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JIRSEA is published electronically on a biannual basis. In 2017, a decision was made by the SEAAIR Executive Committee to celebrate the inclusion in the JIRSEA issues of the top "Best Paper" and "Outstanding Papers" selected from the annual SEAAIR Conference by a panel of judges on-site. In 2020, to ensure potential papers reach journal generally accepted standards, a Preliminary Review was instituted before the double-blind review. All publications, invited or selected, undergo the due diligence of the double-blind review process, after revisions based on the preliminary review, by independent international reviewers. Original research papers, which have not been submitted for publication elsewhere, dealing with all aspects of institutional research, governance & planning, quality & performance management, instructions & instructional technologies, and related issues in tertiary education will be considered.

All papers are refereed by two independent persons and evaluated according to:
1. Significance in contributing new knowledge
2. Technical, Scientific and Academic acceptability
3. Appropriateness for the Journal IR and Higher Education Focus
4. Clarity and Competencies of academic research.

Updated June 2021

Editorial

In this May/June 2021 issue, we have continued with the newly instituted "preliminary review" process to "screen out" papers before the formal double-blind review process. This has consistently resulted in 60% of papers being declined due to relevance to JIRSEA focus on Higher Education issues or Institutional Research and those that do not meet the "sound scientifically grounded" research requirements of JIRSEA. Of the 14 papers that went through the Preliminary Reviews with revisions re-submitted, 8 papers are accepted for this issue publication after the rigorous and stringent vetting process. Of the 8 papers, one is withdrawn with two not re-submitting their revisions addressing the reviewers' comments. The remaining 5 papers cover key academic areas of Teaching-Learning Methods; Assessment for learning; Perfectionism and Academic Procrastination and Peers online learning interaction and Alumni survey on individual competency, institutional service, and job satisfaction.

The key synopses of these five papers are as follows:

- **Heidi Grace P. Mendoza** of *Capitol University, Philippines* research describes the teaching-learning environment and the activities conducted in an adult education classroom according to the self-assessment of 180 Graduate School Business Development and Management Program (BDMP) students of a Philippine university through the use of the Principles of Adult Learning Scale (PALS).

- **Rommel M. A. AlAli** of *King Faisal University, Al-Ahsa, Saudi Arabia* investigate and analyze the practices of assessment for learning among the faculty members at Saudi Universities. It uses psychometric properties of assessment for learning an instrument through the Rasch Model Analysis The findings showed that the practice degree of assessment for learning among the faculty members was medium. In addition, there were no statistically significant differences in the practice degree of faculty members of assessment for learning according to gender, faculty, and teaching experience.

- **Siah Poh Chua, Joanna Lee Jia Hui,** and **Kee Yen Yee** of *Universiti Tunku Abdul Rahman, Kampar Campus, Malaysia* use the transactional model of stress and coping theory and personality-coping-outcomes theory to examine whether perfectionism is associated with academic procrastination and whether coping strategy mediated perfectionism's effects on academic procrastination. The results showed that perfectionism is associated with academic procrastination. Besides, coping strategies are statistical mediators for the effects of perfectionism on academic procrastination. The findings support the generalization of the theoretical models to understand the mechanism of academic procrastination.

- **Yahya M. Al-dheleai, Samah Ali Mohsen Mofreh, Hairul Nizam Ismail** and **Siti Mastura Baharudin** *of School of Educational Studies, Universiti Sains Malaysia*, **Zaidatun Tasir** and **Waleed Mugahid Alrahmi**[2] of *School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia*, **Kew Si Na** of *Language Academy, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia* developed an instrument to measure peer online learning interaction for knowledge construction crucial for instructors, instructional designers, and researchers called the Peer Online Learning Interaction Questionnaire (POLI-Q) for higher education courses. This POLI-Q consists of seven constructs which are question, answer, comment, discussion, information sharing, scaffolding, and reflection with five Likert Scales. The findings of the Rasch Model analysis confirmed that POLI-Q is valid and reliable to measure peer online interaction that is related to learning. However, the instrument validity of the response spread across scales analysis resulted in excluding the scale number 1 (Strongly Disagree) which was not represented in the results while the other 4 scales were supported. Hence, it is recommended that the POLI-Q can be used by the instructors, instructional designers, and researchers to measure peer online learning interaction for higher education courses.

- **Tao-Ming Cheng** of the *Chaoyang University of Technology*, **Hsing-Yu Hou** of *National Taichung University of Science and Technology*, **Dinesh Chandra Agrawal,** and **Ching-Jung Chi** of the *Chaoyang University of Technology*, Taichung, all from Taiwan use Alumni surveys for detecting students' problems, trends in learning outcomes, and planning for students' common competencies for their careers. Feedback on the alumni's employment status, job satisfaction, and gathering insights for institutional quality improvements are some of the major objectives of alumni surveys. Through the 'Hierarchical Linear Model' (HLM), it is found that factors related to individual competency were professional skill, information technology application, communication and teamwork, and learning autonomy. Factors at the organizational level were related to institutional services, such as teachers, equipment facilities, administration, reputation, and service-learning.

JIRSEA Editor: Assoc. Prof. Teay Shawyun, Ph.D.

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TEACHING-LEARNING METHODS IN THE BUSINESS DEVELOPMENT AND MANAGEMENT PROGRAM OF A PHILIPPINE GRADUATE SCHOOL

Heidi Grace P. Mendoza

Capitol University, Philippines

ABSTRACT

The adult learner - self-directed, self-motivated, and ready to learn for further growth – needs to learn through teaching styles of professors and actual classroom activities which are sensitive to their needs. Guided by Knowles' philosophy of andragogy and Conti's principles of student-centered teaching style, this research describes the teaching-learning environment and the activities conducted in an adult education classroom according to the self-assessment of 180 Graduate School Business Development and Management Program (BDMP) students of a Philippine university. Through the use of the Principles of Adult Learning Scale (PALS), the management graduate students label their adult learning experience through their instructors' teaching style as "somewhat student-centered". The general environment in the BDMP classroom has succeeded to satisfy the principles of adult learning, though graduate school professors can still improve in learner-centered activities and flexibility for personal development factors. Through a list of actual activities that happen in the classroom, student-respondents state that a final written project is almost always required; but case studies, which allow students to apply theory and practical knowledge to a real management problem, are rarely applied. Recommendations are given for the consideration of the BDMP to help enrich the learning experience among its graduate students.

Keywords: principles of adult learning, student-centered teaching style, graduate school activities

Introduction

United Kingdom Prime Minister Winston Churchill has been quoted to have said: "I am always ready to learn although I do not always like being taught". This statement, from a man of vision, good communication, engagement, and influence, well depicts the typical adult learner.

Adult learners are those above 18 years of age; beyond age 18, the adult learner is a non-conventional student - different from the traditional, established, and habitual student (Kapur, 2019). Expectedly, they are different from younger learners, and they show six characteristics: they are life-centered or problem-centered; they have specific results in mind for education; they are self-directed; they are often skeptical about new information; they seek education that relates or applies directly to their perceived needs; and, they accept responsibility for their learning if they find it timely and appropriate. These characteristics illustrate the principles of andragogy, a theory popularized in the United States by Malcolm Knowles – which embodies the methods and philosophies used in adult education (McConnell, 2013).

For higher educational institutions, this description of the adult learner may necessitate modification and adjustments of standard teaching methods to reflect the more modern ways that adult students choose, gather, and use information. They try to do more with less, have a very short time available for learning, and they always get pressed for time (Grovo, 2015; Hogle, 2017). Especially for a graduate school with adult learners who are navigating modern methods, communications technology, and their careers - the description of the modern learner also highlights the need to improve the delivery of degree programs and courses to be able to meet institutional objectives.

Integral to the attainment of its mission, this Philippine university commits itself to provide a quality education that responds to the challenge of producing globally recognized graduates. It is with this institutional objective in mind that there is a need to look at the teaching methods in the business and management courses in the Graduate School of this university located in the southern Philippines.

Aside from their competence and qualifications, professors in graduate school create an impact on their adult students through their teaching approaches. Teaching styles help ensure more confidence in the learning abilities of students in higher education (Nessipbayeva, 2015). Since there is a significant relationship between teaching style and academic achievement (Conti, 1985) as well as teaching style and academic engagement (Shaari, Yusoff, Ghazali, Osman, & Dzahir, 2014), professors and teachers-facilitators need to be alert and sensitive to the needs and characteristics of their adult learners for learning to be successful (Florea, 2014; Kapur, 2015).

Learning is defined in the dictionary as the process of gaining knowledge or skill by studying, practicing, being taught, or experiencing something. Learning has become about what students do and less about what teachers do. Teaching is defined as engagement with learners to enable their understanding and application of knowledge, concepts, and processes. Teaching is

engaging students in learning and getting them involved in the active construction of knowledge (Christensen et al, 1991).

There is a rise in adult learning. Enrolment is steadily growing as adults seek a graduate education to get a new job, get career advancement, or seek general self-improvement. This is the case with the Business Development and Management Program (BDMP) within the Graduate School of a Philippine university.

