21	Very Good	Very Good	Good	Very Good	
22	Excellent	Very Good	Very Good	Excellent	
23	Excellent	Very Good	Very Good	Excellent	
24	Excellent	Very Good	Very Good	Excellent	
25	Excellent	Very Good	Very Good	Excellent	
26	Excellent	Very Good	Very Good	Excellent	
27	Excellent	Very Good	Very Good	Excellent	
28	Excellent	Excellent	Excellent	Excellent	
29	Excellent	Excellent	Excellent	Excellent	
30	Excellent	Excellent	Excellent	Excellent	
31	Excellent	Excellent	Excellent	Excellent	
32	Excellent	Excellent	Excellent	Excellent	
33	Excellent	Excellent	Excellent	Excellent	
34	Excellent	Excellent	Excellent	Excellent	
35	Excellent	Excellent	Excellent	Excellent	
36	Excellent	Excellent	Excellent	Excellent	
<b>Count (N)</b>	36	36	36	36	
<b>Not Answered</b>	0	0	0	0	
<b>Total</b>	36	36	36	36	
<b>Very Poor</b>	3	6	6	6	
<b>Poor</b>	3	3	6	3	
<b>Good</b>	10	9	9	3	
<b>Very Good</b>	5	9	6	9	
<b>Excellent</b>	15	9	9	15	
<b>TOTAL</b>	36	36	36	36	

<b>Very Poor(%)</b>	8%	17%	17%	17%	
<b>Poor(%)</b>	8%	8%	17%	8%	
<b>Good(%)</b>	28%	25%	25%	8%	
<b>Very Good(%)</b>	14%	25%	17%	25%	
<b>Excellent(%)</b>	42%	25%	25%	42%	
<b>TOTAL</b>	100%	100%	100%	100%	
					Average Mean Score
<b>Mean</b>	3.7%	3.3%	3.2%	3.7%	3.5%



# Statistics as Measurement: 4 Scales/Levels of Measurement

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## Abstract

This article discusses the basics of the “4 scales of measurement” and how they are applicable to research or everyday tools of life. To do this you will be able to list and describe the four types of scales of measurement used in quantitative research; provide examples of uses of the four scales of measurement; and determine the appropriate measurement scale for a research problem. The article is designed to present an overview of statistical methods in order to better understand research results. Formulas and mathematical computations will not be presented, as the goal for this article is to merely provide a basic understanding of statistical measurement.

**Keywords:** Statistics, Measurement, Levels of Measurement

## Introduction

"Statistics can be fun or at least they don't need to be feared" (1). When the authors first heard this, they asked who are you kidding! Statistics are part of our everyday life and the ability to reason and think statistically should not be considered as something of a luxury, or a catalyst that triggers anxiety at the mere mention. For example, statistics can be found in the local newspapers, sports, banking statements, and most recently media broadcasts addressing pandemic information. As early as 1903, H. G. Wells, ironically a science fiction author, warned that statistical thinking would one day become a necessity along with the ability to read and write. Many people are finding that they are ill prepared in the fundamentals of statistics and are unable to navigate through the vast information currently being presented in news and media. In general, statistics doesn't have to be scary, can be fun, and is quite useful in everyday life.

Merriam-Webster (2) defines statistics as “a branch of mathematics dealing with the collection, analysis, interpretation, and presentation of masses of numerical data” which can also be classified into two categories: descriptive and inferential statistics. In either case, data is collected and then measured according to its specific purpose. These measurements are categorized into different levels, also know as levels of measurement, according to how they can be treated mathematically. The primary levels of measurement this article will focus on are nominal, ordinal, interval, and ratio data (Calkins, 2005). The terms scales and levels are used interchangeably in the literature but for purposes of this article the term scales will be used unless found in a table or chart. Before delving into the four levels of measurement, it is important to understand some basics of statistics, specifically the

two categories mentioned previously – *Descriptive* and *Inferential statistics*, each with their own goals and formulas.

### Descriptive and inferential Statistics

Any statistical study requires the collection of information (data) gathered from a group known as the population (3). Descriptive statistics takes the data from the entire population and organizes it in some type of graphical representation, and then summarizes the data to gain an overall understanding. In simple terms, descriptive statistics *describes* the data in a quantifiable manner such as in measures of center (mean, median, mode) which capture general trends in the data; and measures of spread (range, variance, standard deviation) which describes the distribution of the data values throughout the population in relation to each other (Taylor, 2018). An example of descriptive statistics is to take the scores of a 7<sup>th</sup> grade math test and find the average student score, or to find how each score deviates from the mean score. It is important to note that descriptive statistics cannot be generalized to other populations, however, the data can be used to infer or make predictions using inferential statistics.

Inferential statistics uses formal methods for drawing conclusions from the sample data, and then makes inferences about the larger population. Whereas descriptive statistics have a primary goal of summarizing the entire population, inferential statistics has two goals – estimating and predicting based on a sample of the population (3, 4; Taylor, 2018). Inferential statistics takes what is known (from descriptive statistics) and “makes assumptions or inferences about what is not known” (Newsome, 2007). If we wanted to determine how well students will do on the math test mentioned above for the entire state, it would more feasible to analyze a sample or subset (one school district compared to the entire state), and then generalize to the entire population. These measures obtained from analyzing the sample, when applied to, and thus representing, the entire population are known as parameters (3). Parameters are a “characteristic of the whole population” (Calkins, 2005). Inferential statistics uses confidence intervals (range of values from observed interval estimates), and hypothesis testing based on probabilities which may be uncertain.

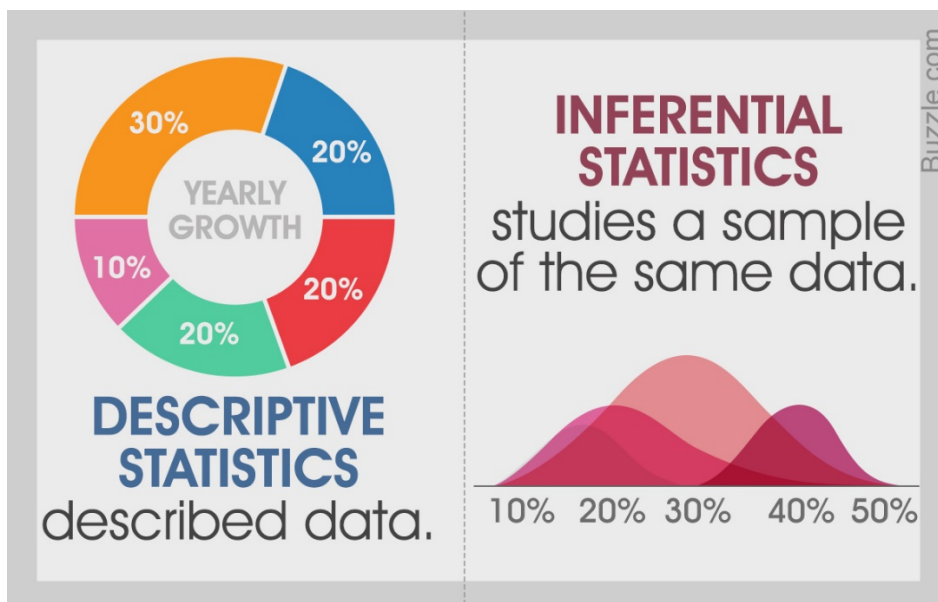


Figure 1: Descriptive vs. inferential statistics: Know the difference (3)

As Figure 1 depicts, with inferential statistics only a sample of the population is needed, however, descriptive statistics require the entire population be used (3, 4; Taylor 2018). Table 1 provides the main differences between descriptive and inferential statistics; however, it is important to note that *generalization* is a key difference between the two. Descriptive statistic measurements are summarized as exact numbers and cannot be used to generalize to other populations whereas inferential statistics starts with a sample and generalizes to a population expressed as a range of values along with confidence levels. The two are not mutually exclusive (Calkins, 2005).

Descriptive Statistics	Inferential Statistics
<ul style="list-style-type: none"> <li>It simply describes or organizes data regarding the population under study – it does not draw conclusions.</li> </ul>	<ul style="list-style-type: none"> <li>It extrapolates data to a whole population using a smaller representative sample, allowing you to make predictions and draw conclusions.</li> </ul>
<ul style="list-style-type: none"> <li>It does not use probabilities.</li> </ul>	<ul style="list-style-type: none"> <li>It is based on the probability theory.</li> </ul>
<ul style="list-style-type: none"> <li>The results of descriptive statistics are presented as numbers, graphs, charts or tables.</li> </ul>	<ul style="list-style-type: none"> <li>The results of inferential statistical analyses are presented as a range of potential figures, along with a margin of error.</li> </ul>

Table 1: Differences between descriptive and inferential statistics (3, 4; Taylor, 2018).

## Measurement

From a historical perspective, measurement systems have long existed in human activities for a variety of purposes such as to simplify trade or to compare items. Metrology is the study of measurement whose sole purpose is to unify acceptable standards of common understanding and conformity. Such standards of measurement include the metric system, proposed by France in 1795, and accepted worldwide as the International System of Units (SI) during the 11<sup>th</sup> Conference Generale des Poids et Mesures (CGPM) in 1960. Since measurement is the cornerstone of science, technology, and research fields, application is dependent on context and discipline. Every day use of the term measurement would typically refer to the length of something (i.e. feet, miles, meters, etc.), or how much something weighs (i.e. grams, ounces, pounds, etc.) (1,5).

According to The Center for Innovation in Research and Teaching, measurement is a “means of assigning numbers or other symbols to characteristics of objects according to certain pre-specified rules” (6). Helmenstine (2019) states that when comparisons of quantity are made with a specified rule or standard unit, it cannot be perfect and “inherently include error, which is how much a measured value deviates from the true value” (para 1). For educational purposes, measurement “refers to any device for the general study and practice of testing, scaling, and appraising the outcomes of educational process” (7). Applying measurement methods, ranging from a simple computation of calculating the mean of a distribution, or more complex calculations such as interactional effects, to data is known as statistics (8). Measurement, in terms of statistical research, is used to assign symbols, letter, or numbers to variables according to conditional rules. These measurement tools are held to standards and can be used to obtain reliable results.

## Quantitative and Qualitative Data

The variables used in statistical measurements can be classified into two different types: qualitative or quantitative variables. Qualitative variables, also referred to as categorical variables, describe data that are not numerical and fit into specific categories. This would include such items as eye color (i.e. brown, blue, hazel); type of automobiles (i.e. SUV, compact, mid-size), or gender (i.e. male, female). Qualitative variables have no natural order nor can they be added, subtracted, multiplied, or divided.

Quantitative data, on the other hand, has numerical value and is something that can be counted or measured by a tool or scale. For example, the average of test scores, number of recorded births, home values, etc. The type of data represented quantitatively could be expressed as a distribution of values or summarized as an average, and are classified as either discrete whole number values (i.e. number of t-shirts sold, students in a class, home runs hit etc.), or continuous rational values (i.e. distance traveled, weight/height, temperature, etc.) (Surbhi, 2017).

Both qualitative and quantitative variables are classified into four categories of scales of measurement -nominal, ordinal, interval or ratio. As Figure 2 shows, qualitative data can be either classified as nominal (by name such as gender, name, social security numbers) with no ranking order, or ordinal that provides some type of order but without a mathematical difference between scales (e.g. level of satisfaction, or spiciness levels – med, mild, hot). Quantitative data can be classified as either Interval (e.g. differences in temperatures according to an interval scale) or ratio (e.g. measurement of height). The authors note a word of caution when dealing with Likert scale surveys as they can be considered both interval or ordinal depending on if the data fulfills the interval scale requirements, or if they are just ordering responses. Figure 5 summarizes how each of the four scales interacts with qualitative and quantitative data and will be the focus of the remainder of this article (6).

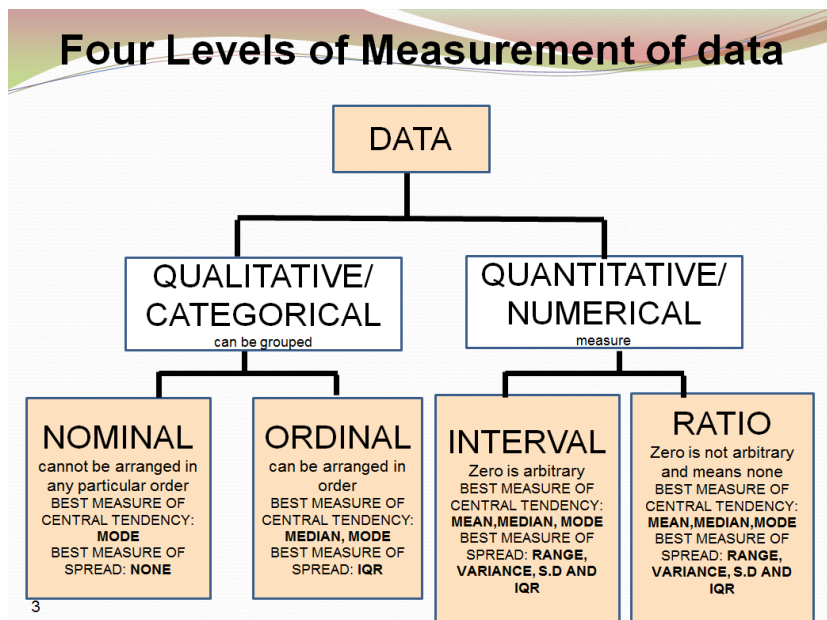


Figure 2: Four Levels of Measurement of data (Raghunath, 2019)

### Scales of Measurement

In statistical measurements, all variables fall in one of the four scales of measurement – nominal, ordinal, interval, and ratio (Figure 3), and are considered an easy way to sub-categorize different types of data. The variables in collected data can be classified into one of the four scales of measurement depending on how a variable is defined or categorized, and analyzed (1, 9). As Figure 4 depicts, each scale fulfills a function of scale preceding it (Bhat, 2020) and are considered additive - Nominal scales simply names based on characteristics with no specific order. Ordinal scales names and then places variables in specific order based on their attributes. Interval scales names, orders, and then proportionate intervals between variables. Finally, ratio scales does all that interval scales plus it can accommodate zero as a value for any of its variables.

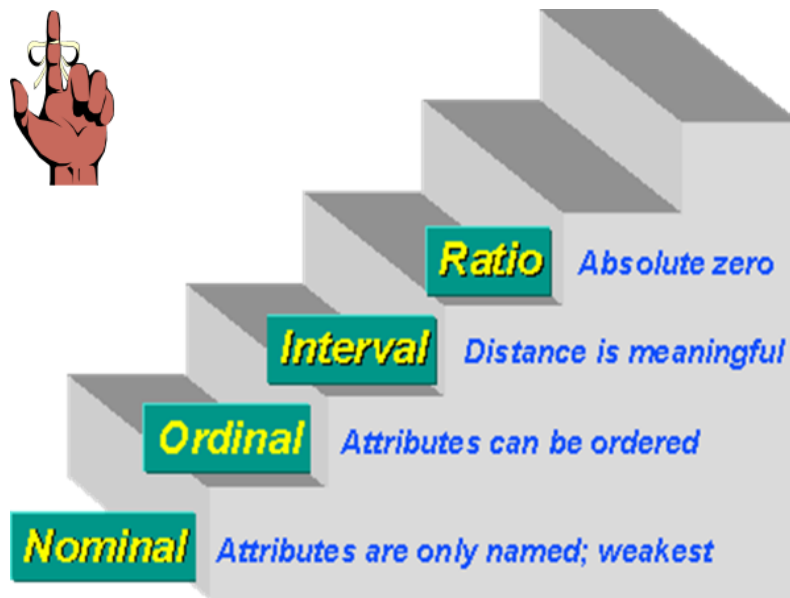


Figure 3: Trochim (2002)

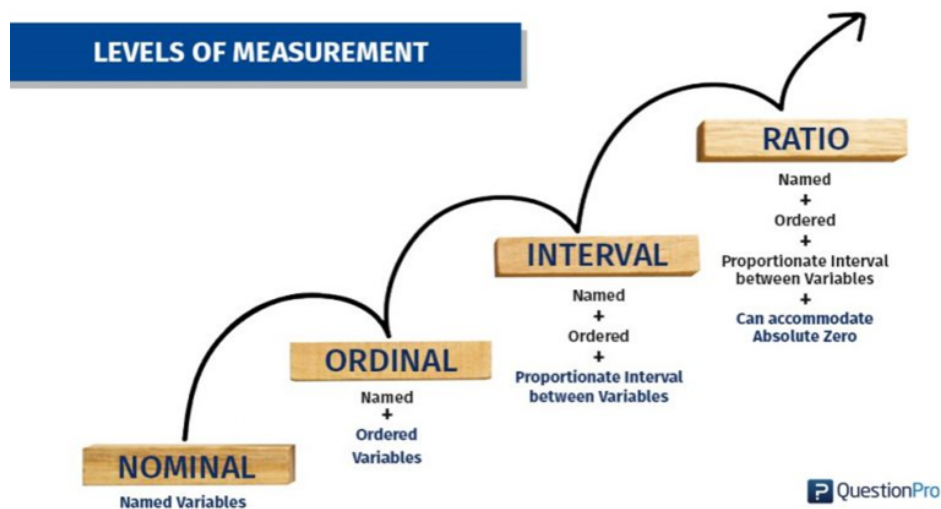


Figure 4: Levels of Measurement (10)

It is important to know about scales of measurement, because without this understanding, you would not be able to conduct appropriate data analysis techniques. In the process of statistical measurement numbers, or values are assigned according to set rules, and hence determines the scale of measurement. Each scale of measurement has its own property or set of properties, which determines what statistical methods to use (7). In knowing the level of measurement, you will be able to interpret the data, and then decide what statistical analysis is suitable. The following description of the levels is based on the references (6, 7, 9, Crossman, 2019; Garger, 2010; Regoniel, 2012; Volchok, 2015).

### Nominal Scales

At the lowest level and weakest form of measurement, nominal scales are considered the easiest to understand because they are simply used for labeling or arbitrarily categorizing variables. The word nominal comes from the Latin word Nomen which means "name". Nominal scales have no quantitative value or order, nor can you apply any mathematical operations with them. Nominal scales are essentially a type of coding, and are based on qualities of type or kind such as gender, ethnicity, place of birth. Typical coding used are numbers, letters, colors, labels or any other symbol that distinguishes between the categories.

Nominal scales can arbitrarily be assigned numbers (i.e., 1=East, 2=North, 3=South, etc.), however, with no order or equal intervals, one cannot perform arithmetic (+, -, /, \*) or logical operations (>, <, =) on the data sets. It is important to note that in assigning numbers in nominal scales, it does not imply order, or ranking, it just uniquely names the attribute. An example of this type of coding would be football jerseys. A player with jersey number 20 is not twice the player with a jersey number of 10. As the example illustrates, there is only a qualitative difference between the jersey numbers, and not a quantitative one. An easy way to remember nominal “that “nominal” sounds a lot like “name” and nominal scales are kind of like “names” or labels” (11).

Nominal scales are often used in survey research or questionnaires, for example asking students what their favorite music genre is between Rap, Country, or Pop. The researcher could then arbitrarily assign numbers to each category, and then quantify the preference for each genre using percentages or mode (which category received the highest vote). Figure 7 provides three examples of nominal scales each with no overlap (mutually exclusive) nor numerical significance. Notice that in the case of “What is your gender”, there are only two variables to select from – male or female, and are identified as a *dichotomy*. Other examples of dichotomous nominal scales without order include yes/no, hot/cold, on/off. Some nominal data can be ordered such as with “cold, warm, hot, very hot” but again, the order has no quantifiable significance.

Figure 7: Examples of Nominal Scales (Raghunath, 2019)

### Ordinal Scales

The second level of measurement is the ordinal scale which builds off of the nominal scale. While both nominal and ordinal scales categorize data, the primary difference between the two is that ordinal data is concerned with rank-ordered (i.e. highest to lowest), and summarizes where data points are in relations to each other. Ordinal scale is defined as “a variable measurement scale used to simply depict the order of variables and not the difference between each of the variables” (11), and typically uses non-numeric categories for example, low, medium, and high, or Likert items with responses such as never, sometimes, often, always.