The BDMP is defined as the academic cluster encompassing the degree offerings of Master of Business Management (MBM), Master of Public Service Management (MSPM), and Doctor of Management (DM). The program has been created to contribute to the University's business and management education that is competitive, innovative, and of international standards.

This institutional research aims to identify the environment in an adult education classroom through the teaching-learning methods teachers use and recognize the activities conducted in an adult education class according to the assessment of the BDMP graduate school students. This study can serve the BDMP as it shall characterize how the professors and students engage with each other in the delivery of courses in the BDMP and ascertain methods appropriate for adult learning. As it looks into the teaching and learning methods in the university against new initiatives in teaching adults, the research enables a critical reflection if the current practices in the graduate school indeed provide effective learning among its students. The study aspires to be a reference point in the continuing efforts to improve the delivery of classes and courses within the BDMP of the graduate school.

The research framework stems from andragogy, the adult learning theory by Malcolm Knowles, as it defines the adult learner and their characteristics of being self-directed, self-motivated, and ready to learn for further growth. Through his work on this theory which spanned from the 1970s to the 1980s, Knowles offered a type of learning for adults which adapts to their personalities and characteristics (Smith, 2002).

Building upon this description of the adult learner would be the principles of adult learning further enhanced by Gary Conti, who proposed that teaching-learning methods are either teacher-centered or student-centered.

Various studies suggest that a teacher's actions affect student achievement. Good teaching does not only need competence but also a commitment to a systematic understanding of learning for the teacher cannot transform a student without their active participation. Teaching is fundamentally about creating the pedagogical, social, and ethical conditions under which students agree to take charge of their learning, individually and collectively (Christensen et al, 1991). Therefore, actualizing the principles of adult learning are the teaching styles of professors which, in turn, create the learning experience of adult students.
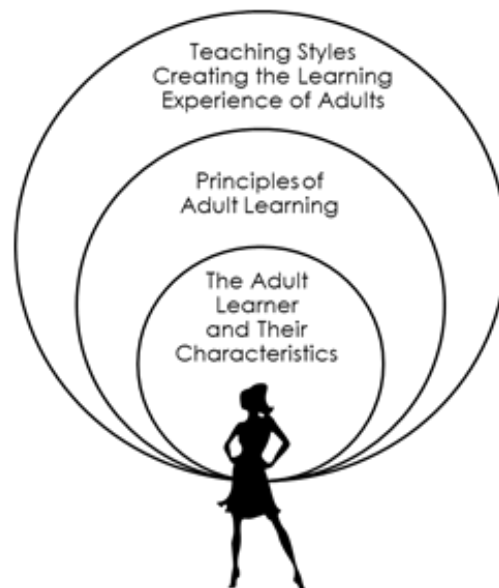
Figure 1: The Research Framework

The research carried these concepts and answered two specific questions: What is the adult learning experience in a graduate school classroom in terms of the teaching styles of the professors? What are the adult learning activities used by professors in a graduate school classroom? What can be learned from this study to benefit the Business Development and Management Program of a graduate school?

Andragogy and the Adult Learner

Defined in its general terms, pedagogy is the instructional techniques and strategies that allow learning to take place (Siraj-Blatchford, Sylva, Muttock, Gilden & Bell, 2002) as cited by Child Australia (2017). But Malcolm Knowles (1980) distinguished pedagogy from andragogy by describing it as having an emerging role and technology for adult learning.

Andragogy, or the art and science of teaching adults, was proposed by Knowles as early as the 1970s to distinguish the way adults learn from that of children. As Knowles conjectured, adult learners demand self-direction, are significantly affected by their prior experiences, are motivated by internal stimuli, and explore or experience their interest in learning. Therefore, andragogy presents an alternative to pedagogy – as a process-oriented and student-centered approach (Rismiyanto, Saleh, Mujiyanto, & Warsono, 2018).

The manner that the adult learner is described in andragogy reflects the profile of the modern learner (Kearsley, 2010). Teachers can therefore draw on concepts of andragogy, as a step forward from pedagogy or the child-focused teaching approach, to make graduate school education classes more effective.

Teaching and Learning Methods and Styles

Andragogy has come to represent a learner-centered approach to learning, as an alternative to pedagogy which is more teacher-centered. They can be considered as two kinds of teaching philosophy.

A teacher must consider that adult learners bring their knowledge and experience, as well as their values and beliefs governing their thoughts (Jarvis, 2004). Their training must focus on their experiences and interests (McConnell, 2013). The way they think and feel about their education influences how they learn and retain what they learn.

Graduate students - adult students - learn like their younger counterparts: through retention and transfer (Cassuto, 2013). Graduate professors should therefore teach in a manner that promotes knowledge transfer and retention in the best way possible. Keeping knowledge of the different approaches will enable teachers to apply them in practice and help to nurture their students (Akimenko, 2016). Yet for the most part, student-centered learning has not reached graduate school level yet (Cassuto, 2013).

Thus, teaching is best viewed as a continuum, which can swing from the traditional teacher-centered approach to a student-centered approach (Herod, 2012). The challenge is how to find the right balance of teaching style for adult modern learners. A teaching style is much broader than teaching strategies and methods. As professionals, teachers must be aware of their teaching styles, so that they can assess their practices in the classroom and their beliefs about these practices (Yoshida et al, 2014).

Conti (2004, 2007) writes that teachers must identify and assess their teaching styles so they can state their beliefs about teaching, the nature of their learners, and their mission in education. Teaching style refers to the distinct qualities displayed by a teacher that are persistent from situation to situation regardless of the content.

Teaching styles build upon the two types of teaching philosophy. As the professor creates the atmosphere in the classroom, their teaching style may either be teacher-centered or student-centered. There is a relationship between teaching style and adult student learning (Conti, 1985). If a teaching method is comprised of the principles and manners of teaching students, then it is also the method with which students are enabled to learn.

Conti (1985, 2004) created the Principles of Adult Learning Scale (PALS), an assessment tool to enable educators to measure the frequency with which they practice the teaching-learning principles of adult education. Originally intended to be answered by teachers, the questionnaire was adjusted so that students will gauge their adult learning experience as provided by their professors. The scale has seven factors, namely: (1) learner-centered activities (2) personalizing instruction (3) relating to experience (4) assessing student needs (5) climate building (6) participation in the learning process, and (7) flexibility for personal development.

Learner-centered activities are the core of a learner-centered approach to teaching. For these types of activities, the teacher takes the role of facilitator and allows the students to take the lead and the duty for learning, encouraging participation from them. This is closely related to *participation in the learning process;* where, with the guidance of the teacher, the student is given the responsibility to identify the learning material, reflect on teaching procedures, and engage themselves in the manner that the material is revealed and learned.

Personalizing instruction considers the adult student's abilities, needs, and limitations, and these are matched with the learning objectives and teaching techniques. This is also associated with *assessing student needs* and *relating to experience* since students' personal goals and their current and prior experiences of the students are taken into account in the teaching method.

As *climate building* creates a positive environment for adult learners within the learning space in the university, this is complemented by *flexibility for personal development* which allows for adjustments for student needs and situations, as well as the adaptability of the teacher whenever circumstances so demands it. In all, each of these factors may illustrate how to deliver student-centered teaching-learning styles based on the philosophy of adult education.

Methodology

This descriptive study sought the personal assessment of students in the business development and management degree programs of a Philippine graduate school. Through a survey questionnaire, the study determined how the students gauge their adult education experience through the teaching styles of their professors and also revealed the teaching-learning activities they experience in their classroom.

The first part of the survey questionnaire, to identify the environment in an adult education classroom, used the Principles of Adult Learning Scale (Conti, 1985, 2004). The second part of the survey questionnaire, to identify the activities conducted in a class among adults, consisted of a list of activities that may be used by professors as their teaching-learning methods. The list of activities was generated through a key informant interview of three students from each of the degree programs – MBM, MPSM, DM - who provided their thoughts on the teaching and learning techniques and activities that can be experienced in the graduate school classroom. Their aggregate responses were used as the basis for the list of teaching-learning activities in the survey questionnaire.

The research set out to seek the full participation of the 296 students who were enrolled in the Business Development and Management Program of the graduate school, the population for this study. Visitations to the classrooms were conducted, and students were invited to take part in the survey. While efforts were taken to survey the total population of management students, the study came up with a response rate of 61%; only 180 completely- and correctly- accomplished survey questionnaires from students were used and analyzed to provide the data for this study. It is therefore acknowledged that, with a non-response rate of 39%, some degree of selectivity bias may be present in this study.

Almost half (46%) of the 180 participants are taking up their MBM, while 32% are pursuing their MPSM, and 22% have their DM degrees. The graduate students are mostly female (63%), and almost all (92%) are employed while pursuing their graduate education, though a very big majority (86%) do not receive a high-level monthly income, getting just less than P50,000 per month. The age of participants was not collected, as all of them are of adult age or above 18 years.

The participants were asked to answer the adopted Principles of Adult Learning Scale (PALS), created by Gary J. Conti (1985, 2004). The 44-item questionnaire was adapted to measure the teaching-learning environment of adult learners. Permission to use the questionnaire for this study was secured from Conti. But to simplify the survey for participants, the response options were also reduced from six to four: Always, Usually, Rarely, and Never. The coefficient of reliability test of the actual survey questionnaire showed a Cronbach's alpha of 0.97. This high level of internal consistency is expected of the adapted questionnaire, as it has been confirmed in several instances (Rachal et al, 1994; Spoon & Schell, 1998; Conti, 2004; Yoshida et al, 2014; Kovacevic & Akbarov, 2016).

Scoring was based on the guidelines provided by Conti (2004), both for the positive and negative items with reversed scores. A student's total score on the instrument was calculated by adding together the value of the responses to all items. Factor scores were calculated by summing the value of the responses for each item in the factor (Conti, 2004). These total scores were converted to their PALS mean scores.

All BDMP student-participants were informed of the purpose and methodology of the study, and their consent to participate was solicited. They were assured that they will not be named in any manner of publication and that all information gathered about them as a result of this study will be secured and confidential. There is definite assurance that confidentiality and anonymity were observed during and after data collection, as well as in the storage of the research data.

Results

Adult Learning Experience

Students responded to the 44-item Principles of Adult Learning Scale by Conti. Table 1 shows their frequency and percentage distribution according to their PALS mean scores.

Table 1: Principles of Adult Learning Scale Scores

Range of Means	Interpretation	Frequency	Percentage
3.26-4.00	Very Student-Centered	0	0.00%
2.51-3.25	Somewhat Student-Centered	152	84.44%
1.76-2.50	Somewhat Teacher-Centered	28	15.56%
1.00-1.75	Very Teacher-Centered	0	0.00%

The mean score of 44 items in the PALS reveals the strength of commitment of the BDMP professors to a style of teaching, which in turn is the learning experience of adult students in the classroom. High scores on the scale (2.51-4.0) indicate a student-centered learning experience, while low scores on the scale (1.0-2.5) denote a teacher-centered learning experience.

BDMP graduate school students label their adult learning experience as somewhat student-centered. While 15.56% think that the teaching style is *somewhat teacher-centered*, a big majority of 84.44% regard the teaching style as *somewhat student-centered*.

The overall PALS score is divided into seven factors, with items grouped to compose each factor or teaching method. Table 2 shows the results for each of the factors.

Table 2: Factors of the Principles of Adult Learning Scale

No.	Factor	Mean	SD	Interpretation
1	Learner-Centered Activities	1.80	0.18	Somewhat Teacher-Centered
2	Personalizing Instruction	2.68	0.69	Somewhat Student-Centered
3	Relating to Experience	3.35	0.07	Very Student-Centered
4	Assessing Student Needs	3.29	0.09	Very Student-Centered
5	Climate Building	3.30	0.21	Very Student-Centered
6	Participation in the Learning Process	3.32	0.05	Very Student-Centered
7	Flexibility for Personal Development	1.73	0.15	Very Teacher-Centered
	Overall PALS	2.78		Somewhat Student-Centered

(Factor1=12items; Factor2=9 items; Factor3=6 items; Factor4=4 items; Factor5=4 items; Factor6=4 items; Factor7=5 items)

The overall PALS is described by BDMP students as *somewhat student-centered* (overall mean of 2.78), but with a standard deviation of 0.73, this indicates that the points of the responses are spread widely. The numbers show that participants are pulled differently in their assessment of their general experience inside the classroom of adult learners.

A clearer view of the seven factors is needed to better understand the principles of adult learning used in the scale. These factors, namely: (1) learner-centered activities (2) personalizing instruction (3) relating to experience (4) assessing student needs (5) climate building (6) participation in the learning process, and (7) flexibility for personal development, are also explained by each of their item components.

Firstly, *learner-centered activities* in a classroom help define the teaching-learning method. A high score means a teaching style that emphasizes informal evaluation techniques, encourages initiatives, and on having students take responsibility for their learning.

Table 3: Learner-centered Activities

Item	The teaching-learning environment of the Graduate School BDMP classroom…	Mean	Interpretation
02	Uses disciplinary action, or the process for dealing with behavior that does not meet expected and communicated performance standards, when students need it.	1.96	Somewhat Teacher-Centered
04	Encourages students to adopt business and professional values.	1.87	Somewhat Teacher-Centered
11	Determines the educational objectives for each of the students.	1.66	Very

			Teacher-Centered
12	Plans the courses of instruction that differ as widely as possible from the students' socio-economic backgrounds.	1.41	Somewhat Teacher-Centered
13	Gets the students to motivate themselves by confronting them in the presence of classmates during group discussions.	1.81	Somewhat Teacher-Centered
16	Uses one basic teaching method because the professor has found that most adults have a similar style of learning.	1.82	Very Teacher-Centered
19	Uses written tests to assess the degree of academic growth in learning rather than to indicate new directions for learning.	1.74	Very Teacher-Centered
21	Uses what history has proven that adults need to learn as the chief criteria for planning learning episodes.	1.82	Somewhat Teacher-Centered
29	Uses methods that foster quiet, productive, deskwork.	1.78	Somewhat Teacher-Centered
30	Uses tests as the chief method of evaluating students.	1.78	Somewhat Teacher-Centered
38	Uses materials that were originally designed for students in elementary and high schools.	2.17	Somewhat Teacher-Centered
40	Measures a student's long-term educational growth by comparing their total achievement in class to their expected performance from standardized tests.	1.78	Somewhat Teacher-Centered
	Overall Mean	1.80	Somewhat Teacher-Centered

However, the scores in Table 3 indicate teachers' support for inflexible courses of instruction that do not relate to students' socio-economic backgrounds (mean 1.41), and their establishing educational objectives for all students (1.66) as well as preference for written and formal tests to assess the degree of academic growth (mean 1.74). Discipline and quiet work are preferred in classrooms (mean 1.78), which can discourage a creative and fluid learning environment among adults. For this factor, the BDMP is hence labeled by participants as somewhat teacher-centered (overall mean 1.80).

Table 4: Personalizing Instruction

Item	The teaching-learning environment of the Graduate School BDMP classroom…	Mean	Interpretation
03	Allows older students more time to complete an assignment when they need it.	2.92	Somewhat Student-Centered
09	Uses lecturing as the best method for presenting the subject material to adult students.	1.75	Very Teacher-Centered
17	Uses different techniques depending on the students being taught.	3.17	Somewhat Student-Centered
24	Lets each student work at their rate regardless of the amount of time it takes them to learn a new concept.	3.11	Somewhat Student-Centered
32	Gears the professor's instructional objectives to match the individual abilities and needs of the students.	3.29	Very Student-Centered
35	Allows a student's motives for participating in continuing education to be a major determinant in the planning of learning objectives.	3.38	Very Student-Centered
37	Gives all students in the class the same assignment on a given topic.	1.63	Very Teacher-Centered
41	Encourages competition among the students.	2.01	Somewhat Teacher-Centered
42	Uses different materials with different students.	2.90	Somewhat Student-Centered
	Overall Mean	2.68	Somewhat Student-Centered

Table 4 summarizes the items for the second factor, *personalizing instruction*. Participants describe it as somewhat student-centered (mean 2.68). Results show that faculty practices in personalizing instruction are varied: though they allow the students' motives as the determinant

of their learning objectives (mean 3.38, very student-centered) yet they still use lecturing as the best method for presenting the subject material to adult students (mean 1.75, very teacher-centered). However, BDMP professors do not rely solely on lecturing, and they design the learning situation depending on the students being taught (mean 3.17).

Personalizing instruction in the BDMP encourages self-paced learning, allowing students to work at their rate (mean 3.11) and more time to complete coursework (mean 2.92).

Another teaching style is *relating to experience,* see Table 5. BDMP professors are found to plan learning sessions that take into account students' experiences, as evidenced by this factor getting the highest score (overall mean 3.35).

Table 5: Relating to Experience

Item	The teaching-learning environment of the Graduate School BDMP classroom…	Mean	Interpretation
14	Plans learning episodes to take into account the student's prior experiences.	3.28	Very Student-Centered
31	Plans activities that will encourage each student's growth from dependence on others to greater independence.	3.37	Very Student-Centered
34	Encourages the students to ask questions about the nature of their society.	3.44	Very Student-Centered
39	Recognizes adult learning episodes according to the problems that the students encounter in everyday life.	3.31	Very Student-Centered
43	Helps students relate new learning to their prior experiences.	3.43	Very Student-Centered
44	Teaches courses of instruction about problems of everyday living.	3.28	Very Student-Centered
	Overall Mean	3.35	Very Student-Centered

This indicates a very student-centered approach, recognition of the importance of encouraging students to ask questions about their society (mean 3.44) and relate new learning to prior experiences (mean 3.43). This result is relevant because 92% of the BDMP graduate students hold careers and have work experience.