The ordinal scale is best used when rank is important, but when intervals between data points are not the same length. An example would be a students’ rank in class where the distance between the top student’s GPA ranking is not as close to that of the second and third ranked students. Since there is a lack of equal distance between rankings, mathematical manipulations cannot be performed on ordinal data other than logical operations (>, <, =), nor can a true zero value be indicated (i.e. how much faster 1<sup>st</sup> place is compared to 2<sup>nd</sup> and 3<sup>rd</sup> etc.). Although the data can be rank-ordered, the distance between the rankings have no meaning and may vary. As with nominal data, and easy way to remember ordinal scales is that ordinal sounds much like “order” which is precisely to purpose of this type of scale.

A Likert Scale is a good example of ordinal measurement and typically used by market researchers to determine non numeric levels of customer satisfaction (Figure 8). In the case of Figure 9, numbers are used to rank the responses, but are only used to represent order and not meaning in regards to distance between scores (a 4 - Happy does not indicate twice as much as 2-Unhappy). It is important to note that with this type of scale, *order* is significant since the difference, or magnitude, between each interval is not really known which is the major disadvantage of ordinal scales.

**How do you feel today?**

1 – Very Unhappy

2 – Unhappy

3 – OK

4 – Happy

5 – Very Happy

Figure 8: Example of Ordinal Scale  
(Raghunath, 2019)

**How satisfied are you with our service?**

1 – Very Unsatisfied

2 – Somewhat Unsatisfied

3 – Neutral

4 – Somewhat Satisfied

5 – Very Satisfied

Figure 9: Ordinal Scale with Numbers

### Interval Scales

Building on the two previous levels, the third level- *Interval Scales* goes beyond categorizing and ordering by establishing consistent distances known as intervals between categories or data points. Bhat (2020) defines interval scales as “a numerical scale where the order of the variables is known as well as the difference between these variables”. Since numbers are used to express quantities, with interval data (price per gallon of gasoline, miles driven, and temperature) the numbers will be classified as all-inclusive (a specific dollar amount), mutually exclusive (a single amount cannot take on two different values), and ordered (gas at station 1 is more than gas at station 2). A key point of interval scales is the equal and meaningful distance between measures that lack a true zero point.

A classic example of interval scales is temperature where 50 degrees and 70 degrees has the same distance between that of 40 degrees and 60 degrees. Since temperature can be a negative value, the value of zero is considered arbitrary (0 degrees Celsius is the same as 32 degrees Fahrenheit), and does not indicate the absence of something (0 degrees does not mean no temperature). Other common examples of interval scale measurements include IQ scores, personality tests and aptitude test scores. Theoretically, IQ scales should be treated as ordinal data since psychologists have no way of quantifying intelligence (i.e. a person with an IQ of 120 is not twice as smart as someone with an IQ of 60), however, in practice, IQ scores are treated parametrically as interval (and at times ratio) data. As with the previous two scales, interval scales is easy to remember since the word interval means “space in between” – the constant distance being the key characteristic of interval scales.

In addition to being able to categorize and order data frequencies and percentages, interval scales allow for more advanced statistical analysis such as in measuring mode, median, or mean, and importantly the calculation of standard deviation. Interval data can be added or subtracted; however, it is important to note that interval data cannot be multiplied or divided. This is because of the presence of an arbitrary zero point; thus, you cannot calculate ratios in a meaningful way (i.e. 100 degrees is not twice as *hot* as 50 degrees even though the attribute value is twice as large).

### Ratio Scales

The final level of measurement is ratio scale and is considered the highest level of measurement because it satisfies all four levels of measurement, contains the most information about the data values, and includes the presence of zero as a starting point. Ratio scale, as defined by Bhat (2020) is “a variable measurement scale that not only produces the order of variables but also makes the difference between variables known along with information on the value of true zero”. Since ratio data has a starting point of zero, values less than zero are not possible (i.e. you cannot weigh -40 pounds). This fact alone allows for a wide range of both descriptive and inferential statistics to be applied.

With ratio data you can construct meaningful fractional values, such as weight, and height. Time is an example of comparisons in ratio scales because it can be divided into equal intervals that can be used compare to another value (i.e. 10 minutes is twice as long as 5 minutes, and income of \$52,000 is twice that of a starting salary of \$26,000, etc.). Ratio and interval scales are often used interchangeably, however, it is important to keep in mind that interval data cannot not be meaningfully multiplied or divided as previously discussed. The interval data for temperature is not ratio because zero degrees does not equate to "no temperature," however, income would be considered ratio data because zero dollars is truly "no income."

As mentioned, the ratio scale satisfies all levels of measurement because it categorizes data, organizes the data so that comparisons can be made in relation to each other, and sets the data at equal intervals apart. Ratio scale data produces the most power statistical information, and it is possible to extract lower-level statistics from it such as categories or ranking, however not vis-versa. Knowing what level of measurement your data is will determine the type of analysis to use, thus allowing you to ask deeper degrees of questions about your data. If your data is ordinal rather than interval or ratio, it limits the type of statistical analysis that can be used therefore useful information would not be discovered. A few examples include a chi-square tests of independence being most appropriate for nominal level data, and The Mann-Whitney U test would be used for an ordinal level (dependent variables) and a nominal level (independent variables) data. Figure 10 summarizes each of the four levels of measurement in respect to properties, examples, and statistical analysis used, along with appropriate graphical representations.

Level of Measurement	Properties	Examples	Descriptive statistics	Graphs
Nominal	Discrete Order less	Binary Responses (True or False) Names of People Colors of paint	Frequencies/Percentages Mode	Bar Pie
Ordinal	Ordered categories Comparisons	Likert Scales Grades on an exam	Frequencies Mode Median Percentiles	Bar Pie Stem and leaf
Interval	Differences between ordered values have meaning	Deg. C or F Some Likert Scales (must be specific)	Frequencies Mode Median Mean Standard Deviation	Bar Pie Stem and leaf Box plot Histogram
Ratio	Continuous True 0 allows ratio statements (for example, \$100 is twice as much as \$50)	Money Weight	Mean Standard Deviation	Histogram Box plot

Figure 10: Summary of Descriptive Statistics & Graphical Summaries for the Four Scales of Measurement (Raghunath, 2019)

### Measurement Error

No matter which level of measurement used in statistical research, researchers, statisticians, and data professionals all agree that there will always be some type of measurement error in statistical measurement. According to Glen

(2020), “Measurement Error (also called Observational Error) is the difference between a measured quantity and its true value” (para 1). These errors, which may be either negative or positive, can occur when there is a difference between a reported test score and actual knowledge/ability, or when outside factors influence actual performance during the collection process (12). Random errors are those that are generally expected and occur naturally in the scientific process. Systematic errors are another type of measurement error and occur due to human error or miscalibrations of testing instruments. Regardless of the error type, effort should be given to minimize these errors.

Measurement relies on precision and accuracy meaning the more precise your data is, the more accurate it will be to the true value with minimal error. With interval and ratio scales, precision is not so much of an issue because parameters can be set to a much finer distinction (i.e. using millimeters rather than centimeters to measure height, or nearest millionth of a second rather than tenth of a second for lapsed time). It is much more difficult to maintain precision with ordinal scale measurements as is the case with a five-point scale verses a 29-point scale. Participants would have difficulty selecting a best representation of their responses thus introducing measurement error and an illusion of precision (Fife-Schaw, 2006).

### Application and Conclusion

Measurement is a constant in our society. Are you a sports fan and identify number 9 on an NFL New Orleans Saints jersey as Drew Bree’s? Are you a mother looking at a small box of cereal comparing unit rates (\$0.14 per ounce for large box compared to \$0.11 per ounce on another). How about checking your child’s temperature? We use measurement to identify if training in the workplace is effective, to evaluate classroom instruction, to identify knowledge and skills gaps, and even more recently to determine if CDC guidelines are effective (Does hand washing and social distancing decrease the rate of infections?). Learning management systems (LMS) use analytical measurements to tell which pages were accessed more frequently, and classroom teachers can use the measurement features in their current virtual programs to differentiate instruction. These items are just the tip of the iceberg as the list of what we could measure, and apply the four levels of measurement, goes on indefinitely. Since we all use statistics and measurement on a daily basis, having a basic understanding of the four levels of measurements, regardless of vocation, is important. From an everyday consumers perspective, levels of measurement information assists us in making informed decisions. The information we will work with to answer the aforementioned daily activities are the result of researcher’s knowledge of measurement scales to determine credibility and validity of collected data. As we have learned from this article, each of the four levels of measurement provides for different amounts of detail with nominal producing the least amount of detail and ratio the most amount. Each level will also determine how to mathematically treat the data and which type of testing procedures are most appropriate. We also learned that by using a sample set of the population, we can use the data to make generalized decisions for the entire population.

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# Aligning ACRL's Framework for Information Literacy with Communication Studies' Learning Outcomes for Library Instruction: An Exploratory Study

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## Abstract

Integrating the ACRL Framework for Information Literacy in a library instruction class can be challenging. In addition, some disciplines such as communication studies have their own learning outcomes with similar connections to the framework to consider. This study explored how the framework can be positioned with learning outcomes from the National Communication Association (NCA). This study was guided by two research questions: 1. what are the intersections and shared values between ACRL's Framework for Information Literacy and NCA's Learning Outcomes, and how can these outcomes and frames be integrated into a library instruction workshop for undergraduate students in communication studies? To address these questions, the study identified, synthesized, and presented learning outcomes from two disciplines to communication studies faculty and academic instruction librarians in focus groups and interviews. Based on the interviews and focus groups, two themes emerged in this study: concept to practice and communicating information in society. These themes illuminate the connections between the two disciplines in the context of library instruction. By gathering their perceptions, the study explored a synthesized guideline to support future library instruction for communication studies courses at the undergraduate level.

**Keywords:** Information Literacy, Communication Studies, Faculty Collaboration, Library Instruction and Research Skills

## Introduction

In higher education, students may often take a first-year communication studies course as part of their general education requirements (National Communication Association, 2019a). In such courses, students develop basic communication skills and an understanding of communication theories. What role does information literacy play in this discipline? This study explores the perceptions of faculty and academic librarians on students' information literacy needs in communication studies by drawing on the shared values, goals and visions from the Association of College and Research Libraries (ACRL) Framework on Information Literacy for Higher Education and the National Communication Association's (NCA) Learning Outcomes. The purpose of this paper is to identify and

synthesize key frames and outcomes, and to present a new guideline to potentially support students' information literacy skill in the field of communication studies.

Launched in 2016, the ACRL Framework for Information Literacy for Higher Education “[grew] out of a belief that information literacy as an educational reform movement will realize its potential only through a richer, more complex set of core ideas” (ACRL, 2015, para 1). The six frames were developed as “interconnected core concepts with flexible options for implementation, rather than on a set of standards or learning outcomes, or any prescriptive enumeration of skills” (ACRL, 2015, para. 2). These frames focus on core values and ideas about information literacy that can be adapted into a library instruction session (see Table 1). Kuglitsch (2015) wrote, “like the ACRL Information Literacy Competency Standards for Higher Education (the Standards), the Framework is intended as a broad, generalizable statement on information literacy” (p. 458). The framework emphasizes the research processes, and skills to critically evaluate information and how information is accessed, presented, preserved, processed, and created while adapting to disciplinary approaches and needs.

Table 1: ACRL Framework for Information Literacy in Higher Education: Frames

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1. Authority is constructed and contextual
  2. Information creation as a process
  3. Information has value
  4. Research as inquiry
  5. Scholarship as conversation
  6. Searching as strategic exploration
- 

The National Communication Association (NCA), a nonprofit membership based scholarly society, created the Learning Outcomes in the field of communication studies to focus on what students should know, what should they understand and what should they be able to do with a communication degree (NCA, 2019c). By developing the outcomes through a collaborative tuning process with faculty leaders in communication studies, the field aims to create a better understanding of the “discipline’s core, career pathways for students and feedback from stakeholders” (Marshall, 2017; NCA, 2019c). Table 2 lists the nine outcomes that came out from such discussions.

Table 2: NCA’s Learning Outcomes

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1. Describe the communication discipline and its central questions
  2. Employ communication theories, perspectives, principles, and concepts
  3. Engage in communication inquiry
  4. Create messages appropriate to the audience, purpose, and context
  5. Critically analyze messages
  6. Demonstrate the ability to accomplish communicative goals (self-efficacy)
  7. Apply ethical communication principles and practices
  8. Utilize communication to embrace difference
  9. Influence public discourse
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These learning outcomes and their goals resonate with the ACRL’s frames but there is a lack of research in the intersections or integrations of these two areas from the perspectives of teaching faculty and librarians. This study addresses the shared learning outcomes and designs a synthesized guideline from the two disciplines. Gathering and utilizing the perceptions and feedback from faculty and librarians, the study tested the feasibility and acceptability of the synthesized guideline through interviews and focus groups. Feasibility testing is defined as how operational this synthesized guideline is: do faculty and librarians feel that these outcomes can be useful and possible to incorporate in a library instruction workshop? The study also evaluated the acceptability of this guideline: are these key components of the guideline representing both disciplines and/or are they limiting other objectives from either discipline. Can communication studies faculty apply this new document in their teaching approach to information literacy as well? To assess the potential effectiveness, feasibility and accessibility of this

synthesized guideline, focus groups and in-depth interviews with instruction librarians and communication studies faculty were conducted.

This case study contributes to the current literature on mapping appropriate frames to learning outcomes of a specific discipline. The research questions for this study are 1. What are the intersections and shared values between ACRL's Framework for Information Literacy and the NCA's Learning Outcomes? 2. How can these outcomes and frames be integrated into a library instruction workshop for undergraduate students in communication studies?

By understanding the intersections in both disciplines, faculty and librarians can create appropriate and meaningful assignments, lesson plans and activities to enrich communication students' learning experiences. By exemplifying how to adapt the framework into communication studies and its own standards coming from NCA, universities and colleges that require students to take a communication class may utilize this study as a potential guide to integrate information literacy into their program and expand conversations about the framework in other disciplines as well. Assessing how faculty and academic instruction librarians perceive the synthesized guideline from both areas can provide useful feedback to demonstrate the key frames and learning outcomes that can be effectively applied. Interviews and focus groups were conducted to gather qualitative feedback from teaching faculty and librarians in developing useful approaches to measure students' information literacy needs in communication studies at the undergraduate level.

### **Literature review**

There is a growing number of studies concerning the ACRL Framework for Information Literacy, and there are several articles that cover disciplinary standards particularly for writing, business, agricultural sciences, nursing and journalism (Albert & Sinkinson, 2015; Boss, De Voe, Gilbert, Hernandez, Heuer, Hines, Knapp, Tokarz, Tucker, & Williams, 2019; Gilman, Sagàs, Camper, & Norton, 2017; Jefferson, 2017; Willson & Angell, 2017). One gap in the literature is the research concerning the NCA's Learning Outcomes in relations to the framework and information literacy (IL). To understand the role of the framework in disciplinary studies, it is helpful to explore articles that examine the framework conceptually.

Kuglitsch (2015) described the challenge that exists between IL as a skill to be generalized and IL as discipline-specific by emphasizing "teaching for transfer," which helps students apply knowledge and skills learned in one setting to other situations, which "offers a way to resolve the tension" (p. 458). Threshold concepts are "core ideas and processes that define the ways of thinking and practicing for a discipline" (Townsend, Brunetti, & Hofer, 2011). Kuglitsch (2015) argued that threshold concepts in the "teaching for transfer" idea can support librarians to draw on connections and develop transferable skills for their students (p. 467). Jacobson and Gibson (2015) introduced the conceptualization of the framework, threshold concepts and how they are part of the framework. Jacobson and Gibson (2015) asked "how can students themselves contribute most effectively to research projects based on the framework?" The authors highlighted the values of the framework in IL. Albert and Sinkinson (2015) acknowledged IL and rhetoric as "complex information landscape" and addressed the value of each framework that can be applied to composition in a presentation. This study exemplified the integration of both learning outcomes from two disciplines by applying selected frames into research assignments. However, the study does not elaborate on assessment and outcomes, which would be helpful to develop assignments that could be evaluated for learning purposes.

Lindstrom and Shonrock (2006) emphasized faculty-librarian collaboration in designing learning outcomes and shared goals through several case studies. Other areas included first year learning communities and interest groups in implementing collaborative programs involving librarians. Lindstrom and Shonrock (2016) explored how to apply information literacy in different contexts and discuss assessments from such partnerships. A faculty-librarian partnership is key in developing IL assignments and assessments as described in a research paper by Junisbai, Lowe and Tagge (2016). Their paper demonstrated the value of collaboration: "when faculty collaborate with librarians to foster IL competencies, the result is a statistically significant improvement in students' demonstrated research skills" (p. 604). Furthermore, to understand faculty perception in IL, Guth, Arnold, Bielat, Perez-Stable

and Vander Meer (2018) conducted a study and found that “faculty’s ranking of the importance of information literacy for students’ academic success was high across disciplines” (p. 707). The authors launched an online survey in the Spring 2016 semester to gather input from 237 faculty regarding their thoughts on information literacy and the framework. Based on such responses, the authors studied the faculty perception on IL and created ten themes that were coded from such faculty responses. The findings from communication studies faculty from this study found that there is an interest in visual and digital literacy, and on the “authority of the author/speaker (types of authority) as well as the research versus research/evidence theme” (p. 707). The study by Guth et al., served as a helpful example of understanding faculty perception of IL.

Studies that focus on communication studies assignments that utilized information literacy skills include Mottet (2004) and Koltay (2011). Mottet (2004) presented an assessment overview for communication studies by exploring the values and competencies in the field. Mottet (2004) recommended various assignments that can be applied to a first-year communication class. Some of these assignments may utilize information research skills and the article explains how to assess communication assignments through selected learning objectives. Koltay (2011) addressed the similarities and differences between media and information literacies by presenting the developments, discussions, and discourse for each literacy. Koltay’s (2011) research is useful in identifying different kinds of literacies in the research contexts. The paper examined the interdisciplinary nature of information literacy in the field of communication studies. References to the framework were limited in such studies but they highlighted the importance of assessing research assignments that utilize information literacy skills and the collaboration between faculty and instruction librarians.

## Method

By reviewing literature in these two fields and identifying the shared learning goals from both disciplines, the paper explored the perceptions of communication studies faculty and librarians on this synthesized guideline and evaluated its feasibility and acceptability. In the first phase of the study, an analysis of the ACRL framework and NCA documents was conducted to draw on the similarities of languages and outcomes. The researcher identified three learning outcomes from NCA and four frames from ACRL by mapping the common languages used by both documents. The researcher examined the documents and proposed a new guideline that integrated components from these two areas. These were the suggested outcomes:

1. Formulate research questions and find debates in the communication discipline (from 1. engage in communication inquiry and 4. research as inquiry, 5. scholarship as conversation and 6. searching as a strategic exploration).
2. Searching for and creating messages for specific audiences, purposes, and contexts (from 4. create messages appropriate to the audience, purpose, and context and 6. searching as strategic exploration).
3. Understand how information and communication are created and utilized in diverse contexts (from 8. utilize communication to embrace difference and 2. information creation as a process).

In the second part of this research study, in depth interviews and focus groups with academic instruction librarians and communication studies faculty in the United States were conducted to explore and gather perceptions, feedback and ideas on such documents and outcomes. The focus groups and interviews took place before and after the U.S. Presidential Election on November 8, 2016. The researcher found that some responses after the election focused on the fake news phenomenon. For the sampling of these two groups, the researcher recruited communication studies faculty from California State University, Fresno and academic librarians who teach information literacy workshops from various universities in the United States.

The rationale of this sampling approach was to gather participants to identify potential gaps and alignments between the two documents presented in communication studies and the framework. The responses from both groups generated codes that were grouped into themes. The responses provided qualitative data in reaction to the synthesized guideline from both disciplines. The limitation of this approach was that it is unbalanced with the lack of communication studies faculty. However, responses from both groups provided helpful responses on how the synthesized guideline from both documents are perceived.