Table 6: Assessing Student Needs

Item	The teaching-learning environment of the Graduate School BDMP classroom…	Mean	Interpretation
05	Helps students diagnose the gaps between their goals and their present level of performance.	3.33	Very Student-Centered
08	Shows the professor to participate in the informal counseling of students.	3.17	Somewhat Student-Centered
23	This shows the professor has individual conferences to help students to identify their educational needs.	3.28	Very Student-Centered
25	Helps students to develop short-range as well as long-range objectives.	3.37	Very Student-Centered
	Overall Mean	3.29	Very Student-Centered

Assessing student needs is the fourth factor that describes a teaching-learning approach in the classroom of adults (Table 6). The high score (overall mean 3.29) points to very student-centered practices of determining and addressing the needs of BDMP students. Their teachers help students diagnose the gaps between their goals and their present level of performance (mean 3.33). The BDMP classroom environment helps the adult learners develop short-range as well as long-range objectives (mean 3.27) through regular conferences between teachers and students (3.28). Professors conduct regular informal counseling or consultation sessions with students (mean 3.17).

Table 7 shows the results for the fifth factor of adult learning teaching style, *climate building*. Teachers initiate the classroom environment – the social situation which influences and encourages interaction. A high score (overall mean 3.30, very student-centered) reflects that BDMP teachers trying to establish a learning climate that is friendly and comfortable for the adult learner – including dialogue among the students (mean 3.54), accepting errors as part of the learning process (mean 3.34), and utilizing the different competencies of adult students (mean 3.25).

Table 7: Climate Building

Item	The teaching-learning environment of the Graduate School BDMP classroom…	Mean	Interpretation
18	Encourages dialogue among the students.	3.54	Very Student-Centered
20	Utilizes the many competencies that most adults already possess to achieve the educational objective.	3.25	Somewhat Student-Centered
22	Accepts errors as a natural part of the learning process.	3.34	Very Student-Centered
28	Allows the students to take periodic breaks during the class.	3.03	Somewhat Student-Centered
	Overall Mean	3.30	Very Student-Centered

Table 8: Participation in the Learning Process

Item	The teaching-learning environment of the Graduate School BDMP classroom…	Mean	Interpretation
01	Allows students to participate in developing the criteria for evaluating their performance in class.	3.34	Very Student-Centered
10	Arranges the classroom so that it is easy for students to interact.	3.24	Somewhat Student-Centered
15	Allows students to participate in making decisions about the topics that will be covered in class.	3.36	Very Student-Centered
36	Allows the students to identify the problems that need to be solved.	3.34	Very Student-Centered
	Overall Mean	3.32	Very Student-Centered

Another important factor of the teaching-learning approach is *participation in the learning process*. Table 8 shows a high score of (overall mean 3.32), interpreted as a very student-centered approach by BDMP teachers. This demonstrates that through the course of the semester, teachers can let students participate in making decisions about the particular topics that will be covered in class (mean 3.36). Teachers also allow students to help identify which priority problems need to be solved (mean 3.34) and participate in the development of the criteria for

evaluating their performance (mean 3.34). As students take responsibility for their learning, teachers prepare the classroom so that it is easy for students to interact (mean 3.24).

The last factor involves *flexibility for personal development,* see Table 9. The participants of the study gave this a low score (overall mean 1.73) signifying a very teacher-centered approach. This suggests that a disciplined classroom is a major consideration for learning (mean 1.53). The BDMP teacher is shown as a provider of knowledge rather than as a resource person or facilitator (mean 1.69). Professors also stick to the program objectives previously established (mean 1.70).

Table 9: Flexibility for Personal Development

Item	The teaching-learning environment of the Graduate School BDMP classroom…	Mean	Interpretation
06	Shows the professor to provide knowledge rather than serve as a resource person.	1.69	Very Teacher-Centered
07	Sticks to the instructional objectives established at the beginning of the program.	1.70	Very Teacher-Centered
26	Maintains a well-disciplined classroom to reduce interferences to learning.	1.53	Very Teacher-Centered
27	Avoids discussion of controversial subjects that involve value judgments.	1.88	Somewhat Teacher-Centered
33	Avoids issues that relate to the student's concept of themselves.	1.87	Somewhat Teacher-Centered
	Overall Mean	1.73	Very Teacher-Centered

In this approach to teaching and learning, there is no flexibility in the instructional objectives, the students' concept of themselves and their value judgments is avoided (mean 1.88). The low score on this factor appears consistent with the low score given by the students for the factor on Learner-Centered activities.

In summary, only in two out of the seven factors on the principles of adult learning has the BDMP been found wanting by student participants.

Adult Learning Activities

Andragogy is a teaching philosophy or approach that espouses student-centered while the teaching methods of graduate school professors include their interpersonal approach to facilitate the learning of adult students, these methods are delivered through different means or activities. Activities in graduate school are unique because they must consider that the students are life-centered yet time-pressured individuals who directed themselves to learn. Students assess the teaching-learning methods of the BDMP through their actual classroom activities (Fig. 2).
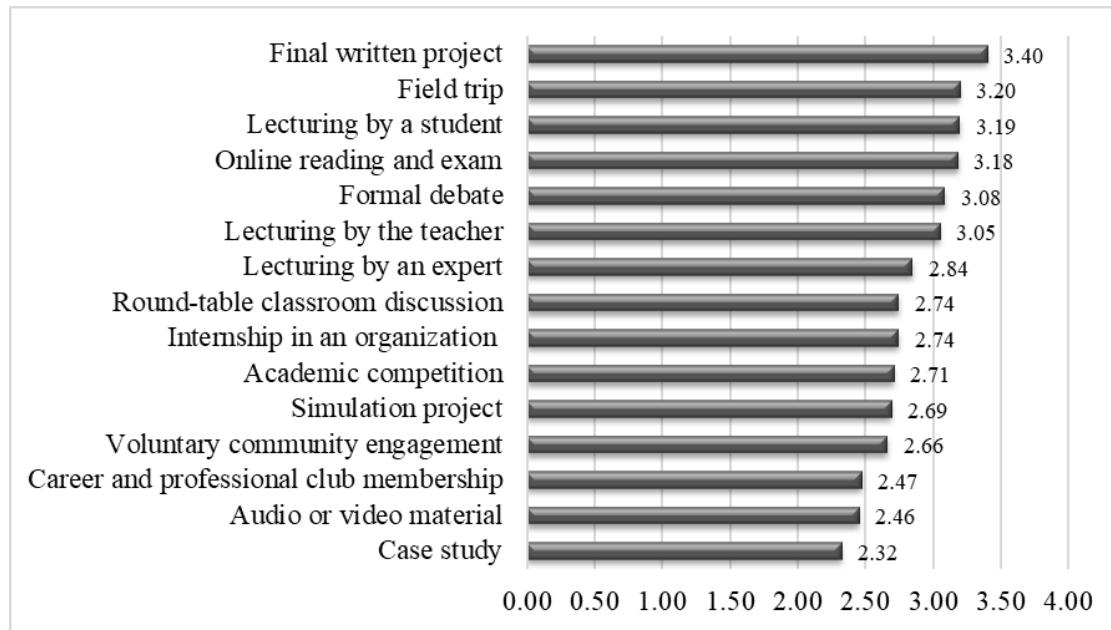
(Range of mean scores and interpretation: 3.26-4.00=always; 2.51-3.25=usually; 1.76-2.50=rarely; 1.00-1.75=never)

Figure 2: Teaching-Learning Activities in the Classroom

According to participants, BDMP classes almost *always* require a final written project (mean 3.40). These are usually experiential projects conducted by students, either individually or in small teams. Final written projects summarize and highlight course objectives and the student's growth in the course. Final written projects can include individual policy analysis, team workshop documentation, rapid research with limited participants, and technology need assessment with a chosen industry partner. The final written project supports the philosophy of adult education that students want to learn through experiential learning.

Case studies describe real-life management issues, theories, analysis, and proposed solutions and thus develop the problem-solving skills of students. Often used in teaching management, case studies allow students to apply theory to a real management problem. However, according to them, these are *rarely* applied (mean 2.32) as a teaching-learning method in the BDMP. Good and full-length business and management case studies are purchased by the university. To manage costs, some classes use shorter and similar versions found in books and the Internet.

Lectures as a learning activity are the most basic of teaching methods. Important to note, however, is that providing knowledge within the classroom is not dominated by the BDMP professors (mean 3.05) as there are more opportunities for students to share what they know (mean 3.19) from their self-study or actual work skills and proficiency. Experts from the industry are also invited (mean 2.84) to help enrich the learning experience.

The other teaching-learning activities *usually* utilized in management classrooms are field trips (mean 3.20), online reading and examinations (mean 3.18), formal debate (mean 3.08) and round-table discussion (mean 2.74) inside the classroom, an internship in an organization (mean 2.74) through the course project, academic competition (mean 2.71) within the classroom and

the program, course simulation project (mean 2.69), and voluntary engagement and interaction with members of the community (mean 2.66).

However, there remains an opportunity for professors to engage students through audio or video materials (mean 2.46) aside from lectures and inspire the adult learners to draw knowledge, experience, and networking from career and professional club membership (mean 2.47). These teaching-learning methods are still *rarely* used in the BDMP. The first is gaining popularity due to access to computer and Internet technology, and the second encourages practical knowledge through academic engagements outside the classroom.

Discussion

Implications of Research

This study, through the assessment of students, shows that the teaching-learning methods in the Business Development and Management Program (BDMP) of the graduate school are *somewhat student-centered*. This is important for the Graduate School since it is the department of the university which serves adult students who are at the apex of their learning journey.