Table 3: List of participants

Participant/Group	Number of Participants	Status
A	1	Communication studies faculty
B	1	Communication studies faculty
C	1	Communication studies faculty
D	2	Academic librarians
E	4	Academic librarians
F	5	Academic librarians

Each participant was given documents from both disciplines in advance prior to the interview. They received documents on the ACRL Framework and NCA's Learning Outcomes. Seven questions were asked during the semi-structured interview and focus group sessions (see Appendix A). The questions were seeking descriptive responses from participants. These responses provided feedback on the synthesized guideline. How do teaching faculty and instruction librarians react to new outcomes? There were three communication studies faculty members and 11 academic instruction librarians who participated in the interview study. Each interview and focus group was held between 45 minutes to 1 hour. All the meetings were audio recorded and transcribed. All the communication studies faculty participants were interviewed while librarian participants were part of a focus groups (see Table 3). All participants signed a consent form which indicated that their names would be anonymized in the study. This form also showed that the research received approval from the institutional review board (IRB) at California State University, Fresno.

### Findings and Analyses

Based on the findings from the interviews and focus groups, the following two themes emerged:

1. Concept to practice: NCA's Learning Outcomes are practical and reflects on the ACRL Framework's conceptual features. This theme focuses on the application of concepts in real world examples.
2. Communicating information in society: the frames focus on information process, the creation, and development whereas the NCA's Learning Outcomes address the importance of communication in information. This theme highlights the inquiries on how information is disseminated, communicated, and presented.

Drawing on theme one, the responses from questions 1-3 highlighted the need to apply concept to practice (see Appendix A for questions). When asked what participants thought of when they first look at the ACRL information literacy framework, participants felt and agreed that the frames were "very conceptual," "theoretical" or "nebulous." There were mixed responses for the framework's audience. All the communication studies faculty participants A, B and C felt that the framework was written for librarians who taught information literacy. Based on the jargons presented in the document, they viewed this document as an important source for librarians. They understood the concepts of "authority" and "information" in the context of research.

For librarian participants, the responses to this question included faculty, administrators, students, and other educators. One librarian in group D thought the framework would be helpful for administrators who lead assessment or curriculum development work to see the value of IL in higher education. The participant shared that it would be more like "looking at larger curricular issues in a cross-disciplinary way." Another librarian participant from group E mentioned how the framework might be written for "library directors" because of the language in the document and the emphasis on assessment. In addition, librarian participant from group E mentioned it could be broad for all educators, to "customize it for themselves in whichever way they want to make it for their environment." These responses revealed how both groups perceive the framework and its audience.

For question two, the researcher asked, "when you look at the communication's learning outcomes, what are your general impressions and who is the audience?" The responses also varied for general impressions and audience

members. A librarian from group E described the learning outcomes as a “check box strategy to explain the origins of the communication discipline and the students’ career of communication.” This librarian saw how this document can be used by degree planners, faculty, and advisors. Both librarians from group D found the learning outcomes to be for practitioners, and that “it was a lot easier and straight forward” to understand compared to the framework. One librarian felt that the learning outcomes did not give the impression as “corporate” or “out of touch” since the one outcome focused on the “public discourse” and the need to explain real world application as described in learning outcomes number 9: create messages appropriate to the audience, purpose, and context (NCA, 2019b). Communication studies faculty participants’ responses were consistent on this question: the NCA’s Learning Outcomes were designed for faculty and students in communication studies. However, faculty participants shared different responses on the learning outcomes. Faculty participant B described the outcomes as being “narrow” while faculty participant C described them as “good learning outcomes for anybody who’s wanting to know about communication in general.” These responses illustrate how communication studies faculty interpreted their disciplines’ outcomes differently, yet librarians found them to be consistently simple to follow.

For the third question, the researcher asked, “based on these learning objectives, do you see any correlation between the two?” All participants agreed that there is correlation between the two documents. Librarians from group F felt that they were overlapping between the two, and that “one can fit within one of the frames for the most part.” The librarians emphasized the “scholarly conversation,” “purpose of inquiry” and “critical reflection” as key features from the framework and the learning outcomes. Faculty participant B’s response was also consistent that there were overlaps involving “research and inquiry.” This participant mentioned the “broadness of the framework” and that the learning outcomes could also fit into the framework. These initial perceptions from faculty and librarians can potentially support how educators can adapt a new guideline or outcomes from different disciplinary standpoints. Certainly, there are possibilities for these learning outcomes and framework to be synthesized. Based on the conversations with teaching faculty, they described as conceptual whereas they stated that the learning outcomes were applicable but narrow.

By thinking on how to apply a “concept into practice,” the frames can be aligned with a specific learning outcome. This first emerging theme on concept to practice has appeared in the responses from faculty and librarians. The open codes included common feelings and responses towards the documents. They included “conceptual, unclear, fuzzy, theory, narrow, broad, prescriptive, practical and encompassing.” The framework is perceived as more conceptual than the learning outcomes. However, the learning outcomes may be perceived as narrow and practical and focused on communication issues. By applying information literacy frames or theories into practices, this theme focuses on the application of concepts in real world examples.

The second theme, “communicating information in society,” emerged based on responses related to audience members for the framework and learning outcomes, and the concept of information creators. The open codes that came up included “persuasive speech, intent, intention, authority, construct, strategy, communicating, talk, share, discuss, goals, claims, target, aim, create, and design.” Most of these verbs as codes are all ways to communicate information to individuals, groups, and society at large. Individuals can communicate information differently based on their intent and strategy. This theme focuses on how information is disseminated, communicated and presented in society.

When discussing the relationship between information and authority, librarian participant E made references to the United States President Donald Trump perceived as an “authority” while alluding to his tweets. Another faculty participant B reflected, “I think Trump is one of those people that we saw that really kind of tapered his message for an audience.” Information creators can be viewed as a type of authority. Their work can focus on a specific audience. Both groups recognized the importance and power of communicating information to society. Responses from the participants focused on how information is being created and communicated; how is information being perceived and understood; and who is creating or communicating the information and who is the consumer/audience for such information? Participants’ responses highlighted these inquiries for questions 4-7 (see Appendix A).

Table 4: List of potential learning outcomes from the new synthesized guideline

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1. Formulate research questions and find debates in the communication discipline
  2. Searching for and creating messages for specific audiences, purposes, and contexts
  3. Understand how information and communication are created and utilized in diverse contexts
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For question 4, the researcher presented the synthesized guideline to participants and asked them to share their reactions to these new learning outcomes (see Table 4). All faculty participants had different responses to these outcomes. For faculty participant A, number 1 is important for students to develop these skills, particularly in an argumentation class where they must write persuasive speeches for public speaking. This fits into that kind of area and the use of “critical skills to have those evidence and reasoning” are important components. For number 2, this faculty participant emphasized the role of an effective communicator, and how they must understand how the research/search process works, and to find such information. As remarked by this faculty participant, “If you have more knowledge then you can use that to influence others.” Information is processed and communicated differently by the person and so it has value to understand these messages in context. Faculty participant B highlighted how it is important to understand how to influence public discourse and the value of information. This participant emphasized the “value of information and ethical communication practices”, which may fall under number 3. Faculty participant C also echoed that number 1 advances the thesis/argument component of an assignment in an undergraduate communication studies class. Numbers 2 and 3 are connected to some of the advanced public speaking classes that are focused on understanding how “messages are crafted and directed” at specific groups.

For librarian participants in group E, they reacted and described how the three outcomes used languages from the framework and learning outcomes. One librarian commented that “diverse contexts can also mean diverse medium”, which may include “online,” “social media,” or “print” formats. This librarian stated, “for example, some context mattered, it doesn’t carry as much as print or vice versa on that matter.” Another librarian participant found that the “searching for messages” is very much connected to information literacy” based on the scholarly production cycle and “how information is created in different ways than news versus journals.” Participants were drawing on connections between the framework and outcomes based on this new document. Librarian participants found relevancy and value in these three outcomes as a potential guideline to inform the practice of teaching information literacy skills to an undergraduate communication studies class.

As described earlier, this study was conducted during and after the U.S. Presidential Election on November 8, 2016. References to fake news were mentioned by a few participants. The prevalent of fake news in information literacy and communication studies discourse was discussed briefly for the interviews that took place after November 8, 2016. One communication studies faculty A mentioned how assignments that focus on creating messages to share on social media may require an understanding of the fake news phenomenon, “tying into the discourse of today’s fake news era and connecting that, would perpetuate in some ways, require some kind of self-analysis to understand fake news, and using the memes ... it’s a great activity but then you have students doing it without realizing [that they are] perpetuating these kinds of issues.” Teaching how to create messages can be challenging based on the national discourse on fake news during the U.S. Presidential Election of 2016. National discourse can influence public discussion on how information can be understood or taught as seen with the fake news phenomenon.

For question 5, the researcher asked, “Is this new set of outcomes limiting the focus from both disciplines? Any other framework or learning outcome that is not included that you would like to see it be included?” Participants shared additional ideas that could fit into the new guideline. Faculty participant A remarked how these are overlapping outcomes from both disciplines but focuses on specific areas. Faculty participant C described how number 2 and 3 can be shaped differently since it is important to understand how messages are crafted for specific audiences and how to search for such messages is important and central to the discipline since students would need to do research applying methods from this discipline. Faculty participant B responded that “scholarship as conversation” sounded better than “debate” since debate felt more competitive and “it means something very specific for communication scholar and so scholarly conversation works better in this context.” This is an important note since the new guideline may contain jargons from the other disciplines.

For librarians, it was important for students to formulate research questions based on the literature as described by a librarian participant in group F. Another librarian participant from group F described the three learning outcomes to be “broad enough” to cover the library instruction section and yet it is “narrow of communication for the department, it is still about the process of information literacy.” A librarian participant from group E emphasized how important it is for students to understand how to search and create messages for specific audiences, purposes, and context which relates to search strategies, thinking about messages and how they are created, and who is in authority. For number 3 in the synthesized guideline, “understand how information and communication are created and utilized in diverse contexts,” it was mentioned by a librarian participant in group D as timely as it related to U.S President Donald Trump’s communication strategy, “Donald Trump now going to be in authority .... U.S. President, standing in the right, absolutely.” Information communication can be connected to the national discourse. The varying opinions and thoughts on this synthesized guideline in table 4 can strengthen and enhance such resource for future use or provide a new opportunity to engage with librarians and faculty to develop a common core set of ideas or notions relating to IL in disciplinary standards. The synthesized guideline generated positive sentiment from all participants based on initial feedback.

For question 6, the researcher asked, “in your experience, what would be the best way to measure the learning outcomes for this new synthesized guideline?” Participants shared various potential ways to assess the learning outcomes. Librarian participants from group D emphasized how helpful it is to measure students’ learning through a long-term study. The new guideline can be helpful to measure a year-long course rather than a single “one shot” session. Librarian participants from group E emphasized how partnership is critical for assessment as one participant remarked, “it would be difficult to assess for us if we didn’t have a really close relationship with the instructor. I think if your only communication with the class was teaching that one shot and then having some kind of in class assessment, I don’t see how you could make it work with this.” Assessing such a document requires partnership and long-term range to see how students develop such skills from this new guideline as revealed in Lindstrom and Shonrock’s study (2006).

Communication faculty participant A recommended pre- and post-tests, for formative assessment, that utilizes a dependent t-test to measure students’ learning on the first and last day of class. The survey questions can focus on “how comfortable they are formulating research questions,” or understanding “communication skills” or “information being communicated” and measure from their experiences before and after. This assessment would be more for the instructor to understand the progress of students’ learning developments. The feedback on assessment practices can be viewed as a form of feasibility of the document itself. The feedback on assessment also provided an opportunity to measure students’ learning under this new set of learning outcomes.

Participants also described a few assignments that they thought connected to the synthesized guideline. These assignments could be used to teach information literacy and communication studies skills. This paper highlights two examples based on responses for question 7, “are there any activities or assignments that you can think of that can meet the synthesized guideline?” A librarian participant from group F described a social media or public relations (PR) assignment where students can go to a community and create a “campaign message.” Students would identify the types of resources, software, or media needed for this communication project. Students would research on the company or organization, the techniques that such group have employed previously and a design campaign or PR message for such group. This project may focus on specific demographic groups. The assignment can fulfill the synthesized guideline by underscoring the need to formulate research questions, search and create specific messages, and understand how information and communication are created and utilized in diverse contexts for a public relations and communication project.

On a different assignment, faculty participant B shared how “students can create memes to share.” Memes are viewed as humorous, satirical, or ironic texts that are shared on the Internet. This faculty participant emphasized how students can do research on memes, create and share their memes to see how they can get “recirculated” and “how far did this spread, how popular were they able to get this video or meme to go online.” This assignment could take account on the specific audiences that students are trying to reach and “were they able to get it move beyond that particular audience, like it is a message always contain only to the audience you have in mind.” The

images and memes could get picked up by people that they did not intend to, and what responses would that generate. This meme assignment will instruct students to understand how information is created, shared, and responded to by the Internet audience. It becomes a useful exercise that fosters a different way of thinking about communicating information for students. However, it can also be problematic if students did not realize about the consequences of creating and spreading falsified viral content as described by faculty participant A.

Fister (2019) wrote about “information gerrymandering” based on a research article by Bergstrom and Bak-Coleman (2019) published by *Nature* to examine what group can be effective in influencing the greatest number of people who are in the center. The significance of this research and Fister’s (2019) comments directly connect to this activity. Fister explained that “the systems we so often use for keeping up with current events are optimized both for persuasion and for attention” (Fister, 2019, para 8.). This type of assignment can help students think about the challenges posed by misinformation and disinformation, and the power of persuasion in information sharing context, and how “messaging can be influenced at a scale” (Fister, 2019, para. 8). The faculty participant felt that these assignments connected to the learning outcomes and framework because it focused on searching and creating messages for specific audiences, purposes or contexts, and understanding how information and communication are created and utilized in diverse contexts.

### Summary

This study identified and integrated the potential shared goals, visions, and outcomes between two areas: information literacy and communication studies by mapping and aligning the frames to appropriate learning outcomes for communication studies. The study was guided by two research questions: what are the intersections and shared values between ACRL’s Framework for Information Literacy and the NCA’s Learning Outcomes, and how can these outcomes and frames be integrated into a library instruction workshop? This study presented a synthesized guideline with shared learning outcomes and sought input from faculty and librarians and found that the guideline is feasible and acceptable to be considered for communication studies courses, particularly in the first year where information literacy skills are emphasized. By gathering faculty feedback and perspectives on the synthesized guideline and providing examples from their own pedagogies, the study highlighted two themes: concept to practice and communicating information in society.

These themes reveal how participants perceive both documents from ACRL and NCA and the opportunity to explore the intersections between the two: framework and learning outcomes. They provide useful consideration for future researchers in these overlapping areas to explore the role of information literacy in communication studies. The themes also responded to the research questions. “Concept to practice” addressed how there is a need for application of concepts in real world examples when it comes to information literacy frames and communication studies. The intersections and shared values between the two groups should focus on concept to practice approaches. The second theme on “communicating information in society” highlights the importance of how information is disseminated, communicated and presented. The outcomes and frames can be integrated into a library instruction workshop for undergraduate students in communication studies by addressing, examining and understanding the role of communicating information in society. In addition, the different approaches of communicating, disseminating and presenting information should be considered as well. The frames and outcomes need to be focused on concept to practice approaches in supporting, addressing and teaching information in communication studies. The synthesized guideline can be used in an information literacy workshop by fostering a more collaborative approach between communication studies faculty and academic instruction librarians. Both can work together to create and assess assignments and activities that require students to formulate research questions and find debates in the field, to search for and create messages for specific audiences, purposes, and contexts and to understand how information and communication are created and utilized in diverse contexts.

Communication studies and information literacy can be viewed as a bridge based on this synthesized guideline to support communication studies’ students in the undergraduate level. Based on the interviews and focus group discussions with communication studies faculty and academic instruction librarians, the synthesized guideline can be viewed as potentially feasible and acceptable for communication studies courses. Since this was an exploratory study, more interviews and focus groups would be needed to confirm the applicability and usage of the synthesized

guideline. This exploratory study introduced a possibility of integrating learning outcomes from both disciplines to support library instruction.

Future studies should include more communication studies faculty in a focus group or interview to collect their perspectives on the ACRL Framework and NCA's Learning Outcomes. In addition, communication studies faculty can belong to any subfield such as rhetoric, media studies, and communication studies. It may be important to focus on a subfield in communication studies. By obtaining more faculty input, perspective understanding of IL and the framework, librarians can build on meaningful resources and services that support teaching and learning needs, particularly during critical moments where information is constantly ever flowing in the digital space. This exploratory study aimed to capture and analyze preliminary qualitative data. The findings can guide other educators and librarians' future research and teaching practices concerning information literacy and communication studies. By sharing perspectives from both groups in understanding how to synthesize disciplinary outcomes with the ACRL Framework for Information Literacy, academic instruction librarians can develop new ways in supporting students' learning and faculty's teaching needs.

### Acknowledgments

The researcher would like to thank all the participants in the study. The researcher would like to acknowledge the California State University, Fresno's Provost Research Award (2017) for funding this project. In addition, the researcher would like to thank Jimmy Xiong for research support and transcription help. This project was initially developed in the Institute of Research Design Librarianship (IRDL). The researcher would like to thank the feedback received from IRDL in 2016.

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**Appendix A: Interview and Focus Group Questions**

1. When you look at the ACRL Framework for Information Literacy, what comes to mind? Who is the audience?
2. When you look at the communication's learning outcomes, what are your general impressions? Who is the audience?
3. Based on these learning objectives, do you see any correlation between the two?
4. I am going to present three new outcomes. Please tell me what you think they mean. You are also welcomed to use some of the language from the two learning objectives to describe what they mean as well:
  1. Formulate Research Questions and Find Debates in the Communication Discipline.
  2. Searching for and Creating Messages for Specific Audiences, Purposes, and Contexts.
  3. Understand How Information and Communication Are Created and Utilized in Diverse Contexts
5. Is this new set of outcomes limiting the focus from both disciplines? Any other framework or learning outcome that is not included that you would like to see it be included?
6. In your experience, what would be the best way to measure the learning outcomes for this new synthesized guideline?
7. Are there any activities or assignments that you can think of that can meet the synthesized guideline?



# Toy library: Possibilities of Actions in the Education of Pedagogues

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## Abstract

The present article displays a research designed to investigate the role of the toy library as a research laboratory focusing on plays and educational processes in Pedagogy courses. It is a theme of relevance, as it is necessary to deepen the conception of the toy library as a scientific space for learning, aiming at the improvement of the education of pedagogues. This qualitative action research was carried out at a Faculty of Education, having as subjects, the students and teachers of the faculty who accepted to participate. A Study Group was initially created with these students, aiming to develop a deeper theoretical knowledge on the theme and experimental activities in the toy library domain through workshops and recreational activities. Along the research, the teachers also participated answering a questionnaire, which investigated possibilities of actions in the toy library, linked to the course subjects. Several theoretical arguments were found, which were also detected in the answers to the questionnaire, supporting the idea of the toy library as an important laboratory in the educator's education, contributing, despite some remaining weaknesses, to a well-qualified education enabling pedagogues to face the challenges of today's world.

**Keywords:** Games, Playing, Pedagogy, Plays, Teacher's Education, Toy Library

## 1. Introduction

A toy library has been widely discussed and referred to as a potential space for children's and teenager's learning and development. However, there is still very little research and discussion on its legitimation as a training space within the higher education levels, as in pedagogues' training courses, due to the fact that it is still considered only as a potential learning space for children and adolescents, a presumption that stirred us towards the development

of a research. The present article will display procedures and results from that research, aiming to investigate the importance of toy libraries in higher education in Pedagogy.

We consider this study duly required for both, to point out the importance of a toy library as well as to make its use clearer, better delineated enhancing the importance of toy libraries in higher education courses. Furthermore, it is highly important to point out the Brazilian 1988 Federal Constitution, the 1990 Statute of the Child and Adolescent, the 1996 Law of Directives and Bases of the National Education and the 2008 PL 11.274 proposing to expand school education from 4 to 17 years old, which leads to the importance of exploring the toy library as a laboratory that enables the improvement of the concept of playing activities, toys and games in the training of pedagogues to work in Early Childhood Education and Elementary School.

For the purpose of this research, several questions were raised previously in our own practice, as teachers in the Pedagogy Course, but one was outlined as a central problem: What theoretical relationships can we establish between studies already developed in relation to playing activities, toys and games, and the educational processes and, in such a way, create methodologies that take hold of the space of the toy library, so as to contribute to the training of educators?