A One-Way ANOVA test resulted in an F-statistic of 0.1696 and a significance level or p-value of 0.8441, demonstrating that there is no significant difference among the Principles of Adult Learning Scale results among the students – whether they are enrolled in MBM, MPSM, or DM. This may be explained by the graduate school's practice of hiring professors to teach across the three-degree offerings of the Business Development and Management Program; hence, the general experience of the students can be described as typically similar. An important thing to consider is that almost all faculty members are teaching in the graduate school on a part-time basis; their main profession may be in the industry, or they are teaching in the college or tertiary level of the university.

This Philippine university needs the BDMP to identify improvement areas to better deliver its promise of providing quality education and this research provides the chance to do that. This study brings out how adult students characterize their learning experience through the teaching methods and styles of their professors. The study recognizes new initiatives and good practices and identifies areas of improvement – like the level of expertise and preparation of the faculty members. For example, because of the complexity of the case study methodology, some faculty members may avoid conducting it as a teaching activity.

The research also comes at an opportune time, when the university embarks on a paradigm shift for teachers to introduce student agency among its higher levels. Student agency fully supports student-learning methods of teaching-learning, and the graduate school can lead the way.

This study measures the teaching styles of the BDMP faculty of a graduate school through the experiences of the students, rather than by self-assessments of the teachers. Classroom environments and conditions are defined by the experience of students more than by the

curriculum and the syllabus. This study confirms the principles of adult learning, allowing student-participants to paint the picture of their experience.

Recommendations

Results of this study can be offered to this Philippine graduate school for the review and improvement of its curriculum and course syllabi, as well as for the career development of its instructors. By ascertaining the various teaching styles and methods appropriate for graduate education through various literature and studies and using them as benchmarks for improving the teaching-learning experiences of its students, this study reminds BMDP professors to practice the ways of adult education in their classrooms.

- Specifically, learner-centered activities and flexibility for personal development can be fostered to provide student learning for adults. Understandably, the graduate school curriculum provides a specific and planned instruction process as approved by education regulatory bodies. But faculty members of the BDMP can foster adult education by designing a syllabus linked to the experience of students, and incorporating more activities that are responsive to the prerequisites of an adult learner. While the BDMP operates following the general policies, standards, and guidelines (PSGs) for graduate programs, on the one hand, the graduate programs must also direct courses that allow the full degree of independence as described by the Philippine Qualifications Framework. This means a high substantial degree of independence in individual or teamwork that demands leadership for research and creativity, as well as autonomy and accountability. This is usually encouraged in the final written project of students, but this can also be brought into the weekly engagements between teachers and adult students.

- Secondly, flexibility for personal development makes the teacher a knowledge facilitator and not the sole source of knowledge. Teachers must engage the students in content, connection, and application of their personal development so they are motivated to learn and can bring their own experiences to the learning process. These can include activities that involve solving problems which they may meet in their personal and work life and even provide them an opportunity of improving themselves and even their status. Most students in the BDMP take their graduate studies for professional growth - so they may prepare for a promotion or a higher rank and responsibility. Aside from inviting experts to provide supplemental lectures, professors in the BDMP can adopt case studies that provide rich information on various management functions. The university must invest in purchasing and subscribing to databases with these stories through the viewpoint of real people and real organizations – as this can effectively present situations that business and management students may face and need to resolve in their workplace. By performing case studies, aided by simulation projects through the aid of audio and video materials, professors can bring learning beyond the four walls of the classroom.

- Thirdly, adult students must be allowed to see immediate application for their learning and where they can also share what they know. Community engagement and project simulations will allow BDMP classes to collaborate with the real players from the industry. Students may work on their final written projects in partnerships with managers, entrepreneurs, special government projects, and organizations. Their overall learning will be strengthened by the implementation, and thus the validation, of their knowledge. The BDMP can create a network of private and public partnerships for its various activities.

- Focused and engaging faculty development can never be overemphasized. The BMDP, acting as the body that organizes, supervises, and evaluates the curriculum, procedures, and personnel of the MBM, MPSM, and DM cluster, must equip its teachers with their knowledge, skills, and values about andragogy that will escort them to the application of well-balanced and effective teaching-learning methods for adult learners.

- Looking forward, the study can be expanded into correlational research and even include the assessments of teachers to create a more comprehensive analysis and help BDMP ensure that its adult students learn through teaching styles and classroom activities that are sensitive to their needs. Learning styles are defined by teaching styles. The Business Development and Management Program of the graduate school can seek opportunities to make the learning experience revolve around the students themselves and thus better understand the challenge of andragogy. The BDMP can also embark on continuing research about the preferred teaching and learning methods of students, their limitations and challenges, the effective teaching methods particularly for business and management students, and the role of student-centered learning in online or distance education, which is marked by a strong preference among contemporary adult learners.

Conclusion

Students learn the way the teachers teach. But more importantly, teachers must teach the way students learn. For professors teaching adults in graduate school, this means an understanding of andragogy – where the learning environment must be characterized by equality, mutual respect, collaboration in planning and objective setting, inquiry and independent study, and self-assessment (Herod, 2012).

To summarize the results of the PALS factors, the Business Development and Management Program of this particular Philippine Graduate School has classrooms with a general environment that succeeded to satisfy the principles of andragogy and adult learning, namely in the following factors: relating to experience, participation in the learning process, climate building, assessing student needs, and personalizing instruction.

While this is an achievement for the BDMP, this finding is better understood through a closer look at each of the seven teaching styles to find areas for improvement. Therefore, to be able to

continue its practical approach to the principles of adult learning, the Graduate School BDMP needs to improve its learner-centered activities and flexibility for personal development.

The principles of adult learning translate into the activities that the faculty introduce in the classroom. The BDMP must understand student perspectives on how to effectively teach management to adult learners who are professionals themselves because, at end of the day, the professors of the graduate school must be held to higher standards of teaching.

Acknowledgments

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ASSESSMENT FOR LEARNING AT SAUDI UNIVERSITIES: AN ANALYTICAL STUDY OF ACTUAL PRACTICES

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ABSTRACT

Assessment for learning is a part of learning and teaching processes, diagnosing learners' needs, and providing them with feedback to improve their performance. This study is aimed to investigate and analyze the practices of assessment for learning among the faculty members at Saudi Universities. This study uses a quantitative survey approach. Psychometric properties of assessment for learning instrument using Rasch Model Analysis were verified on a sample of (255) faculty members from Saudi Universities. The findings showed that the practice degree of assessment for learning among the faculty members was medium. In addition, there were no statistically significant differences in the practice degree of faculty members of assessment for learning according to gender, faculty, and teaching experience. While there were statistically significant differences in all dimensions of assessment for learning based on academic rank. Finally, the study recommended that conducting training programs on strategies of assessment for learning and holding workshops to exchange experiences between all faculty members.

Keywords – Rasch Model Analysis, demographic factors, Psychometric properties

Introduction

Considering the scientific and technological development and progress, it is essential to change and renew the educational process. Recently, the focus has become on constructivism visions, which rejects to divide the curriculum into separate skills. It emphasizes that the mind creates knowledge, and the teacher is a supporter in building that knowledge (Rizk, 2014; Alsbeeh, 2017; Flórez & Sammons, 2013; Alkhayal, 2019). Since the assessment is one of the components of the educational process, hence it has an important role in the learning and teaching process because it considers the main source to make decisions that are related to learning difficulties and their diagnosis, it is also encouraging and enhance student' learning. Furthermore, it considers an effective tool to judge on progress of students, curriculum, programs, and educational policies. There is a clear and strong relationship between assessment and teacher's teaching methods and student learning styles. Educational assessment plays an important role in determining the level of learning, and in the appropriate education, methods to achieve its goals (Ryan, 2015; Alshamekh, 2018; Akib and Ghafar, 2019; Taras, 2010).

Assessment is a systematic process for collection, analyzing, and using information from the outcomes that were measured in an organized and continuous method to improve student learning (Akib and Ghafar, 2019; Darandari, 2017). Considering the call for developing the educational process and adopting comprehensive quality, the evaluation process should be reformed because of its importance within the educational system. The 'fixed educational concepts for teachers must be modified. Assessment is a tool that the teacher uses to judge students, it is not considered as a way to engage them in a constructive assessment environment, however, it is to develop a positive trend towards the evaluation process. The assessment is necessary for educational institutions, but the need for it is more in universities because its application successfully leads to achieving the desired goals, such as raising the academic level, developing creativity, and achieving communication between the aspects of the educational process (Azizi, 2018; Alkhayal, 2019).