In general, the objective of this research was to investigate the toy library at a Faculty of Education of a Brazilian public university, accepting it as a scientific space, comprising playing activities and games linked to educational processes, considering its importance in the training of pedagogues in that faculty. Initially, in order to achieve this objective, it was necessary to define, conceptually and historically, the toy library as space and time for playing and learning, recognizing the learning processes interconnected with toy resources, games and playing activities. In addition, it was necessary to identify possibilities for actions in the toy library of the Pedagogy course and its importance for the education of pedagogues and, further, to deepen studies in the area of pedagogues' ludic training based on readings, workshops and playful activities.

These objectives are in line with our interests in our daily work, because, as teachers linked to the Center for Studies and Research in Educational Psychology and Psychopedagogy (NEPEPp) of the Faculty of Education, which holds the space of the toy library, our eyes are turned at this object of study, under the theoretical perspectives with which we work, which makes this investigation and its procedures more alive and present, a fundamental component for the development of researches.

It is worth mentioning that, even knowing the different fields and contexts in which a toy library can have numerous functions, in this research we focused on the context of higher education, more precisely, on its assignment as a training instrument in the Pedagogy course.

It is in such a sense that the research was based on different theoretical contributions that circulate within the areas of Education, Psychology, Psychoanalysis and Philosophy, in an attempt to establish a relationship with the socio-historical and cultural dimension. We also emphasize theoretical studies about teaching methodologies, which use ludic activities, games and plays in educational processes.

Next, the methodological path outlined and followed in the research that originated this article will be described in detail and the results achieved will also be presented and discussed.

## **2. Theoretical-methodological aspects of the research**

This research was developed within the assumptions of a qualitative research, because here, it was necessary to work with a methodology that can "face reality as something in permanent movement and the phenomenon as something that is built in that movement" (Bock, 2001, p. 33). We find in Minayo and Sanches (1993) some arguments for the use of quantitative and qualitative research and, in Minayo's words, the qualitative approach is one that asserts itself in the field of subjectivity and symbolism. For this author,

The understanding of human relationships and activities with the meanings that enliven them is radically different from the grouping of phenomena under generic concepts and/or categories given by observations and experiments and by the discovery of laws that would order the social.

The qualitative approach establishes a fundamental and intimate approach between subject and object, since both are of the same nature: it empathizes with the motives, intentions, projects of the actors, based on which the actions, structures and the relationships become significant (p. 244).

For this qualitative research, the methodology we used was action- research, because according to Pimenta (2005, p. 523) "Action- research has the assumption that the subjects involved in it make up a group with common goals and objectives, interested in a problem that emerges in a given context in which they act playing different roles: university researchers and researchers (teachers in the case of a school)."

We consider the application of action-research as a practice that requires a lot of methodological severity, considering that, according to Miranda and Resende (2006), it is necessary to be alert so that we do not fall into the mistakes of practicicism, the temptation to have the resolution of immediate problems, whereas, in education, according to the authors, it is necessary to go beyond punctual and emergency solutions and the educational research requires theoretical, historical, political, social and cultural mediations.

The authors therefore define action-research as

a research that articulates the relationship between theory and practice in the very process of constructing knowledge, that is, the dimension of practice - which is constitutive of education - would be a privileged source and place for research. In addition, the investigation itself would be converted into action, into social intervention, enabling the researcher to act effectively on the studied reality. Reflection and practice, action and thought, extremities previously opposed, would now be welcomed in a research modality that considers social intervention in practice as its beginning and its ultimate end. (Miranda & Resende, 2006, p.511)

As a first step of the research, and aiming to answer the specific objective of the research that means to know the learning processes linked to the resources of toys, games and playing activities, a survey of these resources was carried out by the researchers, mapping all the playful material and permanent material found at the toy library of the Faculty of Education, a space defined as the location of this present research.

As a second stage of the investigation, activities such as study group, literature review and research were created and developed focusing on the latest theoretical and scientific productions related to ludicity and university toy libraries. This action was planned by us researchers, who, when starting to study the texts that would theoretically support our investigation, realized that we could add value to the activity, as we also had other participants in the group, which was consistent with the research methodology of an action-research.. This activity took place throughout 2019, from May to November and led us into a revision of the literature investigated in this research, and induced us to define conceptually and historically the toy library as a space and time for playing and learning, the essential objective of our study.

As a third stage of the research, we started the field research, which occurred at the same time the study group carried out the reading process and theoretical studies. Thus, in order to deepen our studies about the pedagogues' ludic training based on practical activities, several experimental actions were developed through workshops and playing activities, in the space of the toy library so as to advance, from a practical point of view, studies about the toy library within the pedagogues' ludic educational training.

Finally, to complement our field research, a fourth stage of the research was necessary, which consisted of the application of an online questionnaire answered by the teachers, in order to investigate, more directly, the possibilities teachers and students from the Pedagogy course had to develop activities at the toy library, which could enrich educators' training at the studied faculty.

For the stage targeting the analysis of the obtained material and the experienced material coherent with the action-research, we worked on the analysis of texts, the experiences and the answers to the questionnaires, in an attempt to "decipher" this material based on the Discourse Analysis (DA). This is because this type of analysis is the one that enabled us to work on both, the archive corpus, which is found in sources, such as documents, legislation,

books, articles and so on, as well as the empirical corpus, that is, the one produced by the research itself, experimentally and empirically, resulting from the experiments, workshops and events and from the performance and analysis of the questionnaire. In addition, this type of analysis has enabled us to understand the meanings and effects of what we found, analyzing the information from a social, historical and ideological point of view (Caregnato & Mutti, 2006).

The results of this methodological path will be pointed out and discussed below, in topics, so as to better explain the fulfillment of each of the foreseen specific objectives, and the first four topics summarize the bibliographic review carried out during the course of the research.

### **3. Results and Discussion: what do theorists say?**

To discuss the toy library as a space for teacher's training, it was necessary, initially, to review some authors' reflections who present the game, the toy and playing activities interrelating them, although considering its ludic role and its educational role, which can be dealt with in multiple spaces.

First of all, we briefly checked what classical theorists brought us in different approaches. We realized that, for Psychoanalysis, in Bettelheim (1988), playing is so important for children's development, that in its absence, the intellect would not develop, considering that playing has a cognitive function and also a pulsional function. From the point of view of Psychogenetic theories we find both Piaget (1987) who demonstrates how children's intelligence develops in stages translated in the games they play, and Vygotsky (1984), for whom the game facilitates the development of imagination and creativity. We also revisited researchers from the cultural approach, such as Brougère (1995) who states that the idea of games varies according to the theorists and their time, as well as their use and the reasons for their use. And, further, Huizinga (1985) for whom the existence of the game is undeniable, but it is difficult to point out all the activities that the word evokes in different languages and cultures. Kishimoto (2005) also states that a conduct can be a game or not, in different cultures and this will depend on the meaning attributed to it.

Then we will discuss some elements that emerged from the readings of contemporary authors, which also helped us to answer our research questions theoretically.

#### *3.1 The toy library as a teaching-learning space or a ludic space: a counterpoint?*

Ludicity, considered in this text as an authentic and spontaneous manifestation, often dominated by uncertainty and chance, takes place aiming at satisfaction. On the other hand, it may also come through to escape from everyday life, by using imagination and make-believe.

Even taking into account that the main characteristics of the ludic is in the presumption of freedom and in the preference for action, in Luchesi (2018) we find that what matters to define what ludic is and what ludicity is "to be aware of what happens internally with each one in their relationship with the world and with people." (p.141) However, this characterization of game and ludicity seems to have been overwhelmed by a series of other understandings, especially when we go into the educational sphere, although, we understand that this characterization could be experienced in another way, for example, in toy libraries.

Toy libraries are becoming more and more popular and they have been gaining multiple meanings as well as the appropriation of multiple spaces, not only in schools and hospitals, but also in indigenous communities, settlements and universities, the latter being the focus of attention in this article (Paula, 2014).

We emphasize here, therefore, our interest in discussing the toy library in school areas, but specifically, in higher education schools driven to the training of pedagogues.

Several authors discuss the possible polarization between the ludic function and the educational function of games and play. We have the conception of Oliveira (2010)<sup>i</sup> mentioned by Rau and Lara (2017) who argues that playing should be developed only as playing and that the educational act distorts the possibility of spontaneity in playing. Kishimoto (2005) approaches the use of the ludic in education and in the teaching-learning processes in a different way, stating that the toy has two functions: educational and ludic, and points out that in "1. the ludic function the toy provides fun, pleasure and even displeasure, when chosen voluntarily and, 2. educational function, the toy teaches anything that completes the individual in his/her knowledge and apprehension of the world." (Kishimoto, 2005, p. 37).

In this sense, reinforcing the importance of playing in the educational processes Rau and Lara (2017) direct the discussion towards the adequate training of the adult who educates the child, indicating the toy library in the university as a space for this, stating that

In this perspective, the adult assumes an educational position when he is committed to the learning of the other. Playing is to interrelate, to bond, to identify great possibilities of meeting with the child and with oneself. Therefore, the work with proposals for the implantation of university toy libraries can significantly contribute to the understanding about playing in the learning process, considering that there will be continuous training aimed at theoretical studies and practical experiences, in which the teacher in training can confront the common sense with scientific knowledge. (Rau & Lara, 2017, p. 24441)

We agree with Piassa and Montagnini (2013) when they mention that Brazil has advanced considerably concerning the understanding of the importance of the toy library in the educators' training, as the Brazilian legislation itself started to demand the presence of toy libraries in higher education schools, more specifically in the teachers' education courses. Furthermore, they highlight that currently in the Higher Education Assessment Systems, there is the demand for the existence of these spaces as laboratories for teacher training courses to work in Childhood Education.

However, in their texts, the authors, who aim to make a critical interpretation of the space of toy libraries in the context of the capitalist society, place us against another contradiction, pointing out that the toy library, despite being bourgeoisie space concession to refrain social pressures, it is also the materialization of the child's right to play and an important laboratory for pedagogue-teachers, when contributing to a more balanced child development and to a hegemony counter-culture (Piassa & Montagnini, 2013).

Therefore, pointing out the contradiction that we are discussing at the moment, Piassa and Montagnini (2013) also quote Galindo et al (2010)<sup>ii</sup> who state that toy libraries represent the recognition of the right to play, but at the same time, they represent control and institutionalization of childhood, therefore, it is a space of contradiction, which legitimizes it even more as a space for research and training, which we second herein.

### *3.2 Play, its relationship with culture and toy libraries*

In the research presented here, we have as a central point the interest in games, toys and playing activities, development and learning, in short, in the culture of childhood in the various spaces in which it can be lived, and here, fundamentally, our interest is in the space of toy libraries in the universities. Besides that

It is assumed that playing activities is fundamental for the children, as it is the way in which they take hold of the world around them. Children begin to understand their culture, values, habits, desires, dislikes, relationships, when playing. In short, playing they experience their environmental context. (Cotonhoto & Rossetti, 2016, p. 347)

Thus, we found that toys and plays, social practices that are part of the context that surrounds children, keep a dialogue with constant social changes and cultural practices that, when they change, end up causing changes in the contents and forms of ludic activities that are different, at each period.

Silva, Andrade, Torres and Amorim (2017) corroborate this idea of the relationship between the cultural and the ludic context, pointing out that, through the games they practice, “children identify characteristics that are specific to their culture and society, since they have specific traits that contribute to the development of children's relationships between child / child, child / adult and children / society.” (p. 63), which in turn contributes to changing their playful practices as well, as cultural practices change.

For this reason, at this point in the text we emphasize our agreement with some authors whom we consider nostalgic, who criticize the thinking of adults who claim that children today do not play anymore and are not interested in games and plays.

According to Moukachar (2004) in her research on games, toys and playing activities and the representations of childhood, it is clear the need to return to traditional plays and all their contributions to the child development and everything else they provide. However, reaffirming the strong relationship between culture and recreational activities, the author points out “(...) it is impossible to play in contemporary society, in the same way as in the past: the world has been transformed, children have changed and, mainly, their wishes followed these transformations.” (Moukachar, 2004, p. 210).

However, still based on Moukachar (2004), it would not be necessary and imperative to work to keep a *ludic culture* because there are the ludic cultures, whether from previous generations or the most recent ones, in which ludic practices as social and cultural practices are always being done and redone and “All of them have a unique and proper value, a manifestation of the creative and recreational potential of children of all periods” (p. 210).

Thus, when discussing the theme of plays from a historical point of view, we always observe this dichotomy between yesterday's plays and the contemporaneous ones. Here we want to avoid this dichotomous position, because we observe that toys, plays influence, and are influenced by the cultural world around them, and all of this ends up altering significantly the content and form of the ludic activities.

Therefore, the discussion about traditional plays and electronic games in the scenario experienced by children today is essential. Some authors claim that children today do not show interest in playing. But, Cotonhoto and Rossetti (2016, p. 347) question these statements, problematizing about “Who guarantees that the best way for children aged four and five to develop fully would be through traditional plays and games? Do children become passive and mere viewers of life when they play video games? Do electronic games inhibit children's creativity?” They go against the negative argument that the relationship between the child and the internet is a relationship of domination. They understand that through electronic games and / or internet, children interfere in the situations brought by these games, as active subjects they are, as we formerly pointed out when approaching childhood and culture.

Silva et al (2017, pp.65-66), corroborate to these ideas by stating, through their researches, that

The contact with electronic means allows the child to develop fine motor coordination, while having to direct commands to the machine to perform playing activities, in addition to developing reading, since for the machine commands, there are specific keys, and so, the child needs to master certain codes. Logical reasoning is also widely practiced in these games, as children must create certain logics to achieve goals. Electronic games also enable the development of attention and concentration, while children focus on a certain activity and dedicate themselves to it until they get tired, discovering in this process a particular inner fulfilment.

In addition, Cotonhoto and Rossetti (2016) also highlight other advantages of the practices of virtual electronic games, affecting children's development and learning in addition to favoring socialization, such as the development of autonomy and morality, acceptance of rules, limits and frustrations, creativity, imagination and other skills these children's future lives will demand.

As in this research study, our emphasis is on discussing the toy library, we can think that in these spaces we can also, with electronic games, develop the ludic, artistic, dynamic, interactive and virtual language that is part of the

daily life of school children and adolescents. Furthermore, in the toy library, electronic games, as well as traditional ones, can also assist in the development of strategies to overcome their stages and objectives, anticipating future actions.

We saw, therefore, the importance of training the teacher not only for the ludic field, but also in the updates demanded in the direction of the culture currently experienced by the children. Keeping that in mind, theoretical notes on this specific topic, which came into light throughout the research, will be presented next.

### *3.3 Training in Pedagogy: where are the toy libraries?*

At this point in our studies, we directed our inquiries to the research central question, that is, the role of the toy library in teachers' education. However, we found that a previous question had to be answered: how does an educator become a playful being. Would it be possible to train teachers to become able to play?

In Fortuna (2018, p.19) we find that "an educator is not born an educator, or 'becomes' an educator unexpectedly after going through a specific training for that". The author states that educators become educators through their school, professional and personal experience. Teaching situations make up a part of that training. And, if so, in this study we complete that it is in this specific training that we must also emphasize the teacher's training as playful being.

And for that, according to Fortuna (2018), there are several types of knowledge involved in the educator's initial and onward training. The ludic knowledge that interests us here "is an informal knowledge, based on good experiences from playing in childhood and episodes of ludic learning at elementary school and initial training." (p. 23). However, in teachers' initial training at universities, this knowledge does not usually receive systematic training, being approached just in the practical scope. For the author "... the ludic knowledge is essentially experiential and the university training is essentially theoretical" (Fortuna, 2018, p. 23), but the author argues that the ludic knowledge could not do without the theoretical and conceptual contributions, in a continuous dialogue between experiential and ludic situations with the theory from the field of studies in Game and Education.

In article 61 of the Law of Directives and Bases of National Education LDB n° 9.394 / 96 (Brasil, 1996), it is determined, as essential, this desired association between theory and practice, not only in continuing education, but also in the initial training studied herein. This same legislation, which embeds Early Childhood training in Elementary Education, also includes playing activities as one of the languages of early childhood training. In addition, in the National Syllabus References for Early Childhood Education (2009) we find that "(...) playing favors children's self-esteem, helping them to progressively overcome their acquisitions in a creative way" (Brasil, 2009, p. 4), and, all of this leads to a more appropriate teacher training to work with children.

This research emphasizes precisely this discussion, as we suggest that these living situations be developed in the space of toy libraries within the university and in the pedagogues' initial training, as

the toy library in teachers and pedagogues' training courses is justified as it favors transformations in knowledge and conceptions about ludic activities and provides theoretical support for a reflexive, critical and autonomous performance about playing in the teaching and learning process at school. (Rau & Lara, 2017, p. 24438)

In order to further emphasize the importance of the toy library in the educator's training, Fortuna (2018) states that educators are not born knowing how to play, either, this ability may be built in their educational experience, Our studies showed that toy libraries are currently present in different contexts and are part of the daily life not only of large urban centers, but also of rural areas and even indigenous communities. Each of them has its specificity and its common aspects and we see them not only in Early Childhood and Elementary schools, but also in hospitals, indigenous communities and settlements. (Paula, 2014). We emphasize here that this expansion undoubtedly points to a greater interest in the constitution of these premises.

However, we observed that this greater interest in toy libraries has not reflected proportionately in Pedagogy and Teaching License courses. Therefore, our argument in the research was that these spaces need to be presented, discussed, studied and more than that, experienced in educators' training who wish to work with children.

We underline that the theoretical contributions discussed so far make up the results of this research, fulfilling our goal to define conceptually and historically a toy library as a space and time for playing and learning. The study developed throughout the entire process, receiving contribution from several students who participated in the study groups. More specifically, the results and discussion from the field work research will be presented next.

#### **4. Results and Discussion: what do the teachers in the investigated field say?**

##### *4.1 The learning processes linked to the resources of playing activities toys and games. What resources can we count on in the investigated toy library?*

This initial phase, in some way, indicated that the toy library is not yet a space, in fact, for actions for the learning of our Pedagogy students, as we found that its use is still fragile in comparison with all its potential in teacher education that we see from the readings carried out.

As for the survey of the material, we list below what was computed in the playroom space. As permanent material, we find: twelve (12) mattresses; twelve (12) cushions; four (04) sets of children's tables and chairs; one (01) TV (32 inches); fifteen (15) large blue plug-in plates; thirteen (13) small plates of different colors; and two (02) tire made puffs. The ludic, pedagogical material found could be classified into three categories and were counted as follows: twenty-six (26) boxes with ten (10) literacy games each; one hundred and three (103) children's literature books; and, fifteen (15) educational games.

In our discussions about this constant material in the research space, we found that there is still much to do and we are even proposing new partnerships and acquisition of new materials, both permanent and ludic-pedagogical, even if it is through a donation campaign carried out in the academic community, an idea that emerged among the students who attended the study group.

##### *4.2 Ludic training in Pedagogy: an experience with reading groups, workshops and ludic activities*

In the volunteering Group of Studies and Readings established, we could see how much the students' individual and spontaneous action, looking for themes of their core interest can actually contribute to meaningful learning, so that each one who was there, attending our meetings, was able to assign a particular meaning to each text they read, to each discussion they developed, and to each concept they learned then.

It was also evident the need for more dense content about the ludic, as well as the requirement for changes in the pedagogical practices developed in our students' training, in the perspective of training an educator, but also and even more so, aiming at training a playful educator, fundamental for working in Early Childhood Education.

It was also clear, as a result of our research that, as the group came through, the production was more guaranteed and expanded, expressed in the manifest desires of other and more readings.

Based on this experience, other ideas for more practical activities emerged, fulfilling another stage of the research. We had playful experiences in the toy library, such as: meditation workshop for the Pedagogy teachers, experiencing something that, in the future, they could use with their future students in child education; b) Commented Cinema based on a special section of the film "Invisible Children", namely "João and Bilo"; c) Commented Cinema, with the film "Between worlds: Helena Antipoff: 's life and work", which would be launched in March 2020, with the participation of Guilherme Reis, director of the film, and members of the Helena Antipoff Foundation, who were able to bring the innovative and the use of ludicity and spontaneity in the teaching-learning process, a practice already constant in the psychologist and educator's work back in the 1950s, in our country.

These activities showed that the ludic format favors our undergraduate students' learning and development, which reaffirms the theoretical notes found, for example, in Kishimoto (2005) defending the idea that playing has two functions, namely, educational and ludic. Agreeing with the author, we saw that both are equally important, considering that, when fulfilling its ludic function, the activities we carried out in this research with the groups, provided pleasure and fun and were even spontaneously chosen by the students, while, on the other hand, they accomplished their educational function as they taught, and we can affirm, they complemented the knowledge and the ability to apprehend the world of our participants, towards their qualification, so that, in the future, they can also provide qualified training.

#### *4.3 Possibilities of actions in the toy library of the Pedagogy course and its importance for the training of pedagogues*

Based on the information obtained through the questionnaires applied to the FaE/CBH/UEMG teachers, we found that there is still a great demand for different uses, of a greater number of ludic activities and space such as our toy library, which can also prepare teachers to be more ludic.

No more than eighteen (18) out of the eighty-five (85) faculty teachers volunteered to answer the research questionnaire about the toy library, which is made up of our (4) questions that could be answered online in a *Google* form that was sent to everyone via email and *whatsapp*. This showed us a previous extent of the interest in the subject among our undergraduate course teachers.

The quantitative results of the questionnaires showed that 61.1% of the FaE teachers who answered the questionnaire already knew about the toy library, but 38.9% did not know about it, which is a question to be considered, since it seemed to us that, in our faculty, this space is not properly considered as a laboratory for the Pedagogy course, which is a mandatory item prescribed by the legislation, as we mentioned earlier. One of the respondent teachers in his/her comment, at the end of the questionnaire, even states "I would like to know how I get access to the toy library to use the resources in my classes", showing evidence of ignorance concerning the toy library as a space for teaching and learning for Pedagogy students' training. Yet another responder points out that

I believe that this space should be more used. I speak based on my own experience, as I have not been able to take my students there to carry out activities. It was not out of unwillingness, but because it was not possible get hold of the key or authorization to go into the toy library.

This is an important testimony, which shows how little this laboratory is divulged among us in the course, and makes it evident the urgent need to increase not only the access to the space, but, also, we add, the organization and enrichment of materials and a greater dissemination of its potential for a better use in the training of our students.

This is also reasserted by another responder to our questionnaire, who thinks, "that the availability of the toy library space for teachers who can include ludic experiences in their classes, can enrich and bring great contributions to the pedagogues' training.

In the question about the possible interrelation between the responding teacher's discipline with activities in the toy library, most teachers (72.2%) answered affirmatively, which indicates that the toy library would actually be a laboratory of the Pedagogy course, since it would benefit all these disciplines confirmed by the teachers themselves. Only 11.1% of the teachers completely disagreed with this statement, which indicates that the disciplines of this group of teachers do not have any element that could be discussed and that they could benefit from the ludic space of the toy library. Based on the type of instrument and questions answered, the reason for these responses was not clear, but we saw that it would be important to set more light to this fact. The other teachers partially agreed with the statement, which places us, before another group of subjects and teachers (16.7%) who would use - even partially - the toy library. We can even ask whether this partial (im)possibility of dialogue between the discipline and the toy library would not be due to the difficulties that, even now makes it difficult the access to the toy library, a process that is still being organized.

In the third and last objective question, the entire group of participating teachers (100%), agreed with the statement that, as teachers in the Pedagogy course, they understand that the toy library can favor the pedagogue's training. So, we hear from one of them that

In the pedagogy training, it is not enough to learn to develop ludic activities; it is necessary to learn to be ludic. I think that the toy library offers this possibility of trans(forming) into a ludic being.

It is important to highlight how this responder's statement can be directly addressed to what we discussed earlier in this text, in the theoretical part, about what we studied in Fortuna (2018) that educators are not born ludic, as this capacity can and should be built up during their training at the universities.

Therefore, we see the articulation between practical and theoretical knowledge as fundamental, as it was pointed out in our theoretical framework, and it is necessary to break off with the dichotomy that places the ludic knowledge on one side as experiential and practical knowledge, and, the university education with its essentially theoretical knowledge on the opposite side, (Fortuna, 2018). Thus, we used the voice of one of the faculty members who responded to our questionnaire, reaffirming this idea by saying that

The use of the toy library is one of the ways to provide a theoretical-practical training for the undergraduate in pedagogy on ludic learning. In addition, the presence of the toy library in an higher education institution pictures one of the indicators of the quality of education as determined in the assessment instruments of the pedagogy courses.

This also helps us to reaffirm the legal requirement for this theoretical-practical interconnection of knowledge given by the Syllabus References. Furthermore, to contribute to this interconnection and measure the importance of the toy library that was evidenced in our research, here we use the argument from another teacher who points out that for the Pedagogy course, the use of the toy library is as important as the use of the library, as "playing is part of the school universe as well as children's literature books".

In order to analyze more specifically the possibility of actions in the toy library and its importance in the education of the pedagogue, we highlight the testimony of one of the subjects who answered the questionnaire, who reports on the little use he/she made of the toy library having been only in one integrated class, claiming that it was "**just** to use a different space for the production of group activities" (emphasis added). For this research, however, this brief use already points to possible actions in the toy library that we believe to contribute substantially to education in Pedagogy, by encouraging spaces other than the classroom, which should also be considered "classrooms" with a possible greater potential to produce knowledge. The same teacher confirms this when she/he argues that, "In the case of Special and Inclusive Education, it is essential to use distinguished spaces, to rethink resources and ludic activities as a manner of intervention."

Another testimony towards the same direction caught our attention because it contributes greatly to new ideas for actions that was one of our goals in the research. The responder suggests that

the toy library could take toys as cultural artifacts that bear the marks of different historical moments and different cultures; the plays could also be considered as cultural heritage, because through them we can recognize ourselves and be recognized by others.

The subject adds that he/she carried out a workshop with a student in which students in the class compared the possibilities of development and learning from handmade toys with those provided by current industrial toys and used the soap bubble play for this experience, which produced a fruitful debate on this topic.

Therefore, in this item, it was evident both, in speakers' statements who answered the questionnaire, as well as in the discussions that we stirred from these speeches and from the other information we obtained in the groups and workshops developed in our research trajectory, the importance and the urgent need to use it by creating and increasing actions in the toy library that we know are actually effective in teacher's training.

## 5. Final considerations

We begin these final words, reaffirming what we described throughout the research in this article: the ludic training in the toy libraries in the universities and especially in the Pedagogy faculties, ought to be part of the undergraduate

students' training, as pedagogical theories as well as pedagogical practices involving laying, contribute to breaking off with this spontaneous-like conception about the ludic and its place in the child learning process.

However, it is up to us here, to focus on the information obtained, not only from the research phase of literature review, but also from the answers from our research subjects, which have become fundamental in our investigation. We realized that, regarding the material contained in the research realm, there is still much to be done and we are even proposing new partnerships and the acquisition of new materials, both permanent and educational.

We have also seen that the ludic format favors our undergraduate students' learning and development, which seconds the theoretical notes we found, bearing in mind the idea that playing has its two functions, the educational and the ludic. Fulfilling their ludic function, the activities that we developed in this research with the groups, provided pleasure and fun, as they were spontaneously chosen by the students. They fulfilled their educational function because they taught and we can state that they completed the knowledge and our participants' capacity to apprehend the world, towards a qualified training, which will allow to train with quality in the future.

We discussed the toy library as a space of contradiction, because at the same time that it recognizes the child's right to play, it also establishes controls and institutionalizes playing activities, proving to be, a space for researching and training which corroborates our research hypothesis. This contradiction is also expressed in the discussion approaching electronic and traditional games, but we found that, in the toy library, both, traditional and electronic games, can help as strategies to promote the development of children and adolescents because ludic practices are social and cultural practices and are always being created and recreated by those who are active and not compliant with the impositions of a society.

Thus, we realized that in the teachers' training, the interrelation between theory and practice, the interconnection of experiences and theoretical contributions to these experiences, the interrelation between the ludic knowledge and the theoretical knowledge about ludic activities is essential, confirming our hypothesis that the toy library space is the space par excellence where all this can come true.

In addition to all these arguments, brought into light from the readings, in favor of the toy library in the Pedagogy graduation, we could realize that the same arguments were present in our teachers' answers to the research questionnaire, even finding several weaknesses in the implementation of practices that can actually, legitimize this space in teachers' training.

Finally, we could detect from the research that: it will still be necessary a lot of work in teaching, research and extension at the investigated faculty, which aims to: help in an organization that can lead everyone, teachers and students, to move around and benefit from the toy library; reach a greater quantitative and qualitative interconnection between the disciplines and possible actions in the toy library, a laboratory regulated by law, to form the future educator; transform into legitimate practices what this research still showed us as legitimate ideas, present in our academic community, that the toy library can, in fact, favor the pedagogues' training. Therefore, we realized that, in the Pedagogy course it is extremely important to go on **playing, so as to learn pedagogical practices, from playing!!!**

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# Action Research in a Juvenile Detention School: New Processes, Paradigms, and Possibilities

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## Abstract

The purpose of this study was to explore the roles, perspectives, and actions of teachers and students for first-time-detained juvenile delinquents by examining a reading intervention for a student. Using an action research methodology, the reading intervention was explored within the broader context of the history and operations of the juvenile detention center in the United States of America. There is a description of education in a short-term, small juvenile detention center, which has not been clearly defined in previous research. Test scores, observations, and review of a student's assignments were analyzed to determine the effectiveness of the reading intervention. The situation was further broken down by roles assumed for each participant. The conclusion was action research improved a student's results and aided in examining educational practices. Four recommendations were offered to improve practices: iterative processes, heuristic challenge, positionality, and pragmatic rationality. A truncated methodology gives practitioners a plan to implement action research.

**Keywords:** Action Research, Juvenile Delinquency, Interventions, Instruction

## 1. Introduction

Once a student was involved in the juvenile justice system, the chances of dropping out of school and experiencing long-term economic failure increased substantially (Lea & Abrams, 2017; Robison, Jagers, Rhodes, Blackmon, & Church, 2017). After release from secure detention, there were few programs or supports to assist a juvenile reenter school (Kubek, Tindall-Biggins, Reed, K., Carr, & Fenning, 2020). Each juvenile, according to one estimate, costs society \$4.9 million in economic loss for continued juvenile delinquency (Ellison, Owings, & Kaplan, 2017). Improving educational outcomes of juvenile delinquents in school has the potential to reduce crime, increase academic attainment, and lower recidivism.

The purpose of this action research study was to explore the roles, perspectives, and actions of teachers and students for first-time-detained juvenile delinquents by examining a reading intervention for a student. Few research articles were identified for first-time-detained juvenile delinquents. After presenting a literature review, the methodology was described, and results and interpretations were presented.

## 2. Literature Review

Learning and teaching in a juvenile detention center were explored by offering a rationale for the study, aspects of juvenile delinquency, and the structure of juvenile detention centers. The rationale showed the need and gap in the literature. All parts described the meaning and experience of juvenile delinquents in secure detention. Understanding the roles and experiences of juvenile delinquents has the potential to improve instructional practices in juvenile detention centers and special education programs.

### 2.1 Rationale

As a group, juvenile delinquents have poor social skills, weak social relationships, and lack of persistence on academic tasks which cause problems for many juveniles continuing throughout adulthood (Donges, 2015; Drury, DeLisi, & Elbert, 2020). Students with adverse childhood experiences and maladaptive personality traits had more severe crimes and at a higher rate, often into adulthood (Levenson et al., 2017; Perez, Jennings, & Baglivio, 2018). Juvenile delinquents have been found to have lower self-efficacy than nondelinquents, and increased self-efficacy correlated to lower levels of violence and delinquency (Farrell, Henry, Schoeny, Bettencourt, & Tolan, 2010; Tangney, Boone, & Baumeister, 2018). The inability to form and maintain positive, mature social relationships were common in students detained in juvenile detention centers.

Students who drop out have higher rates of aggravated assaults and robberies, and students with disabilities have disparate outcomes in juvenile justice involvement, length of sentences, and worse outcomes than students without disabilities (Gerlinger & Hipp, 2020; Kincaid & Sullivan, 2019). There was a gap in the literature concerning the experiences of first-time detained juvenile delinquents. The following study described the schooling experiences of juvenile delinquents, and the results could be used to improve the understanding and practices of educational programs in juvenile detention.

### 2.2 Juvenile Delinquency

Nationally, juvenile delinquents were 85% male, 51% between 16 and 17 years of age, twice as likely to be retained in school, 76% were enrolled in school, and the majority stayed 60 days or less (Sedlak & Bruce, 2016). In juvenile detention, juvenile delinquents arrived with a lengthy history of problem behavior before incarceration, and the prevalence of mental illness and aggressive behavior was much higher (Barrett & Katsiyannis, 2017). Unlike traditional school, classrooms in juvenile detention centers had students where lack of prior academic success and a myriad of problems were the norm.

Disabilities and psychiatric illnesses, especially personality disorders, were found at a much higher rate in juvenile delinquents (Krezmien, Mulcahy, & Leone, 2008; Vaughn, Salas-Wright, DeLisi, Maynard, & Boutwell, 2015). Problematizing school for juvenile delinquents was a higher prevalence of dyslexia and reading difficulties, impulsivity, and lack of improvement unless intensive, long-term interventions were implemented (Baker & Ireland, 2007; Crosby, Algood, Sayles, & Cabbage, 2017; O'Brien, Langhinrichsen-Rohling, & Shelley-Tremblay, 2007; Wheldall & Watkins, 2004). Schools were difficult places for juvenile delinquents to navigate, as most juvenile delinquents lack competency in basic school skills and were not compliant with rules and expectations.

Findings of the Pathways to Desistance Project suggested positive experiences in schools in juvenile detention centers, especially relationships, outweigh grades in predicting future school achievement and employment (Jäggi & Kliewer, 2020). Coker (2020) found prosociality and social self-esteem predicted academic achievement for first-time-detained juvenile delinquents over other noncognitive factors. Social attachment matters, and how teachers and students developed roles and formed relationships in juvenile detention center schools are poorly understood.

### 2.3 Juvenile Detention Center

Schools in juvenile detention centers vary widely, with a curriculum from elementary to postsecondary offered, and computer-assisted instruction and individual tutoring being the most common instructional techniques (Steele, Bozick, & Davis, 2016). Most students will reenter society, and educational attainment can empower students and improve independent living skills (Tannis, 2014). Education in juvenile detention centers often focus on security concerns, preventing students from receiving regular, consistent interaction with school staff.

The inconsistent results of juvenile detention centers manifest in a variety of ways. Students incarcerated in juvenile detention centers benefit from vocational training, but most detention centers do not provide career and technical education (Newton et al., 2018). In theory, students with disabilities are guaranteed all services required by law, but many juvenile detention centers fail to provide services or appropriate staff (Leone & Wruble, 2015). Training for staff members in juvenile detention centers was often haphazard or nonexistent, and staff members were found in one study to choose to be teachers in juvenile detention centers for personal gain over personal fulfillment (Houchins, Shippen, Schwab, & Ansely, 2017; Mathur, Clark, LaCroix, & Short, 2018).

### 3. Data Analysis Plan

Action research is the application of systematic processes to investigate and solve problems, and a goal is to instill and improve democratic participation (Adelman, 1993). Whereas traditional research investigates and describes a problem, action research dictates the researcher changes variables and outcomes during the research to refine and improve outcomes (Sagor, 2000). An example of the conundrum was a research study at a university I attended: Some researchers wanted to continue in a traditional manner when a major problem was encountered, as intervening would change the variables and the outputs. Another researcher broke away and intervened; though the person did not state she was conducting action research, she transformed traditional research. The present study interacted with the variables and made changes as data were analyzed.

#### 3.1 Methodology

Several methods to conduct action research have been proposed. Sagor (2000) proposed selecting a focus, clarifying theories, identifying research questions, collecting data, analyzing data, reporting results, and taking informed action. Another method utilized came from Norton (2018), who stated action research is a spiral, and the steps are the following: identify a problem, think of ways to tackle the problem, do the proposed solution, evaluate results, and modify future practices. In the following study, Norton's methods will be used, but Sagor's idea of theory will be included as a way to tackle the problem. Three other divergences were used as well.

Three ways to operationalize Norton's action research include compositing, positionality identification, and utilization of grounded theory throughout. Compositing refers to the idea of considering multiple situations within the research problem identified. Instead of only observing a situation, multiple students, teachers, perspectives, and practices will be subsumed and overlaid with the observation to give a historical perspective, ability to reconcile past actions, and identify hidden reasons. Positionality seeks to overtly examine the roles actors take within the research at different times and for what reasons. Finally, the constant comparison method was used to ground the results within the data (Glaser, 1965)

The steps for the action research were the following:

1. *Identify the problem.* Students in my juvenile detention center frequently had poor reading skills, as identified by standardized tests and qualitative reviews of leveled reading assignments. Exacerbating the problem was the lack of compliance and ability to work independently. Many students arrived at the detention center with no intent of doing anything other than bossing the teachers around. Most students immediately raised their hands and asked the teacher to read directions, explain what to do, and tell answers. Students acted like they could not read directions, find answers, or often do academic skills already demonstrated. The action research focused on a single subject with reading difficulties who was failing in his work.

2. *Think of ways to solve the problem.* There were three main areas to consider in solving the problem. First, social learning theory posited students learned by observing and defining a phenomenon, deciding to act, and internalizing the new behavior if the behavior is deemed worthwhile and profitable (Crain, 2015). Secondly, as observations and notes were made about practices, composing looked at the dyad of what was once done, why something was chosen, and how abandoned practices inform and shape current practices. Finally, research was read and identified to tackle the problem. For the reading skills, skimming and scanning were used to improve reading comprehension (Marliasari, 2017; Zabucky & Commander, 1993). There were similar prior practices which were incorporated in the plan. To operationalize the reading intervention, there was the determination the student struggled with reading comprehension as well as little effort. Relationship building was central to implementing the intervention. Reading interventions happened spontaneously and through reflection with other staff members and by reading research and best practices.
3. *Do the interventions.* For two weeks, the reading strategies were modeled, practiced, discussed, and refined. Since the facility was a short-term juvenile detention center, the student left at the end of two weeks, precluding the research from being longer. The facility used a thinking routine, RAD, which stands for read-answer-discuss. RAD gave a framework to the implementation of the intervention.
4. *Evaluate results.* Results were evaluated by the student answering vocabulary and test questions on an online program. Composing meant past results and practices were considered within the context of the current problem. Meta-messages, where motives and aims were assigned to student and teacher practices, were important in understanding results, as what people say versus what they mean can be at odds. In the spirit of grounded theory, dyads were actively constructed and explored.
5. *Modify future practices.* The results were used immediately to generalize to other students, and the theoretical and pragmatic concerns either supported past practices or generated further avenues of research.

Action research can be limited in value, as there might not be many reflections which lead to transformation. Most action research is written from a first-person perspective, as the researcher relates attitudes, emotions, and feelings to observations and actions (Somekh, 2005). The end result should produce a theory which fits the data, explains what happened, and can be useful to generalize to other situations (Charmaz, 2006; Glaser, 1965). By systematically researching one phenomenon, the researcher can describe the present as it is rooted in the past and what future direction will be needed.

### 3.2 Subject and Setting

The setting was a short-term juvenile detention center in a small Midwestern town in Illinois. The school was open 257-days per year, and all subjects were taught on a tutorial model, with a computer program for electives and response-to-intervention (RtI) activities. The average class size was seven students to one teacher, though the number can be as high as 10:1. There were eight teachers at the facility; the head of the school, the author of the study, was also a teacher. All teachers were certified, and there were three teachers scheduled per day. Four teachers have in excess of forty years of experience and one had 25-years of experience, and the five teachers worked as long-term substitutes. The other teacher was full time and had worked for 35 years as a teacher, another one started her career here, and finally, there was the author, at 21 years of experience. The average stay for juveniles at the facility was 25 school days, though the range might be one day to two years. Most students were male, and there was an almost even split on White and Black students. Students come from rural and urban areas.