Assessment for learning (AFL) is often used to describe constructive assessment strategies. It is a formative and diagnostic assessment integrated into the teaching and learning process to continuously modify strategies of this process. It focuses on developing the quality of learning and improving performances (Alkhayal, 2019; Abdulkareem & Omer, 2019; Azizi, 2018; Darandari, 2017; Ryan, 2015). Council of Chief State School Officers (2018) defined AFL as a planned and continuous process, used by all teachers and students during the learning and teaching process, to extract and elicit evidence about student learning, use it to improve student understanding of targeted learning outcomes, and support students to become self-learners. Therefore, AFL is interested in employing various methods of assessment and using its data by students, teachers, and parents in the development of quality of learning. Students learn better which makes them the focus of the evaluation process and it helps them to practice and feel them be able to control and achieve success by continuing to work on tasks and activities (Stiggins,

2005). AFL is an effective way to raise student achievement. Students' performance will improve significantly if they understand the goal of their learning. The characteristics of assessment for learning represent the general traits of a good teacher. This requires the teacher to obtain more details about the progress students are making in achieving the curriculum goals to think in different ways to help them (Jawawi et al., 2017; Akib & Ghafar, 2015; Flórez & Sammons, 2013; Haroldson, 2012). AFL helps the teacher to follow the learner's growth in the cognitive, emotional, and psychomotor fields, provide him with feedback on students' mistakes , and provides him with the appropriate data on their progress and level of achievement (Azizi, 2018).

AFL has several basic principles; it covers all aspects of achievement for all students, develop their ability to peer and self – assessment, helps them to know how to improve students', supports understanding of learning outcomes and assessment criteria, builds and supports motivation, meaningful, targeted, sensitive, and takes into account the emotional aspects, essential for professional development, essential for classroom practices, focuses on how the student learns, and it is considered part of effective learning and teaching planning (Darandari, 2017; Jones & Saville, 2016).

AFL is used not only to confirm the learning occurring but to raise the level of learning. It is multi-dimensional, constructional, integrated into the curriculum, real and flexible used in an early stage of learning to diagnose the needs of students. This type provides information about student learning, and the effectiveness of the learning strategies they use (Darandari, 2017; Stiggins & Chappuis, 2013; Arends & Kilcher, 2015).

AFL determines the learners' levels and status from their learning processes, enhances their learning, and makes them aware of their strengths and weaknesses, to improve the learning and teaching process. (AFL) provides an environment rich with feedback, which is done through the teacher's dialogue with his students, and the interaction of students with each other. This environment provides students with opportunities to apply their knowledge, skills, and understanding to learning content. It also provides them with opportunities to improve and progress towards achieving their learning goals. Moreover, helping students to engage in their careers in the future (Ryan, 2015; Pang and Leung, 2011; McDowella et al., 2011).

AFL judges the quality of learning, to determine the next steps of action. It is designed to assess both students and teachers. It also uses clear and detailed descriptive feedback, focuses on improvement and comparison with students' previous performance, promotes students' success beliefs, and helps them get rid of fear and dread that are due to the traditional assessment practices. Furthermore, it helps students on follow-up and adjust learning methods, improves their level of mastery of educational content, increase their performance on all tests, positively affects students' perception of their learning, and enhances their motivation and aptitude to learn (Chappuis et al., 2011; Popham & Stiggins, 2007).

One of the strategies of assessment for learning is that students work in cooperative groups, where peers assess each other by sharing their ideas, suggestions, and decisions, and judging them after comparing them to the success criteria. After that, the misconceptions change directly between the group members due to the exchange of ideas and the diversity of experiences. Peer assessment provides an opportunity for every student to adjust and improve performance; it raises the quality and increases academic achievement (Keeley, 2015). Evidence about students' understanding process can be gathered through various tools, such as listening to student discussions, observing their performance, through written work, learning assignments, or tests of all kinds. The information gathered about student learning should be analyzed by the teacher or the student himself, then work out procedures to improve learning, thus it becomes an assessment for learning (Shepard, 2000).

The results of the multiple studies that were aimed to identify and investigate the assessment practices in Saudi Universities indicated that there is a variation in the degree of assessment practices (Otaibi, 2018; Alshamrani, 2017; Alsbeeh, 2017).   There are also some misunderstandings of the main assessment concepts, there are problems in practicing them, and it is refraining from changing the assessment practice. In addition, some studies conducted training programs and suggested models of assessment for learning to improve the practice of applying and practicing its tools and strategies (Azizi, 2018; Abdulkareem & Omer, 2019; Abdulkareem & Alshaya, 2018). The constructivist view of learning focuses on the learner's role in learning and assessment processes and practices (Darandari, 2017 and 2014).

AFL is one of the most prominent recent trends in educational assessment, and the knowledge of assessment practices for learning enables faculty members to take advantage of it in their teaching behavior and enrich research, hence this study came to develop a tool that includes appropriate assessment practices for learning. The scale is used to measure the degree of the practices of assessment for learning by faculty members.

Literature Review

The study by Darandari (2017) discussed the characteristics and strategies of effective assessment for learning and ways to implement it in the classroom to enhance learning, in addition to developing policies and establishing effective systems for assessment for learning. The study by Gilles, Detroz, & Blais (2011) aimed to investigate classroom assessment practices for faculty members in higher education. The assessment practices of the participating universities from different countries are displayed on the online platform, and these practices are compared with each other. Zacharis (2010) conducted a study that examined the effect of motivation for assessment on student achievement. It also focused on innovative assessment for learning methods to improve learning. Several studies have shown weaknesses and deficiencies in evaluation practices in general and weak practices of teachers for formative assessment.

Therefore, it is necessary to implement the "assessment for learning" effectively to improve students learning (Albursan et al., 2015; Volante & Beckette, 2011; Burns, 2010; Jett, 2009).

Many studies were aimed to identify and investigate the assessment for learning practices of teachers in schools. The results of these studies indicated that there is a variation in the degree of assessment practices from low to high. It also showed a provision of all kinds of written tests (Otaibi, 2018; Alshamrani, 2017; Alsbeeh, 2017; Ryan, 2015; Albursan et al., 2015; Al-Bashir and Barham, 2013; Sharah and Zaza, 2013; Refaee et al., 2012; Zhang & Burry-Stock, 2003; Mcmillan et al., 2002;). To obtain positive and good results of assessment for learning, some studies have relied on Rasch model analysis as a tool of assessment for learning, due to its accuracy and effectiveness in developing items of tests and tools (Akib and Ghafar, 2019; Sumintono, 2018; Akib & Ghafar, 2015). Given the importance of assessment for learning in the learning and teaching process. Some studies conducted training programs and suggested models of assessment for learning to improve the level of achievement, and the practice of applying its tools and strategies (Alkhayal, 2019 ;Abdulkareem & Omer, 2019; Abdulkareem & Alshaya, 2018; Abdulkareem & Alshaya, 2016).

To provide a class environment based on assessment for learning, teachers should change their assessment practices. The most important practices are; focusing on learning by sharing learners to determine the learning objectives, providing effective questions that enhance learners' thinking skills, providing effective feedback that includes clear guidelines and directed at improving student learning, and peer and self – assessment which allow students to discuss their learning, and discuss the level of their awareness and mistakes with colleagues (Alkhayal, 2019; Akib and Ghafar, 2019; Alsbeeh, 2017; Darandari, 2017; Ryan, 2015; Akib & Ghafar, 2015; Erwin and Najib, 2015; Flórez & Sammons, 2013; and Gardner, 2009).

The teacher's awareness of the level of assessment culture is low, misunderstanding of the main assessment concepts, there are problems in applying it, and refrain from changing the assessment practice, which leads to failure to achieve goals of assessment for learning (Volante & Beckett, 2011; Kanjee & Mthembu, 2015; Darandari and Murphy, 2013; Abdulkareem & Omer, 2015). There are difficulties in applying the formative evaluation because of lack of time, increase in the number of students, and intensity of the curriculum (Mariam, 2016). This research paper aims to analyze the practices of assessment for learning among the faculty members at Saudi Universities. Furthermore, the research questions in this paper are: Is the developed instrument valid and reliable to measure practices of assessment for learning to faculty members? What is the practice degree of the faculty member for assessment for learning? Finally, are there any statistically significant differences in the level of practice of faculty members for assessment for learning according to gender, academic rank, teaching experience, and faculty?

Rasch Model Analysis

Rasch model enables teachers to develop test items and substantial tools, by providing psychometrics analysis methods and providing information related to students' assessment for learning (Sumintono, 2018). Rasch developed a special model, to estimate the abilities of individuals through their responses on the test items (McCamey, 2014). Rasch model helps to predict the probability of the correct answer on a test based on estimate items two variables which are the difficulty of item and ability of the individual through joint continuity between them (De Battisti et al., 2004). Rasch model analysis improves the accuracy and quality of tests and surveys, as it also allows the creation of multiple forms of measuring instruments. When using survey data, it makes important corrections and clarifies the meaning of student and group metrics using survey items (Boone, 2016). The construction of any achievement test according to the Rasch model provides the advantages of accuracy, objectivity, and independence in the measurement. Rasch model is taken as a criterion for the structure of the responses, rather than a mere statistical description of the responses. Rasch model is used to reach the highest level of accuracy and objectivity in the measurement to achieve a more accurate relationship between measuring tool and underlying attribute of the individual (Nunnally, 1994). Rasch Model analysis is a powerful tool for evaluating constructs validity and reliability of the instrument (Mofreh et al., 2014).