One student was the focus of the action research. The student, Thomas<sup>1</sup>, was a 14-year White male from a small Midwest town. He had a lengthy history of nonviolent crimes, including thefts and burglaries of houses and cars. He had dropped out of school instead of entering the 9<sup>th</sup> grade, and though an individualized education plan was

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<sup>1</sup> All names were changed to protect anonymity and confidentiality. Teachers were called by their first name at the juvenile detention center, so the pseudonym was a first name instead of Mr. or Mrs.

not produced by his former school, both the student and school district stated Thomas had a learning disability for reading. Thomas immediately offered up “I’m in special education” and “I can’t read.”

A full case study was conducted on all students entering the facility. Initially, students completed two different assignments which were written at the 5<sup>th</sup> grade level. Thomas struggled and was unable to complete both assignments. The Test of Silent Contextual Reading Fluency-2 (TOSCRF), Strengths and Difficulties Questionnaire (SDQ), and Reading-Level Indicator (RLI) were given, and the results are reported in Table 1.

Table 1: *Case Study*

Instrument	Results	Description
TOSCRF	Raw score 51, Age equivalency 7.9, Grade equivalency 2.2, Percentile 2%, Standardized score 70	Student was a 9 <sup>th</sup> grader who reads below 3 <sup>rd</sup> grade, with a low fluency rate.
SDQ	Emotional, Conduct, Prosocial = Abnormal, Hyperactivity = Normal, Peer = Borderline	Student did not get along with others and acts out without concern for others.
RLI	Instructional = 2.8; Independent = 2.2	Student should be placed around a 3 <sup>rd</sup> grade range for instruction.

*Note.* TOSCRF = Test of Silent Contextual Reading Fluency-2. SDQ = Strengths and Difficulties Questionnaire. RLI = Reading-Level Indicator.

Thomas was a very slow reader, with difficulty sounding out words. The TOSCRF-2 and RLI measure reading fluency and comprehension, and both were nationally normalized tests with adequate validity and reliability (Dumont, Willis, Veizel, & Zibulsky, 2013; Williams, 2000). The SDQ is a screener which measures mental health, and the assessment has adequate validity and reliability (Goodman, 2001). Qualitatively, there were also signs. Thomas wanted to please, so he would often guess after reading the first letter of a word, such as saying “landed” for “leader.” He was not good at breaking down words and identifying small words or rhymes. There was a low tolerance level, and he would give up quickly. Phonemic awareness and fluency were not like similarly situated peers. Though he tested around the 3<sup>rd</sup> grade level in reading, being 14, he had more vocabulary and background than the typical 3<sup>rd</sup> grade student. Other assessments were given, but due to poor reading ability, there were concerns about reliability and validity.

#### 4. Results

Somekh (2005) pointed out a goal of action research is to develop an intense engagement with the subject matter, and the results can be startling to teachers as assumptions, beliefs, and values are either cast aside or reformulated. There were some results which produced an awakening and were transformative, but a good study brings forth more questions than it answers. The results were broken down by analyzing the data, discussing roles, interpreting results, and limitations.

##### 4.1 Data

The data were collected by observations, interviews, and review of assignments. Without a contextualized analysis, the current research cannot be properly understood. Compositing, where prior situations and rationales, were interweaved within the research. The goal of compositing was to consciously identify and name all the components directing the phenomenon. The rationale for compositing was there were kernels of knowledge which existed and informed practices of all teachers, and by considering all experiences, action research can have a 360-degree view. Even practices discarded were as important as the positive and add to understanding, as the negative, discarded practice was the reason for the directionality of new endeavors.

*Ghosting* was the intentional use and mixing of past students, teacher, and self in the observation; by ghosting, past people and experiences, even if vicarious, can be identified and included in the analysis. Teachers, like most

professions, operated off either direct or indirect experiences and adopted practices after defining and becoming motivated. When teachers and students interacted, they see either themselves or prior people in the situation, and teachers and students were guided by what others have done and adopt other people as models. Both compositing and ghosting result in teachers confronting their values, beliefs, and attitudes.

Unlike bracketing, the research follows the idea of unbracketing, or confronting the views and biases of the researcher and participants as meaningful and inseparable from the study and future practices. One way to accomplish unbracketing was through the extensive use of *meta-messages*. Meta-messages were where the researcher assigned motives, values, and understanding to events. The origins of meta-messages were clear for special education teachers who conducted a functional behavioral analysis and assigned reasons to behavior. A caveat was meta-messages were the words of the researcher and might miss the mark for what other people think and mean. Still, the importance was meta-messages, either explicitly or implicitly, guided the actions of the researcher and needed identified.

Traditional research would abhor the overt use of reflexivity as a goal to use instead of recognition to control, but the goal of action research was to bring one's *weltanschauung* front and center. Dyads helped inform the research, as explicit statements of the binary and a means to consider the opposite develop an outside perspective. Practices were as much about the process as the values, beliefs, and attitudes of all participants. Action research was not a strict, chronological narrative of past events. Some past events might not even be true or grounded in fact, but what matters was the practitioner believed an event was factual and used the knowledge to guide actions. To understand the reading intervention, one must understand and appreciate the history underlying the norms and expectations of the school.

In 2008, I took over as the head of the juvenile detention center school. I noticed a problem. Teachers were doing more work than the students. Students would enter the classroom, immediately raise their hands, and state they did not know anything. When directed to attempt the work and then ask for help, students like Jerry would say, "Why won't you help me?" Another student, Brittany, called me over, and I asked her to attempt a math problem in Geometry I. She looked at the problem "Convert  $3/4$  into a decimal," and I reassured her once again to give it a try so I could figure out her level of understanding. Coolly, Brittany looked left and right at her peers, and the 17-year old student called me out with a grin: "He thinks you can divide a smaller number by a bigger number." Calling me out for my stupidity, she waved me off, never to be summoned about the matter again.

There were numerous other examples. New teachers in juvenile detention had no comparable example to base decisions. Most students were of high school age, yet most students acted like they could neither read directions nor do anything unless the teacher read and assisted on every question. Students wanted personal assistants. Being with middle school trained teachers, I told everyone it was not normal to read directions for high school students. The situation had to change, as students had a routine where they asked for help and waited while looking around the room, sharpened their pencils, got a dictionary, threw away a sheet of paper, blew their nose, and repeated. At the end of the period, most student handed in no work, yet they stated they worked and were engaged the entire time. The situation had to change, so I went back to the drawing board. Three books and one article changed the way the tutorial model at the juvenile detention center operated.

Ta'Jon was quite a challenge. As a 15-year old repeat offender, I dreaded coming to work with him at his desk. He was either rude or defiant all the time. Eventually, we came to an understanding: He would pretend to not need help and I would be thankful to not be savaged by him in front of his peers. We all got something, but I was the teacher, and just getting by was not enough. Though Ta'Jon was an 8<sup>th</sup> grader, and the one untimed test stated he read at a 7<sup>th</sup> grade level, I wondered back to my earliest days in special education, allegedly stated by Lee Canter in classroom management training: Nothing works if the student can't do the work. Armed with nothing to lose, as Ta'Jon had all F's, I moved him from 8<sup>th</sup> grade work to 3<sup>rd</sup> grade work, theorizing he covered for his poor reading ability by acting out. Teachers, like myself, had frequently heard the maxim: A person would rather look bad than stupid.

Where did you go, Ta'Jon? The new Ta'Jon worked, was funny, and we slowly progressed through reading. Eventually, after coming back repeatedly over the next two years, he completed high school textbooks with ease. New testing revealed he was on grade level by the end. Two issues changed the way schooling was done, and both developments impacted eventually moving to RAD. First, a case study approach, with at least three assessments in reading and three in math, was implemented. Along with the case study approach, the first two assignments were used as qualitative assessments of basic math and reading. Secondly, an article was read which suggested assignments needed to be at a student's functional level (Houchins, Jolivet, Krezmien, & Baltodano, 2008), and our school discarded the meaning of grade levels and worked where everything was individualized. Some local schools were upset to hear students were not doing grade-level work, but how can a student at the 3<sup>rd</sup> grade level complete *The Odyssey* or work on Geometry when the student cannot add two-digit numbers?

I stumbled on and read *The Learning Leader: How to Focus School Improvement for Better Results* by Reeves (2006), which presented a major force to improve school: Students must first describe what they have read. At the detention center, for students and staff members alike, Reeves was a revolutionary act. Once students first had to read and have an answer down, the "product rule," students and staff members went berserk.

I had taught special education and juvenile detention education for years, so I lived by the rule all students need to have high expectations, and the teachers cannot and should not work harder than the students. Having also taught regular education, I knew students in regular classes did not expect the teachers read and do all work for all students. The problem was the regular education teachers did not adjust their expectations. The regular education teachers thought a student question must be answered. Nothing could be further from the truth.

The problem for all teachers, including me initially, was more than just the regular education experiences. The self was a driver of practices. Teachers Gina, Michelle, Amanda, and Michael discussed their experiences with me. All teachers as students did very well in K-12 and college. All teachers as students stated they rarely asked for help; Teacher Michael said, "I never asked for help." Teacher Gina said, "I would have been embarrassed." Before, in a previous conversation, Teachers Stephen and Kenny liked everyone to know how smart they were and never had any problems in school or college. Regardless of teacher training and professional development, one's personal history often controls the paradigm under which one operates. The way each teacher wanted to teach was devoid of books and training and dealt with the experiential learning which propelled them to success. The teachers projected their experiences onto others and tried to recreate it.

Assumptions about our own lives often have negative effects on students. Another example bears this out. The 8<sup>th</sup> grade student Charles asked Teacher Janet for help, and he read the dilemma to her concerning a reading assignment in Language Arts: "This says to draw a conclusion. Ms. Janet, you know I don't know how to draw." Other students have made similar statements. Many students in juvenile detention centers have lengthy histories of failure, and their expectations were often why try.

When I told a colleague to wait and let a student who just entered get to work, as we do not read directions for students, there was push back. Lines I repeat over and over: "We do not read directions for students" and "We will go through the work with you. There is no way you can go wrong. We are here to support you." Teacher Michelle stated, "It is hard because I want to help students." Teacher Michael once sat and assisted a student for one hour. Not only did the student not get the work, the other students had no teacher. I reminded her of the need for students to first describe what they have read and gradual release. Teachers struggled not being at the students' beckon call, literally reducing the cognitive load to just copying answers. Slowly, most students first worked, then asked for help. There were and seem to always be new students who challenge the revolutionary idea that the student can actually work and follow directions.

Reading first made great inroads, and many students showed enthusiasm for being able to work on their own for the first time in a long time (we conjectured, maybe some students had never worked and followed directions). Math was a different problem, as teachers still helped students before discussing. What we found was teachers helped literally every problem, and it would not be uncommon in three class periods for students to complete three to five problems. There was never gradual release, independence, and demonstration of competency.

What was being done did not work, and the book *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom* gave ideas to transform math practices. Following the ideas of Stigler and Hiebert (2009), calculators were removed, testing for math skills for placement was implemented, students had to copy down a problem and show work, and all students must first answer a problem before asking for help. The idea was sold about needing something to talk about, and the attempted problem gave the teacher the chance to diagnose what was wrong (was the issue directions, computational, and, or an unwritten rule, etc.). Many students were not happy, and a common refrain was, "How can I do something I've never done?" The boilerplate became, "How can you do anything you've never done unless you try? Don't be worried about making a mistake, for that is how we learn. By trying it, you will be close, and we can build off what you know." Slowly, students knew the expectations, and many students enjoyed being able to demonstrate mastery. One student, Sheila, had an earth-shattering experience. She was a high school student in Geometry, and she complained about doing basic math. She cried when she realized she did not have the elementary skills needed to do high school math without a calculator.

All these practices led to the crescendo delivered after reading in a graduate class the book *Curriculum 21: Essential Education for a Changing World*. Jacobs (2010) presented the idea of thinking routines, and building on the ideas already established, R-A-D was born. Read, answer, discuss became the oft-repeated refrain. Every period of every day started out with the same direction, and teachers were bullied to force students to work independently. Read and have an answer down meant teachers could have a shared discussion with common vocabulary and ideas. Slowly but surely, students began to work independently. There were problems.

Read-Answer-Discuss was a lot more work than giving answers. Teacher Gina was aghast, as she liked to read directions, point out answers, and plop down as soon as possible. Giving answers and being Teacher-as-Enabler was much easier than helping students work independently, diagnosing the knowledge and skill gap, and teaching the concepts. An example of her resistance showed the havoc one teacher could wreak.

Addie, a 13-year old student with a learning disability, received her first assignment from me. She immediately stated she did not know what to do and asked me to read directions. I went through the RAD spiel, along with the support we would work together, and left. For the first several questions, Addie did that. Then I turned my back and Teacher Gina came and read the directions, gave answers and replaced Teacher-as-Facilitator, me, with Teacher-as-Enabler. As seems to always happen, Addie needed "help" on the next question, that was, the teacher to continue doing her work, but she got me instead of Teacher Gina. Teacher Gina intentionally sabotaged the situation for her own gain, as reading and giving answers was quick, painless, and ensured the student was content. She immediately asked for Teacher Gina, and when I refused, she was mad, became disruptive, and left the classroom. The student refused to work the next three weeks. Whereas she worked for me, once she got a taste of power and control, which was all too common, she could not handle the idea the teachers really would not do her work.

The thinking routine RAD has a lot of ideas supporting it, but the ultimate goal was students must work independently and produce work to learn. Teachers can guide and help, but students must think, discuss, fail, and try in order to learn. The mantra was, "Nothing works if the students don't." Answering first was the student's chance to demonstrate what was known, and students were reassured mistakes were expected and the building blocks to learning. Also, teachers were careful to "honor the answer," where teachers worked off what students know instead of pointing out mistakes first. Honor the answer was about respecting the effort. Building routines and working on developing feedback models made the interactivity and engagement liked by most students, where school was the highlight of most students' day at the detention center. Against this history, there was the dilemma of Thomas.

During the implementation of the RAD protocol, the results of my dissertation (Coker, 2020) directly impacted the operations of the school. To translate the results, two substantive values drove the change: helpability and coachability. Students were told they needed to be helpable, which was operationalized as being mindful and empathetic of others (don't mumble to yourself, do not drum or make noises, and think of others) and assist in

making group rules work (students were together, so students needed to raise their hands, refrain from arguing, and listen to each other). Coachable meant first RAD, and if a student asks for assistance and feedback, the student will accept what the teacher says and do what was asked (do not ask for help only to argue and tell the teacher how to do everything). The teacher's response could be feedback, new assignments, or direct teaching, depending on the need of the students. Along with helpability and coachability, a strong routine helped to reduce angst and uncertainty.

Thomas stated, "I am good at math, but I am not a good reader." His definition of good at math conflicted with society's definition, as Thomas could not add or subtract multiple digits proficiently. Still, he was affable, looked at the teacher, listened, and was polite. He was told to attempt an assignment called the check packet. The reading level was at the 5<sup>th</sup> grade level, and there were simple addition and subtraction problems. He accepted RAD and completed the first page. The work was mostly all incorrect, but his work was honored and worked on collaboratively. At the same time, Samuel was instructed in RAD, stated, "I CAN'T READ," clinched his fist, and stared me down. After 15 minutes of the shenanigans, he started to complete his work and did the work perfectly like he had on all the previous pages. Samuel was capable, with reading test scores at a 5<sup>th</sup> grade level. He expected the juvenile detention center to operate like his alternative school, where he was disruptive, unruly, and the teachers worked for him.

Students like to belittle themselves as a means to attempt to get teachers to feel sorry and default to the student's desired role: teacher-as-enabler. Clark stated, "I am mentally retarded. I can't read." He was not mentally retarded, but he was not a good reader. There were many Clarks who come through the door and infantilize themselves as being incapable of doing anything. The remarks of being a poor reader, in special education, and needing an assistant were regular demands. No student ever stated they could do what was expected, they can work, and they can try assigned work. No student ever yelled, "You are the reason I'm so successful. It is your fault why I got an A." Failing, though, was externalized, and then the students bargained and complained.

The rationale for choosing keywords flowed from reviewing the notes Thomas took. Every student was required to take a minimum of 15 notes for computer work; notes must be at least 6-8 words long and have a complete idea. Notes were all or nothing; if a student did not complete the minimum, then the student could not be on the computer. No bargaining there. The teachers quickly noted Thomas would get 15 notes and of the required length, but he often wrote about what he felt or already knew. Even vocabulary notes were poorly done and disconnected from the reading.

Thomas did not complain. He was not doing well, so discussions were held with other teachers to form a plan. Keywords were selected as the first goal. Notetaking by looking at keywords, reading the sentence before and after, and reviewing the work were the initial plan. There was modeling, guided practice, more modeling, release, and monitoring. Thomas was amenable to all practices. The notes greatly improved and demonstrated many key points from the reading. Discussions tried to connect what Thomas knew to what he read.

Eventually, the goals of the intervention morphed into a systematic approach. The reading intervention included the following steps: 1.) Search for keywords and ideas (generally any word five or more letters, the "big word" strategy, but try to get a complete idea); 2.) Read the sentence before and after the sentence with the keywords; 3.) Expansion continued with one idea per paragraph; 4.) Search for words in bold, look at pictures, and read titles and subtitles; 5.) Notetaking by using keywords gave more practice; 6.) Use the journalism questions to tell the story. All skills started with keywords and branched out to the next steps. There was an emphasis everyone needed to be consistent in their approach and teaching.

As shown in Table 2, Thomas completed answers and then had poor work reassigned. The following results suggested Thomas put down an answer, and then he rapidly guessed when redoing his work. Because he only was reassigned incorrect answers, the possibility of guessing a few correct was great. Using Microsoft Excel, different reading passages were analyzed. According to the Flesch-Kincaid score, the reading difficulty varied from 5.0 to 7.2 grade level.

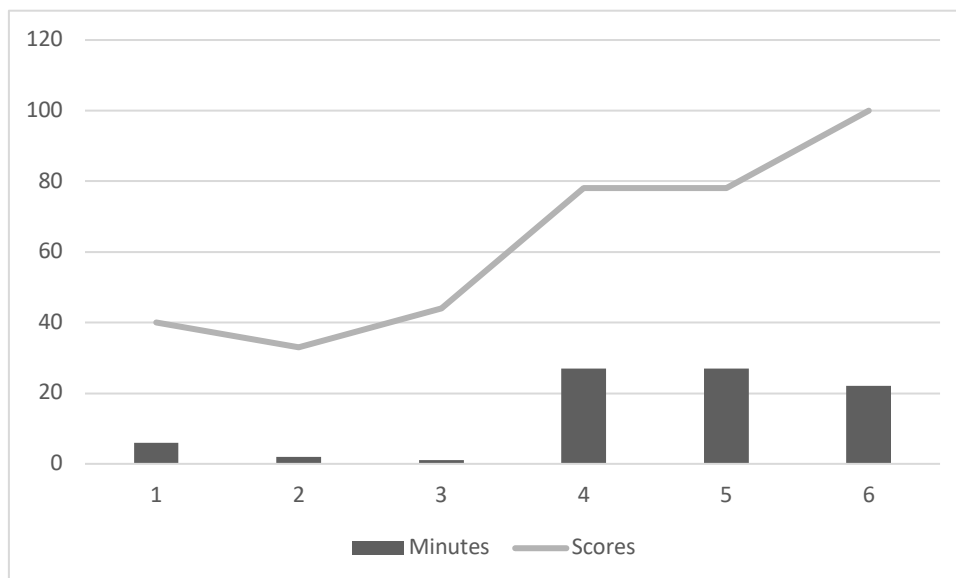
Table 2: *Thomas's Pre-intervention Results*

Assignment	First Score	Second Score	Minutes
Purpose of Work	40%	60%	6
Personal Benefits of Work	33%	50%	2
Wages and Employment Benefits	44%	56%	1

*Note.* Times and scores were from a computer program.

Besides the computer program, there were attempts to generalize the reading strategies to the entire school day. The student was instructed in reading strategies and reminded to ask for assistance after doing three questions, then a complete page, and eventually three assignments. He was told to write notes, and the teachers told him they would support him. There was no fear in failure, as the teacher and student would work together. Slowly, he started to work independently. Many other students refused to do this; these students wanted to direct the teachers to become personal assistants.