Methodology

This study used a quantitative descriptive survey approach. The population is comprised of all faculty members at Saudi Universities. King Faisal University has been specifically chosen from Saudi Arabia during the academic year 2019/2020. There was a total of 2,012 faculty members at the University during this time frame. A sample of this study has been randomly selected of all colleges at King Faisal University which consists of (255) faculty members. To achieve the objectives of this study and answer the research questions, the scale of assessment for learning practices was developed. The scale is used to measure the degree of the practices of assessment for learning by faculty members. Dimensions of the scale were determined by reviewing the past studies. It consisted of four dimensions namely the sharing learning objectives (SL), effective classroom questions (EQ), providing effective feedback (EF), and peer and self–assessment (PS). Items of the scale were developed by reviewing the books, the internet, and previous studies.

Verifying the validity and reliability of the instrument

The validity and reliability of the instrument were verified. Nine experts working at the University of King Faisal examined the instrument items. Based on their professional opinions, five instrument items were omitted, and some items were modified and reformulated. Approximately 30 respondents examined the instrument. The data was analyzed and evaluated

according to the Rasch model using Winsteps software version 3.68.2. The validity of the instrument was measured using values of MNSQ for infit, it should lie between 0.4 and 1.5, item polarity analysis (PTMEA), this value of PTMEA should lie between 0.2 and 1, standardized fit statistic (Zstd) value should be range between -2,2. Calibration scaling analysis, and the dimensionality, where the raw variance explained by measures should be more than 40% and unexplained variance in 1st contrast less than 15. The reliability of the instrument was measured using person and item reliability (Mofreh et al., 2017; Boone, 2016; Erwin and Najib, 2015).

Table 1: Item Fit Analysis of assessment for learning for the faculty members

Items	measure	Model S.E	Infit MNSQ	Infit ZSTD	Outfit MNSQ	Outfit ZSTD	Pt-measure CORR
PS10	.24	0.25	1.48	1.9	1.46	1.8	.33
PS8	1.53	0.42	1.44	1.9	1.44	1.4	.26
PS4	1.49	0.26	2.43	1.8	1.41	1.9	.23
PS7	-.29	0.41	1.42	1.8	1.45	1.5	.26
PS9	.11	0.29	1.25	1.7	1.37	1.0	.25
PS3	-.85	0.38	1.39	1.7	1.34	1.9	.22
PS2	-.92	0.34	1.37	1.7	1.34	1.3	.27
PS1	.87	0.25	1.39	1.5	1.34	1.6	.40
PS6	.66	0.36	1.28	1.1	1.30	1.2	.43
PS5	.73	0.28	1.28	1.5	1.48	1.1	.43
SL2	-.14	0.37	.89	-.4	1.01	.1	.60
SL1	-.17	0.34	.90	-.3	1.04	.2	.61
SL4	.20	0.35	.90	-.3	.85	-.6	.63
SL10	-.40	0.33	.98	.0	1.08	.4	.64
SL5	-.35	0.31	.94	.1	.99	.1	.66
EF2	-.20	0.35	.83	-.9	.80	-.5	.66
SL6	-.22	0.29	.97	-1.1	.90	-.2	.67
EQ11	-.40	0.33	1.00	-1.2	.97	.0	.68
EF12	.02	0.38	.78	-1.0	.73	-1.1	.69
SL7	.28	0.36	.74	-1.4	.75	-1.0	.71
EF4	.04	0.35	.72	-1.4	.67	-1.3	.73
EQ7	-.04	0.32	.70	-1.3	.70	-.9	.73
EF6	-.29	0.41	.67	-.9	.60	-1.5	.73
EF3	-.06	0.37	.69	-1.6	.65	-1.5	.74
EQ3	-.62	0.32	.67	-1.6	.61	-1.4	.75
EF5	-.11	0.29	.75	-1.4	.72	-.9	.75
EF9	.04	0.35	.66	-1.3	.62	-1.5	.76
EQ5	-.40	0.33	.61	-1.2	.63	-1.4	.76
EQ4	-.40	0.33	.63	-1.5	.60	-1.5	.76
EF11	-.46	0.30	.68	-1.3	.64	-1.3	.76
EF8	-.20	0.35	.66	-1.4	.57	-1.4	.77
EQ2	.77	0.37	.64	-1.9	.63	-1.5	.78
EF14	-.34	0.32	.67	-1.3	.62	-1.5	.78
SL3	-.16	0.32	.64	-1.9	.61	-1.6	.79
EQ1	-.14	0.37	.61	-1.5	.57	-1.9	.79
EQ9	.15	0.32	.63	-2.1	.57	-1.4	.79
EF10	.12	0.35	.60	-1.7	.57	-1.9	.80
SL9	-.46	0.32	.63	-1.9	.58	-1.7	.80
SL8	.39	0.35	.58	-1.8	.55	-1.9	.80
EF13	.28	0.30	.61	-1.5	.56	-1.7	.81
EF1	-.16	0.34	.54	-1.3	.52	-1.9	.83
EF7	.15	0.36	.54	-1.5	.50	-1.4	.84
EQ8	-.06	0.30	.43	-1.3	.44	-1.3	.85
EQ10	.12	.32	.43	-1.3	.42	-1.2	.86
EQ6	-.14	0.29	.44	-1.5	.45	-1.4	.86

The values of MNSQ for infit ranged from 0.44 to 1.48, as for the point measure correlation (PTMEA) value, all AFL items showed a positive value and greater than 0.20, this indicates that all items are moving in parallel function to measure the dimensions formed. The ZTS values ranged from -2 to +2 as shown in Table 1 below. These values are appropriate and acceptable for construct validity according to the Rasch model.

The dimensionality analysis result of AFL for the faculty members was illustrated in Table 2 below. The raw variance explained by measured value was 44.6%, which is more than 40%, and unexplained variance in 1st contrast value was 10.2%, which is less than 15. Thus, dimensionality data results in the post that the AFL data fit the Rasch model.

Table 2: Item Dimensionality of assessment for learning for the faculty members

	Empirical			Modeled
Total raw variance in observations	74.4	100%		100%
Raw variance explained by measures	39.4	49.5%		43.1%
Raw variance explained by persons	17.0	22.9%		25.0%
Raw Variance explained by items	12.4	16.6%		18.1%
Raw unexplained variance (total)	45.0	60.5%	100.0%	56.9%
Unexplained var.in 1st contrast	7.6	10.2%	16.9%	13.9%
Unexplained var.in 2nd contrast	5.3	7.1%	11.7%	11.7%
Unexplained var.in 3rd contrast	4.3	5.8%	9.5%	9.8%
Unexplained variance in 4th contrast	3.5	4.6%	7.7%	8.5%
Unexplained variance in 5th contrast	3.2	4.2%	7.0%	7.6%

For grading scale calibration analysis of the AFL as shown in Table 3 below, the most frequent answer is the scale of participants ranking 4 which is 16 (53%). The second grading scale is scale 3 which is 11 (37%), and the last grading scale is scale 2 which is 3 (10%). The column of observed averages shows the pattern of faculty members' move from -.84 to +1.83. Based on the Rasch model this indicates a normal pattern.

Table 3: Calibration Scaling Analysis of assessment for learning for the faculty members

Category Lable	Score	Observed Count %	Observed Average	Infit MNSQ	Outfit MNSQ	Structure Calibration	Category Measure
2	2	3 10	-.84	.72	.64	None	(-2.40)
3	3	11 37	.78	.88	1.29	-1.04	-.17
4	4	16 53	1.83	1.06	1.07	1.04	2.05

The person reliability is 0.94, which is greater than 0.5. Furthermore, the person separation is 4.12, which is greater than 2 as shown in Table 4 below. Based on the Rasch model these reliability values indicate that the instrument has a good degree of reliability. The value of the item's reliability is 0.69, which is greater than 0.5. The values of item separation are 2.93, which

is greater than 2 as shown in Table 5 below. Based on the Rasch model these reliability values indicate that the instrument has a good degree of reliability.

Table 4: Person Separation and Reliability of assessment for learning for the faculty members scale

	Raw Score	Count	Measure	Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	143.6	45.0	1.17	.28	1.10	0.3	1.14	.2
S.D.	19.5	.0	1.34	.05	0.53	2.1	0.67	2.4
Real Rmse	0.32							
ADJ.SD	1.30							
Separation	4.12							
Person Reliability	.94							

Table 5: Item Separation and Reliability of assessment for learning for the faculty member's scale

	Raw Score	Count	Measure	Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	95.7	30.0	.00	0.33	.99	-.3	1.14	-0.2
S.D.	5.9	0.0	0.50	0.04	0.69	2.1	1.24	2.4
Real Rmse	0.37							
ADJ.SD	0.34							
Separation	2.93							
Item Reliability	0.69							

Findings

First, to answer the first question, the instrument dimensions about the assessment for learning practices for faculty members were analyzed. The means, standard deviation, rank, and percentages of the faculty members' responses were extracted. The Likert scale has five options or values: 1,2,3,4 and 5. The means are given the following gradient based on the following equation:

$$(5-1)/5 = 0.80 \qquad\qquad (1)$$

So, the levels are shown as seen follows:

Range	Practice Degree
1.0 – 1.8	Very low
1.81 – 2.6	Low
2.61 – 3.41	Medium
3.42 – 4.22	High
4.23 – 5.0	Very high

Source: Data Adapted from the previous equation

The goal of this classification is to classify faculty members' responses. Table 6 below shows the means, standard deviation, rank, and practice degree for the faculty members on the whole scale.