Thomas took notes and answered vocabulary questions. If he could not find an answer in the reading, he used the strategies to focus his reading. The teachers would read with him and assist, but he first followed the RAD protocol. He would often smile and appear happy he improved his scores on assignments. Soon after, he was working on another computer program for RtI, and he got 0 out of 10 questions correctly. *Sua sponte*, he took out some paper, took notes on his own from a reading passage, and got 10 out of 10. His scores on assignments after the intervention were the following: 74.8% (27 minutes), 74.8% (27 minutes), and 100% (22 minutes). Figure 1 shows the results of the pre-intervention versus the post-intervention.



*Figure 1:* Pre-intervention scores (1-3) and post-intervention scores (4-6).

Thomas greatly improved his scores on reading assignments. Besides RtI, he sometimes took notes in books assigned. He enjoyed reading with teachers, and the prosociality mattered more than his reading ability. There were many students who refuse to cooperate and were enraged they were not in control during the school day. Though the results were promising, two caveats existed: Thomas might find answers, but there were questions about his comprehension of much of what he read, and he was only enrolled for a brief time, questioning the long-term impact.

#### 4.2. Roles

Action research was more than the success or failure of an intervention. Goodnough (2010) stated how teacher identify and conceptualize the self inform practices. Being a teacher and participating in action research aids

teachers to clarify their beliefs and values, and the impact can improve the learning and lives of students (Beijaard, 2019; Trent, 2010). Within the study, the student and teacher roles were key to understanding any intervention.

Role duality defined students. Students might state they were special education and unable, but students separated such protestations from later claims. Students can, at the same time, be competent/smart and incompetent/dumb. A guiding principle of interaction with teachers and fellow students was protagonist/antagonist. Either others do what they were told or they were an enemy, to be challenged, fought, and conquered. The range of independence was from infantilized to adult, but most students tested roles and fished for the teacher's role they wanted. When teachers would not comply and play the game set out by the students, the students often worked for role destruction, role assassination, and role accommodation.

Role destruction often started out as the first step. Samuel argued and complained he needed a different kind of teacher. Marcus once left a note, telling the teachers to teach. Paul wrote his probation officer, stating "Teachers will not help the students." When that did not work, students next worked on role assassination. Calling teachers names, clinching fists, and refusing to go to school until "You all get real teachers," like Clay stated and several others, was a concerted action to move the focus from the student working to the teacher complying. If teachers held steady and maintained consistency, most students moved to role accommodation. Some students could not accept the fact, for the first time in a long time, the teacher and student shared power, and so some students never wanted to attend school.

One way to understand the roles teachers and students took on and discarded was through satisficing research. Hadar (2011) stated satisficing in school has as much to do with compliance as learning; students who were minimally agreeable and went through the motions of work and interaction were successful. Most roles picked by students were probably two reasons which have little to do with school: Students did not want to be locked up and students had a long history of rarely complying in school. The continuum goes from being the tyrant on one end to the learner on the other end. Some students refused to ever budge; like the little kid who realized long temper tantrums work, some students will wait the teacher out. Most students moved along the continuum in a predictable manner:

- Tyrant. Disruptive, defiant, and ordering the teacher around.
- Withdrawn: If a student cannot beat them, forget it. Many students who ask for help and find the teacher will not do the work never want to talk to the teacher again. The student punished the teacher by not talking.
- Director: A softer approach, where there were negotiations to still have most control.
- Manager: The student might bargain some, but there might be room for co-creators of students and teachers.
- Learner: The student controlled his or her own learning, and the student used the teacher to confirm what he or she knows, generate questions, and have teachers either directly teach or facilitate learning.

The continuum was not a linear process, necessarily, but most students follow a predictable path. The continuum really answers the question: Who was responsible for learning? The tyrant believed learning takes place "out there," and the student had no role except to actively boss students and teachers around. At the opposite direction of the continuum, the learner directed his or her own learning and owned failures as much as success. Pathway observations suggested students moved from trying to get all the answers right to learning, discussing, and relating. A main driver of the pathway was not the material or assignments, but the student must like the teachers, feel supported, and view themselves successful within the teacher marshalled regime. An example shows the path.

Using an example, one can see the continuum at work. Sloan, a 16-year-old student in special education for a learning disability, went through the stages. First, after hearing about RAD, he immediately raised his hand before even attempting his work and asked for help. He was told everyone can read directions, to put forth effort and try the first three, and there will be no risk because the teacher will discuss and do what was needed. As soon as I walked away, Sloan thought I was gone and asked Teacher Michelle for assistance. Sloan heard the same spiel.

For the next two months, Sloan tried the same actions every period. When rebuffed, he just did not ask questions. He was never at the tyrant stage, but he was stuck at the withdrawn stage, and teachers, even with support, assistance, and conferences, thought he would never change. There was a contrast here with Chase, who stated he could not subtract. He immediately talked over the teacher and told the teacher what to do. When the teacher redirected him to follow RAD, he refused. The teacher left, and he completed the page, correctly without assistance (he was pretending to not be able to do simple subtraction, even though as a 15-year-old student in regular education, he had already demonstrated it), and then quit. He was very argumentative and insulting, and he refused to ever work and do what was asked for the remaining 10 days he was present. Chase, unlike Sloan, was stuck at the tyrant stage, and through learned behavior, figured the teacher would have to give in like most all teachers he experienced before.

Sloan, though, decided to get unstuck. Little by little, he opened up if he could follow RAD initially and direct the teacher for extra help. Teachers had to be warned to “not get sucked in” to being Sloan’s personal assistant. There would still be relapses, but Sloan was so well mannered and polite, he would bounce from withdrawn to managing. One day, he decided to self-direct his own learning, and the smile on his face as he moved from pretending to not be able to read one sentence to discussing, pointing out passages, and owning his learning, was startling compared to the first Sloan we saw. Roles are ephemeral, and students, like teachers, move up and down the continuum.

Satisficing was both a positive and a negative. Some, like Brittany in trigonometry who cannot divide and does not want to graduate high school, was happy getting F’s as long as everyone left her alone. Other students, such as Erin and Shawn, were much more difficult. Erin missed 90 of 114 days and passed three classes in her home school. Shawn had an experience like many students, where retention and discipline were deemed so bad everyone passed regardless of attendance or effort. The disassociation of effort and behavior from results at a student’s home school compared to the juvenile detention center with firm standards can be difficult to understand. Both students were tyrants, but they acted in a passive aggressive manner. Erin did a little work and failed. Shawn stated the lowest grade a student at his school could get was 70%, and after doing little work at the juvenile detention center, he failed. There was a paradox for these students: The students, by doing anything, did more than their home schools required, yet the students still failed. Many students also mistook being polite and quiet, rare behaviors in their home schools, as passing. The students believed being better behaved than the students ever would at regular school must result in passing. Students completed a check-in check-out sheet each period, and many students would write they completed no work, but they believed they would get an A or a B and pass. How could this situation make sense?

Students with strong academic skills played the satisficing game the other way. Above-average students like Sharon and Vincent found what the minimum was and stuck to it. They never once went above, and unlike records from their high school, both students were able to bite their tongues, listen and persevere. The students with better social understanding moved quickly from tyrant to learner. When many of these same students found they were being released, they shed their maturity and became disruptive and disrespectful. Once the game was over, students moved on to their next role.

Coker (2020) found many noncognitive factors, such as grit, self-esteem, and academic self-concept, did not impact grades as much as prosociality and social self-esteem. More surprising was the sample of first-time-detained juvenile delinquents had self-esteem, grit, and academic self-concept comparable to nondetained peers. The difference was the students in juvenile detention had long histories of failure, were far behind academically, and did not reflect their beliefs in their actions.

Teacher started out with role confusion as well. A problem was teachers and students often have no comparable (e.g., successful students work independently, do not act like they cannot read, and cooperate, etc.). Consequently, teachers made themselves the comparable, yet the teacher was most likely compliant, cooperative, independent, and hard working. A false sense of empathy ensued.

Most teachers started out as teacher-as-enabler. Teacher Gina was doing Addie's work, but several other teachers wanted to do students' work as well. Teacher Kenny felt bad Henry was failing at math and refused to follow directions, so she broke the routine of RAD because she wanted to ensure his success. Teachers-as-enabler felt a noblesse oblige for students and took away a student's responsibility for learning. Over a week's time, Teacher Kenny did every part of every assignment with the student, and the student received all A's. The following week, Teacher Kenny was gone for vacation, and Henry asked for assistance. He did not even want to start out the problem. I told him he needed to memorize step one, and since Teacher Kenny did all the work for him, he needs to go back and actually do the work.

Shockingly, Henry agreed and put in the work. Most students stayed at the tyrant stage, like Addie and a long list of other students. Dyads, though, were important to understand the situation. Teacher Kenny was not wrong as long as she supported all students in the same way and then honored the product rule of having students eventually create work on their own. There was a strong possibility Henry picked up the work assigned by me quickly because of all the scaffolding and assistance by Teacher Kenny. Unfortunately, the Addies greatly outnumbered the Henrys, and enabling was like an opioid, with students suffering through withdrawals.

If a teacher was supporting a student, the teacher started out as teacher-as-instructor. The teacher would tell the student what and how to do assigned work. There would not be bargaining and negotiation; negotiating was an attempt by students to circumvent the rules and be able to do what they wanted. Students had great answers why the students were the exception to all the rules. Thomas stated he was not good at reading. Logan stated he was not like the other students. Michael said at his school he had an aide to help him on every problem. The end result was always, "Let me do what I want because [you fill in the reason]."

Next, as students followed RAD, there was positive support and assistance. The teacher moved to teacher-as-facilitator. The students were sold on RAD, and learning required students working, discussing, and refining. Often, jokingly, students were asked the difference between asking for help and wanting answers. Most students admitted they really wanted the answer initially, and students were told the teachers had already done the work, and school was about putting forth effort, making mistakes, and learning.

The last role a teacher could assume, if the student takes the bait and moves through the process, was teacher-and-collaborator. Teachers would collaborate and help students understand what the student was doing. This method was very different from the teacher reducing the cognitive load by letting a student do nothing and watch the teacher talk, point out answers, or even do the work.

A goal of action research was to be democratic. Teaching was more republican than democratic. The students outnumbered the teachers, and there were state and national policies, so there were constraints on democracy. Furthermore, there were reasons children were called children and adults were called adults. Where possible, within the authoritarian framework, an authoritative governance can emerge. Students can pick assignments, skip sections, and order their day. Patience and calmness were preached every day, and a central aim of the tenet of helpability was no one argues, and if someone wanted to get mad, the students could get mad in their own way as long as they were neither disruptive nor taking it out on others.

Teaching is messy and ill defined, and experienced teachers practice satisficing by finding what works, often at a *de minimus* level (Le Maistre & Paré, 2010; Schwartz et al., 2002). Actors and roles are not the same, though they can be. Actors are generally static, but roles are dynamic and responsive. Teachers often unwittingly enable because first, when they were students, asking for help was for help. The teachers did not know the different motives, as evidenced by student reaction when the student did not get his way, and then the teachers found it was easier to give in. Giving in also meant the teacher assigned the role of student-as-impostor, with the teacher now getting along but keeping the student not only ignorant, but in their role forever. Role taking was about navigating, and sometimes people were trailing, being followed, obstacles, or side by side.

Why do teachers act like enablers, with little concern for student learning? There were several possible explanations. First, action research wants democracy and transformation, but many teachers are in the profession

for themselves with little concern for students. Teacher Stephen gave everyone A's, assigned extremely easy work, and never spoke with students. He made his day easy. Secondly, the status quo is rewarded. Another staff member, Teacher Kenny, also assigned easy work because students who passed and asked no questions did not complain. Paradoxically, administrators like teachers like Kenny and Stephen because their students get good grades and pass, resulting in parents being happy. Mediocrity and refusing to stretch oneself was easier and often rewarded.

### 4.3. Interpretation

Research in juvenile delinquency often failed to translate, with family-based and school-based interventions showing little effectiveness in reducing recidivism (Baetz et al., 2019; Baldwin, Christian, Berkeljon, & Shadish, 2012). All actions test if something will work. Yet, action research was an iterative process of implementing, adapting, and merging multiple practices (both within the specific process and connected to other actions, with a ripple effect). The directionality of the objective was what matters (goal or personal survival). No one was found to read research in my school or in sessions with other teachers in my district, which appears to be common (Joram, Gabriele, & Walton, 2020). Anecdotal was not necessarily less true or less impactful. Pragmatics trumped articles and research for most teachers, but people were ultimately theory driven. The theory might not be about the action, as teacher management might overpower student learning.

Adelman (1993) stated a goal of action research was reconstruction of practices and productive work as researchers consider, reflect, and change through their research. The interpretation disaggregated the dimensions of the process and described the meaning ascribed to Thomas and the facility. Four dimensions were considered: the iterative process, heuristic challenge, positionality, and pragmatic rationality.

*Iterative process.* The research looked at a reader who was a dropout and had a severe reading disability. Questions and hypotheses were generated, and steps were taken to improve Thomas's reading ability. If Thomas had stayed, work on phonemic awareness and fluency would have been added. Generating questions, especially considering the opposite, was useful within a professional learning community. Schools need to be more action oriented by recasting teachers as teacher-as-researcher. There was the problem of time, but a collaborative process can include all stakeholders.

*Heuristic challenge.* Instead of "What did the student learn?," teachers asked "What was easiest for the both of us, so I can leave on time and the student doesn't cause a problem?" I heard all the time "We didn't have any problems," but rarely do teachers state "The students learned a lot and ... who is growing, who is floundering, and what needs done." At one time, the answer about Thomas would have been he followed directions and was polite. Another problem was answering a difference question than the one asked. For example, "What did the student learn?" could be ignored by, "The student was well behaved today." Many teachers were not committed to educating as much as they were stuck in a job they did not want.

The heuristic challenge also precluded attempts at being democratic, as many teachers look at what they wanted versus what students needed. Heuristics need identified and challenged, and educators should make sure they were not substituting logistics for what was right. Perhaps one question can avoid the problem of heuristics: Not what did the student complete or grade received, but what did the student learn, objective by objective?

*Positionality.* Roles were but one way to discuss positionality. Positionality was the location of a role over time and space. Nidus was a central idea in exploring positionality of juvenile delinquents. Most juvenile delinquents in a correctional facility were incarcerated for a short period, and juveniles being around fellow delinquents meant many students needed to save face and look strong. For teachers, many teachers were not working for the children as much as they were for themselves. Doing just enough to get by, regardless of learning, often became the goal. To enable Thomas and erase expectations would make everyone's job much easier, especially as he was present for a short time. Teachers need to identify positionality from multiple perspectives and situations.

*Pragmatic rationality.* Satisficing was easier than maximizing. Every action has an opportunity cost, and teachers can implement first-order change easier than second-order change. The difficulty in challenging pragmatic

rationality was often there was no outside feedback, so teachers lacked a comparable model to assess and evaluate a situation. In the absence of outside feedback, teachers and students defaulted back to what they had always done. Sweeping change produced anxiety, shook one sense of competence, and might lead to failure. On the road between failure and success, satisficing was in the middle, the sweet spot where one can survive with minimal expenditure of energy and resources.

I have seen other students like Thomas where teachers have rationalized why they would not intervene. He was not present long enough. He will never amount to anything. He was just stupid. He was lazy. On and on, teachers withdraw and become teacher-as-secretary, where the teacher liked to grade papers, do paperwork, and enter grades. What worked personally often substituted for what was best for the student, and students often navigated their day by what would get acceptable grades with the least expenditure of energy.

How can teachers challenge pragmatic rationality? There will probably need to be a process to initiate and facilitate action research, as otherwise teachers only seek help when they have slipped from survival to failure. There does not have to be a report or a presentation, but teachers do not normally collaborate and work on examining processes. Trust would have to be at the center, as action research means deconstructing one's practice, and teachers often feel the deconstruction is a personal attack on one's competence, self-worth, and very definition of self. Incentives and time must be given, and teachers need to feel comfortable the action research is not as much about jettisoning the past as honoring what came before and reforming it. Teachers need to know the action and processes are all dynamic and evolving in real time, based on results.

If teachers cannot identify the kernels of knowledge which drive them, they cannot reform their practices. Storytelling helps, but storytelling can suffer from oversimplification, hero worship (people only remember the positive), and ideology. Constant conjectures, meta-messages, and considering-the-opposite (CtO) can work only if a teacher challenges what works and what does not by taking on multiple perspectives. Phenomena are not born in isolation, so teachers must look at practices not as a single cell but a multicellular action connected to goals, practices, and roles. Building a framework and experimenting can move teachers out of their comfort zones.

For Thomas and the many others placed like him, relationships were the key to learning. Juvenile delinquents have, as a group, language and literacy issues which complicate formation of positive social interaction (Snow, 2019). Gearhart and Tucker (2020) found improving individual factors over other noncognitive factors, such as collective efficacy, resulted in greater improvement. Many schools around the nation, including the juvenile detention center in the present study, have professional learning communities. A goal could be to either operationalize action research methods or adopt another truncated method which can be easily learned and implemented. Without outside sources to add to the perspective, though, teachers will be limited by believing they know all one needs to know.

#### **4.5. Problem Solving Teams**

Most education studies have been found to suffer from lack of replication and might be more examples of novelty and excitement than applicability, which was a concern in other fields (Blanco-Perez, C., & Brodeur, 2020; Makel & Plucker, 2014). Effect sizes, as typically presented, can be overstated and might suffer from methodological flaws which render findings and use questionable (Bergeron & Rivard, 2017; Kraft, 2020). Teacher experience and education as vehicles for improvement were found questionable and might even be negative, with teachers lacking the skills to translate research into meaningful practices (Bhai & Horoi, 2019; Booher, Nadelson, & Nadelson, 2020; Ladd, 2008). Education research does not always deliver on promises presented, as teachers struggle having a method and understanding to transform studies into meaningful practices.

Professional learning communities (PLCs) are standing meetings for teachers to meet and evaluate teaching and student learning, and many schools across the United States implemented such practices. When properly developed, PLCs can increase academic achievement and improve teachers' ability to collaborate and research practices (Brodie, 2019; Doğan & Adams, 2018). Teachers have not been found to make use of research, but PLCs focus on improving practices. Bridging the gap could be developing a framework for implementing action research

on a regular basis, as shown in Figure 2. A checklist provides a way to systematically investigate problems in a manner which is easily enacted using a truncated method of I-R-A.

<b>Problem Solving Teams</b>				
<b>Pre-intervention:</b> Second order change? Mission and goals are established.				
<b>Inquiry</b> “examining the situation”	<b>Identify</b> <i>What is the problem?</i>	<input type="checkbox"/> Context	<input type="checkbox"/> Individualized proposed solutions.	<input type="checkbox"/> Data plan
		<input type="checkbox"/> Dimensions: Ecological or TET	<input type="checkbox"/> Time frame	<input type="checkbox"/> Costs
	<b>Think</b> <i>What can be done to improve the problem?</i>	<input type="checkbox"/> Research	<input type="checkbox"/> Collaboration	<input type="checkbox"/> Iterative process
		<input type="checkbox"/> Strategy	<input type="checkbox"/> Collaboration	<input type="checkbox"/> Plan with indicators
<b>Response</b> “creating a better practice”	<b>Do</b> <i>What are we doing differently?</i>	<input type="checkbox"/> Action plan	<input type="checkbox"/> Fidelity checklist	<input type="checkbox"/> Staff training
		<input type="checkbox"/> Roles	<input type="checkbox"/> Outcomes	
<b>Analysis</b> “measuring change” & “shifting gears”	<b>Evaluate</b> <i>How do we know we made a difference?</i>	<input type="checkbox"/> A/B test	<input type="checkbox"/> Observation	<input type="checkbox"/> Heuristics challenge
		<input type="checkbox"/> Interviews	<input type="checkbox"/> Compositing	<input type="checkbox"/> Positionality
	<b>Modify</b> <i>Where do we go from here to improve our plan?</i>	<input type="checkbox"/> Eliminate / Add	<input type="checkbox"/> Pragmatic rationality	<input type="checkbox"/> New plan
<b>Feedback loop:</b> The process is an iterative process, grounded in data. Once the plan starts, there should be concurrent evaluation and modification. The checklist does not have to be sequential.				

Figure 2: Problem solving teams’ checklist.

To make the checklist in Figure 2 work, three actions are required: recognize first-order versus second-order change, develop dimensions and a framework, and measure value and key performance indicators. First-order change is an intervention or improvement which does not cause a major change in practices or the organization. Second-order change would require the research, development, and adoption of a new policy or procedure which disconnects from past practices. Dimensions give a framework, and two possibilities are using teacher-effectiveness training or an ecological perspective. Teacher-effectiveness-training would mean examining problems from the problems or concerns of three entities: the teacher, the student, and the classroom (Gordon & Burch, 2003). An ecological model would focus on the environment: the actors, classroom management, instructional practices, and the curriculum, etc. Finally, plans must focus on value versus activity. A way to avoid the activity trap is to develop robust, measurable key performance indicators which impact student behavior and academic achievement. Within the checklist, one can examine issues and concerns common in action research, such as an iterative process, heuristics challenge, positionality, and pragmatic rationality.

#### 4.6. Limitations

Qualitative triangulation involves considering multiple sources of data to confirm conclusions and themes drawn from the data (Flick, 2018; Sagor, 2000). Concerning Thomas, the data included observations, interviews, and

scores on different assignments. All the data pointed to the conclusion the reading interventions improved Thomas's work ethic and scores on assignments. Since this was an intervention of one student, there might be problems generalizing the results to other students.

Somekh (2005) stated action research needs to look beyond whether every detail was accurate, as the traditional methods of understanding research might not be applicable. All the observations and past history can be warped by time, discussions, and subsequent changes. Yet, the knowledge and practices were perceived as real and were in action regardless of any unintentional omissions.

## 5. Conclusion

Juvenile delinquents have a higher prevalence of significant emotional and learning problems, and graduating high school can improve relationships in juvenile detention and beyond (Engstrom & Scott, 2020; Mallett, 2014). The action research adds a perspective to educating first-time-detained juvenile delinquents which has been little explored. Developing research-based methods, such as RAD and other techniques, have the potential to offer a structure to develop and sustain relationships for juvenile delinquents and teachers.

Winter (2000) found overt learning often stops once professionals feel competent, resulting in professionals no longer progressing. The methods used in the action research, including novel ideas of compositing, ghosting, and meta-messages, offer a way for teachers to examine their practices and move from proficient to accomplished. Several barriers, such as trust and pragmatic rationality, will have to be overcome. Future research can look at incorporating action research within the school day for improved students achievement and classroom management.

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# Exploration of PAD Class Teaching Mode for the Engineering Masters in the Colleges and Universities of National Special Needs Talent Cultivation Project

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## Abstract

The education for the engineering masters in the colleges and universities of National Special Needs Talent Cultivation Project (NSNTCP), is an important component of the graduate education system in China, and is one of the important patterns to cultivate high-level application-oriented talents. However, there are some serious problems in the traditional classroom teaching for the education of engineering masters in the colleges and universities of NSNTCP. In the traditional teaching mode, the interaction between teachers and students is becoming less and less, the students' learning enthusiasm is becoming weaker and weaker, and the students are often passive acceptance. Being faced with the dilemma of classroom teaching for engineering masters in the colleges and universities of NSNTCP, combined with the practical teaching experience of engineering master education in our university, this paper discusses the core ideas of PAD Class teaching mode for engineering masters in the colleges and universities of NSNTCP from three aspects: emphasizing the teachers-students dual centers, strengthening 4C core competencies (namely critical thinking, communication skills, collaboration, and creativity), and paying great attention to process evaluation. Moreover, it also elaborates the crux in the implementation process of PAD Class teaching mode for engineering masters in the colleges and universities of NSNTCP. The results obtained from the teaching practice in the basic course of Advanced Engineering Mathematics is positive and satisfactory. It indicates that PAD Class teaching mode is a kind of new teaching mode which adapts to the growth and development of engineering masters' education in the colleges and universities of NSNTCP, and is an efficient and practical teaching reform that can not only embody the teachers-students dual centers, but also ensure the high-level application-oriented talents training goal of the engineering masters' degree education in the colleges and universities of NSNTCP.

**Keywords:** PAD Class, Teaching Mode, Engineering Master, NSNTCP

## 1. Introduction

In 2011, China started to carry out the pilot work of cultivating professional degree postgraduates needed by the national special industrial needs by selecting a few bachelor's degree awarding units with distinctive characteristics and high level of education. Our university and the other twenty-five colleges and universities were approved by the National Ministry of Education as the pilot units of National Special Needs Talent Cultivation Project (NSNTCP). Since then, the education for the engineering masters in colleges and universities of NSNTCP, has been an important component of the graduate education system in China, and has been one of the most important patterns to cultivate high-level application-oriented talents. What's more, every pilot college or university has actively carried out some theoretical researches and practical explorations. Recently, Xu and Zhao (2017) pointed out NSNTCP has the characteristics of uniqueness, consistency, and diversity, and there are some confusion and problems in the implementation process of NSNTCP. They also suggested that the pilot unities and local governments should take corresponding measures to solve them jointly. Based on the characteristics of NSNTCP, Zhao (2018) posed up the Production-Education-Research-Application talent training mode for the electrical engineering postgraduates. It's proved that the four-combination education pattern is useful to closely take the postgraduate education, the scientific research, and the industrial production into together, and observably improved the application abilities of the engineering masters in colleges and universities of NSNTCP. More recently, based on the 4H-YDP concept and practice in the United States, Wang, Yuan, Li, and Wang (2020) conducted the integration of the 4H-YDP concept and professional degree postgraduate cultivation to improve the cultivation quality of professional degree postgraduates for NSNTCP. Sun (2020) researched the employment problem of the masters of engineering graduates, and proposed some effective employment guidance measures to solve the postgraduate employment in colleges and universities of NSNTCP.

However, there is no literature on the classroom teaching mode of engineering masters' education in the colleges and universities of NSNTCP. It is well known that classroom teaching is an essential and important part in the process of talent cultivation, and is directly related to the quality of talent cultivation. For the engineering masters' education of the colleges and universities of NSNTCP, reforming classroom teaching mode and innovating teaching pattern is one of the important ways to improve the effect of classroom teaching and to improve the quality of talent cultivation.

In this paper, we focus on the classroom teaching mode of engineering masters' education in the colleges and universities of NSNTCP. We first investigate the current situation and the dilemma of classroom teaching for engineering masters in the colleges and universities of NSNTCP. Secondly, we introduce the PAD Class teaching mode, and discuss its core idea from three aspects. Thirdly, we elaborate the crux in the implementation process of PAD Class teaching mode based on our practical teaching experience. The common basic course for engineering masters in the colleges and universities of NSNTCP, Advanced Engineering Mathematics, is taught by applying the PAD Class teaching mode. The positive results indicate that PAD Class teaching mode is a new teaching mode which adapts to the growth and development of engineering masters' education in the colleges and universities of NSNTCP, and is an efficient and practical teaching reform that can not only embody the teachers-students dual centers, but also ensure the high-level application-oriented talents training goal of the engineering masters' degree education in the colleges and universities of NSNTCP.

## 2. Current situation of traditional classroom teaching of the Advanced Engineering Mathematics course for engineering masters in the colleges and universities of NSNTCP

The course of Advanced Engineering Mathematics is a basic course for all engineering masters of the colleges and universities in China. Clearly, it not only has the striking characteristics of mathematics discipline, but also has a solid mathematical foundation that is closely linked with the professional courses studied further. The mastery and application of the knowledge of the course of Advanced Engineering Mathematics directly affects the engineering masters' interest and enthusiasm in learning, professional development, and the innovative ability. The classroom teaching of Advanced Engineering Mathematics course is traditional in appearance, which emphasizes the teacher-centered, textbook-centered, and classroom-centered (Herbart and Li, 2002). Generally, its classroom teaching process consists of lecturing, exercise including classwork and homework for reinforcing the learning, and

examination including mid-semester and final examination for testing whether the students have learned some theories and procedures. As far as the lecturing is concerned, it usually consists of some mathematical definitions, properties and lemmas, theories and their proofs, examples and commentaries on the exercises that have been done in the class.

Meanwhile, with the rapid development of the graduate education in the colleges and universities of NSNTCP and its enrollment expansion with large scale, the knowledge base and ability of the students are declining significantly. For the engineering masters in the colleges and universities of NSNTCP, it is very difficult to learn and grasp completely those abstract mathematical concepts and definitions, logical proofs of theorems and propositions. Furthermore, the traditional teaching mode with the status being “teachers’ speaking and students’ listening”, is too simple, emphasizing theory over practice, and emphasizing knowledge over ability, which directly makes the students seriously lack the ability to solve problems and practice (Chen, Zhang, Feng, et al., 2019). Guo (2019) looks upon the traditional classroom teaching as a full classroom irrigation and spoon-feeding teaching method. Consequently, the classroom learning atmosphere is very poor, and the quality of teaching is significant reduction. More and more students in the colleges and universities of NSNTCP are absent from classroom, and thus the absenteeism is higher than before. Even if some students come into the classroom, they always are lack of concentration in learning, such as playing mobile phone, chatting with their desk mates, staying in a daze, just doing somethings that have nothing to do with learning, and so on.

A survey conducted by the course group on the teaching status of Advanced Engineering Mathematics shows that in the traditional classroom teaching mode, there are only 38.14% of the students who can concentrate on their studies, but 36.08% of the students who are listening to foreign languages or music at the same time, 35.05% of the students who are reading other foreign languages at the same time, 20.62% of the students who are playing games or doing other things while learning, and 9.28% of the students who are sleeping or going out to play. If classroom teaching makes the students' interest and passion for learning dropped and impaired, then those students are only used to passive acceptance and memorization. Without independent thinking and positive thinking, what kind of qualified “talents meeting the national special needs” will be cultivated for the engineering masters’ education in the colleges and universities of NSNTCP?

### **3.The core ideas of the PAD Class teaching mode**

At present, the fundamental problems of Chinese education and world education are how to break through the traditional teaching method based on indoctrination mode, how to optimize the discussion teaching method based on heuristic mode, how to stimulate the students' interest and motivation in learning, and how to improve their learning enthusiasm and initiative. The Presentation-Assimilation-Discussion Class (PAD Class, for short) teaching mode is a new classroom teaching mode proposed by Professor Zhang Xuexin with the doctor of Princeton University, postdoctoral of Yale University from Fudan University of China, which is according to the current classroom teaching status of China and is based on the law of psychology (Zhang, 2014). PAD Class teaching mode advocates distributing the half of the class time to teachers to teach knowledge, half the class time allocated to the students to learn the teaching contents, and the specific form of interactive teaching and learning through discussion, to achieve the understanding and mastery of knowledge (Ma, 2017).

In the practical operation of PAD Class, the classroom teaching is divided into three relatively independent and interrelated procedures: Presentation, Assimilation and Discussion. At the “Presentation” stage, the teacher tells the students the main knowledge points to be learned, including the problem’s background, concepts or definitions, the main theories or results, and viewpoints, etc. The goal of the teachers’ presentation is to help the students to construct a knowledge framework, grasp the focus, and let the students understand what they are going to learn and do. At the “Assimilation” stage, the students have a certain amount of time to arrange their own learning including reading, reviewing, independent thinking, completing the homework or the assigned learning tasks, to carry out personalized internalization and assimilation, and to consolidate learning effect. At the “Discussion” stage, there are usually four sections, including group discussion, cross group discussion, class discussion, and the teachers-students discussion. The form of discussion can be varied, but no matter what section, the students should

be given an opportunity to express themselves and learn from each other in terms of their own gains, confusions, and difficulties.

In the implementation process of PAD Class teaching reform for the course of Advanced Engineering Mathematics, three core ideas are always emphasized and strengthened.

### *3.1 Teachers-Students dual centers*

At the "Presentation" stage, teachers are the center for their giving the concise explanations on the knowledge system and framework, the knowledge background and its ideas, the key and difficult points of knowledge. At the stage of "Assimilation", the students are the center in the process of internalization and absorption. At the "Discussion" stage, both the teachers and the students are centers. The students come to the classroom with questions and thinking experience, and make preparation for group discussion, cross group discussion, class discussion and teachers-students discussion. Then by the "Discussion", the teachers understand the practical teaching status, know what have been grasped and what have not been mastered by the students. Finally, the teachers take some corresponding changes and suitable measures to improve the classroom teaching quality. The PAD Class teaching mode gets rid of the single "teachers-centered" theory and the "student-centered" theory, and find a balance between the "teachers-centered" theory and "students-centered" theory, which effectively changes the classroom teaching situation and ensures the efficiency of classroom teaching. It follows that the first core idea of PAD Class teaching mode is emphasizing and highlighting the teachers-students dual centers through the active participation and effective interaction between the teachers and the students with the equal status in the three stages of its implementation process.

### *3.2 4C core competencies*

It is known that the 4C core competencies that consist of critical thinking, communication skills, collaboration, and creativity, are the key goal of future talent cultivation advocated by the National Education Association of America in 2002. Now, the 4C core competencies have also been highly recognized and extremely recommended by the international education community. For the PAD Class teaching mode, critical thinking can be emphasized by the independent studying and thinking, and creativity can be strengthened by the exploration on how to independently complete the homework, deliberate tasks listed by the teachers, and the intended exercises based on developing the ability of raising, analyzing, and solving problems. Communication skills and collaboration can be consolidated by the group discussion, cross group discussion, class discussion and the teachers-students discussion. In fact, it is in the process of "Discussion" that the students learn to be tolerant, to respect, and to collaborate with others, to communicate fully with team members. Consequently, the formation of 4C core competencies are imperceptibly strengthened and promoted at the three stages of practical operation of PAD Class teaching mode. Equivalently, the second core idea of PAD Class teaching mode is the emphasizing the 4C core competencies.

### *3.3 Process evaluation*

In the traditional classroom teaching mode, the evaluation criteria attach great importance to the achievement of predetermined teaching goals, especially knowledge goals, neglect the development of students' practical ability, emotional attitude and values, neglect students' differences and actual gains, and also neglect teachers' own growth as well (Qian, Wang, Chou, 2019). However, in the PAD Class teaching mode, it encourages the students to actively participate in the whole process of classroom teaching, emphasizes the "teachers-students" dual centers, and strengthens the formation of 4C core competencies. It is also inevitable to scientifically evaluate the students by paying great attention to the learning process. In terms of evaluation mechanism, it changes the previous assessment mode of pursuing summative evaluation instead of focusing on the process evaluation of learning and pay great attention to the learning needs of different learners. Generally, the process evaluation accounts for 70%, the summative evaluation accounts for 30%. The process evaluation includes the students' attendance situation, usual homework, small tasks, inside and outside the class discussion and simulation practice operation and other process results. the summative evaluation focuses on the assessments of the students' learning achievements

including the midterm examination, the final examination, and some unit tests with the pre-determined teaching objectives. The evaluation criteria are diversified and multi-dimensional, which pay great attention to the process of knowledge acquisition, the self-organization of knowledge, and the students' development, not just the results and scores. It follows that the third core idea of PAD Class teaching mode is that the PAD Class teaching mode emphasizes the process evaluation.

#### **4. The crux in the implementation process of the PAD Class teaching mode**

##### *4.1 What are needed to be lectured concisely or in detail, what are needed to be left as a suitable blank or space for the students' assimilation later*

Clearly, classroom teaching should tell students what to learn, why to learn and how to learn. The lecture content in PAD Class teaching mode is different from that in the traditional classroom teaching mode. At the "Presentation" stage, the PAD Class teaching mode requires the teachers to do a good overall design of the whole course, fully understand the content that needs to be transmitted to the students, outline the basic framework, the key points and difficulties that the students need to master in the classroom, and arrange the corresponding homework (Zhou, Jin, Peng, et al., 2018). One crux is that the teachers should discover what are needed to be lectured concisely or in detail, and what are needed to be left as a suitable blank or space for the students' assimilation later. What are needed to be lectured concisely is to tell the students the knowledge system and framework, the knowledge background, ideas, scientific meaning, and applied value of teaching content, etc. What are needed to be lectured in detail is to the key points and difficulties in the process of learning. By lecturing detailly, the students can grasp the knowledge systematically and completely which finally improves their ability to apply knowledge. Some processes of mathematical computation, theoretical deducing, and theorems' proofs are usually left as the suitable blank or space for the students' assimilation later in order to improve their critical thinking and creativity.

##### *4.2 What the students have learned and what they have not understand that need someone to help*

In the implementation process of PAD Class teaching mode, how to strengthen and emphasize the cultivation of critical thinking, communication skills, collaboration and creativity is most important. One another crux is to make the students know what they have learned and what they have not understand that need someone to help. At the "Assimilation" stage, the students will gain something or have some difficulty in the process of learning after class. The tasks assigned by the teachers are to let the students consider and record what they have learned in the process of internalization and absorption, and express what have not understand completely in the form of questions. At the "Discussion" stage, the students who have grasped the knowledge contents should help the students who have not learned. At the meaning time, if some students have not completely mastered certain knowledge points or have some confusions to some extent in the process of learning, they may make up for the insufficiency by turning to the teachers to remove their confusions in the process of teachers-students discussion, or by asking the students who have learned for help in the process of group discussion, cross group discussion and class discussion.

#### **5. Results**

A questionnaire is also conducted by the course group after the final examination to determine how the PAD Class teaching mode affects the 70 engineering masters in our university towards their learning the course of Advanced Engineering Mathematics. There are three statements that need to be evaluated about the influence of PAD Class teaching mode in the questionnaire. The first statement is that the PAD Class teaching mode has improved my critical thinking, communication ability, collaboration, and creative ability. The second statement is that the PAD Class teaching mode has stimulated my motivation and interest in learning, and thus improved my enthusiasm and initiative in learning. The third statement is that the PAD Class teaching mode has promoted my mastery of the teaching contents and improved the ability to solve practical problems by applying the knowledge that I have

learned. All the statements are evaluated by choosing the appropriate one that the students should be most approved from “Strongly agree”, “Agree”, “Neutral”, “Disagree”, and “Strongly disagree”. The results are list below.

As shown in Table 1, 72.85% of the students approve the first statement, and they think the PAD Class teaching mode has improved their critical thinking, communication ability, collaboration, and creative ability. For the second statement, there are 85.71% of the students who think the PAD Class teaching mode has stimulated their motivation and interest in learning, and thus improved their enthusiasm and initiative in learning. On the contrary, there are at most 6% of the students who disapprove the second statement. For the third statement, 80% of the students think the PAD Class teaching mode has promoted their mastery of the teaching contents and has improved their ability to solve practical problem. The results of implementation of PAD Class teaching mode into the course of Advanced Engineering Mathematics are positive and satisfactory

Table 1. Results of the questionnaire

<i>Statement</i>	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	36	15	12	5	2
2	50	10	6	3	1
3	42	13	7	5	3

## 6. Conclusions

The PAD Class teaching mode is a new type of classroom teaching mode with the core ideas that includes emphasizing the "teachers-students" dual centers, strengthening the 4C core competencies, and paying great attention to the process evaluation. It is a classroom teaching reform with Chinese characteristics which fully integrates the advantages of traditional teaching and discussion teaching modes and essentially turns passive learning into active learning. In the implementation process of PAD Class teaching mode, it is very import for the teachers to discover what are needed to be lectured concisely or in detail, what are needed to be left as a suitable blank or space for the students' assimilation later. Also important is that the students should find out their own insufficiency, make up for their blank and difficulty in the process of learning by the effective discussion. The positive results of teaching practice in the course of Advanced Engineering Mathematics indicates that the PAD Class teaching mode is an effective and practical teaching reform which can not only reflect the "teachers-students" dual centers, but also ensure the training objectives of the engineering masters' education in the colleges and universities of NSNTCP.

## Acknowledgments

The authors' work is supported partially by the Postgraduate Education Reform Project of Jiangsu Province (No. JGZZ18-073), Higher Education Reform Research Project of Jiangsu Province (2019JSJG571), Educational Science Planning Project of Jiangsu Province (C-b/2016), Project of Mathematics Teaching Research Association of Jiangsu Province (No. JSSXJY201804), and the Research Foundation of HYIT (No. 2017XJGB15).

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