Table 6: The means, standard deviation, rank, and practice degree of assessment for learning for the faculty members in the whole scale

Rank	Dimension	N	Mean	standard deviation	Practice Degree
1	AvEF	255	3.52	.61579	high
2	AvSL	255	3.42	.58853	high
3	AvEQ	255	3.41	.64957	Medium
4	AvPS	255	3.15	.59019	Medium
Overall average		255	3.38	.52795	Medium

Table 6 shows that the items scores in both dimensions effective feedback and sharing learning objectives with mean of (3.52) and (3.42) respectively, and with a standard deviation of (.61579) and (.58853) respectively. In general, the mean of both dimensions effective feedback and sharing learning objectives indicated high practice degree. While the items scores in both dimensions' effective questions and peer and self–assessment with mean of (3.41) and (3.15) respectively, and with a standard deviation of (.64957) and (.59019) respectively. In general, the mean of both dimensions' effective questions and peer and self–assessment indicated a medium practice degree. The effective feedback dimension ranked first, followed by the sharing learning objectives dimension, then the dimension of the effective question, finally the peer and self–assessment dimension.

Data analysis results also showed that the items scores in the effective feedback dimension have means ranging from (3.37) to (3.78) and standard deviation ranging from (0.71) to (2.61). Item EF4 was found to be the most practice degree and Item EF2 was found to be the lowest item in this subscale as shown in Table 7 below, while the items scores in sharing learning objectives dimension have means ranging from (3.2) to (3.6) and standard deviation ranging from (0.69) to (0.84). Item SL2 was found to be the most practice degree and Item SL7 was found to be the lowest item in this subscale as shown in Table 8 below. The items scores in the dimension of the effective question had means ranging from (3.32) to (3.54) and standard deviation ranging from (0.84) to (0.85). Item EQ2 was found to be the most practice degree and Item EQ10 was found to be the lowest item in this subscale as shown in Table 9 below. Finally, the items scores in peer and self–assessment dimension had means ranging from (2.82) to (3.46) and standard deviation ranging from (1.11) to (0.81). Item PS3 was found to be the most practice degree and Item PS4 was found to be the lowest item in this subscale as shown in Table 10 below.

Table7: The means, standard deviation, rank, and practice degree of assessment for learning for the faculty members in the second dimension (Effective Feedback)

Rank	Items	N	Mean	Std. Deviation	Practice Degree
1	EF4	255	3.7804	2.61409	High
2	EF9	255	3.5373	2.04419	High
3	EF1	255	3.5333	.75677	High
4	EF10	255	3.5020	.92589	High
5	EF5	255	3.4902	.85049	High
6	EF6	255	3.4706	.92967	High
7	EF3	255	3.4706	.93810	High
8	EF8	255	3.4667	.82162	High
9	EF7	255	3.4471	.97009	High
10	EF2	255	3.3725	.70880	Medium

Table 8: The means, standard deviation, rank, and practice degree of assessment for learning for the faculty members in the first dimension (Sharing Learning Objectives)

Rank	Items	N	Mean	Std. Deviation	Practice Degree
1	SL2	255	3.6078	.69527	High
2	SL8	255	3.4863	.68073	High
3	SL5	255	3.4863	.84579	High
4	SL3	255	3.4784	.76238	High
5	SL6	255	3.4353	.73891	High
6	SL1	255	3.4314	.98921	High
7	SL10	255	3.4196	.87867	High
8	SL4	255	3.3255	.98809	Medium
9	SL9	255	3.3059	.80876	Medium
10	SL7	255	3.1922	.83615	Medium

Table 9: The means, standard deviation, rank, and practice degree of assessment for learning for the faculty members in the third dimension (Effective Questions)

Rank	Items	N	Mean	Std. Deviation	Practice Degree
1	EQ2	255	3.5451	.84934	High
2	EQ7	255	3.4745	.87751	High
3	EQ3	255	3.4667	.81198	High
4	EQ8	255	3.4431	.79597	High
5	EQ4	255	3.4314	.91046	High
6	EQ9	255	3.3922	.81999	Medium
7	EQ6	255	3.3765	.84149	Medium
8	EQ1	255	3.3725	.99132	Medium
9	EQ5	255	3.3647	.79636	Medium
10	EQ10	255	3.3176	.84479	Medium

Table 10: The means, standard deviation, rank, and practice degree of assessment for learning for the faculty members in the fourth dimension (Peer and Self – Assessment)

Rank	Items	N	Mean	Std. Deviation	Practice Degree
1	PS3	255	3.4627	.81181	High
2	PS2	255	3.3922	.81999	Medium
3	PS6	255	3.3059	.84681	Medium
4	PS7	255	3.2745	.88466	Medium
5	PS5	255	3.1059	1.07246	Medium
6	PS9	255	3.0863	.99626	Medium
7	PS8	255	3.0510	1.01240	Medium
8	PS1	255	2.8275	1.08390	Medium
9	PS4	255	2.8235	1.11019	Medium

Answering the second question, Table 11 below showed that the means, standard deviation, and rank for practice degree of faculty members of assessment for learning. The findings were as follows: The first five items respectively EF4, SL2, EQ2, EF9, and EF1 were the most prominent the practice of assessment for learning of faculty members. While the last five items respectively ps5, ps9, ps8, ps1, and ps4 were the lowest practice of assessment for learning of faculty members.

Table 11: The means, standard deviation, rank, and practice degree of assessment for learning for the faculty members in all items of the instrument

Rank	Items	N	Mean	Std. Deviation	Practice Degree
1	EF4	255	3.7804	2.61409	High
2	SL2	255	3.6078	.69527	High
3	EQ2	255	3.5451	.84934	High
4	EF9	255	3.5373	2.04419	High
5	EF1	255	3.5333	.75677	High
6	EF10	255	3.5020	.92589	High
7	EF5	255	3.4902	.85049	High
8	SL8	255	3.4863	.68073	High
9	SL5	255	3.4863	.84579	High
10	SL3	255	3.4784	.76238	High
11	EQ7	255	3.4745	.87751	High
12	EF6	255	3.4706	.92967	High
13	EF3	255	3.4706	.93810	High
14	EF8	255	3.4667	.82162	High
15	EQ3	255	3.4667	.81198	High
16	PS3	255	3.4627	.81181	High
17	EF7	255	3.4471	.97009	High
18	EQ8	255	3.4431	.79597	High
19	SL6	255	3.4353	.73891	High
20	EQ4	255	3.4314	.91046	High
21	SL1	255	3.4314	.98921	High
22	SL10	255	3.4196	.87867	Medium
23	EQ9	255	3.3922	.81999	Medium
24	PS2	255	3.3922	.81999	Medium
25	EQ6	255	3.3765	.84149	Medium

26	EF2	255	3.3725	.70880	Medium
27	EQ1	255	3.3725	.99132	Medium
28	EQ5	255	3.3647	.79636	Medium
29	SL4	255	3.3255	.98809	Medium
30	EQ10	255	3.3176	.84479	Medium
31	SL9	255	3.3059	.80876	Medium
32	PS6	255	3.3059	.84681	Medium
33	PS7	255	3.2745	.88466	Medium
34	SL7	255	3.1922	.83615	Medium
35	PS5	255	3.1059	1.07246	Medium
36	PS9	255	3.0863	.99626	Medium
37	PS8	255	3.0510	1.01240	Medium
38	PS1	255	2.8275	1.08390	Medium
39	PS4	255	2.8235	1.11019	Medium

Answering the third question, T-Test and one-way analysis of variance was used. Table 12 below shows the results of the T-Test in the practice degree of faculty members of assessment for learning in the effective feedback, sharing learning objectives, effective questions, and peer and self–assessment dimensions due to the gender and faculty.

Table 12: The results of T-Test for differences between means according to gender and faculty

Variables and Dimensions			No.	Mean	S. D.	t	Sig.
Gender	AvSL	Male	171	3.4222	.58559	.207	.836
		Female	84	3.4060	.59786		
	AvEF	Male	171	3.5246	.61900	.328	.743
		Female	84	3.4976	.61252		
	AvEQ	Male	171	3.4135	.67519	.114	.909
		Female	84	3.4036	.59788		
	AvPS	Male	171	3.1076	.58732	1.512	.132
		Female	84	3.2262	.59153		
	Whole dimensions (AvTOT)	Male	171	3.3766	.53284	.231	.818
		Female	84	3.3929	.52084		
Faculty	AvSL	Humanity	177	3.4051	.58019	.481	.631
		Scientific	78	3.4436	.61000		
	AvEF	Humanity	177	3.5028	.58770	.502	.616
		Scientific	78	3.5449	.67836		
	AvEQ	Humanity	177	3.3994	.62117	.398	.691
		Scientific	78	3.4346	.71347		
	AvPS	Humanity	177	3.1254	.60545	.865	.388
		Scientific	78	3.1949	.55477		
	Whole dimensions (AvTOT)	Humanity	177	3.3672	.50593	.670	.503
		Scientific	78	3.4154	.57684		

Table 12 shows that the value of (t = 0.231) for whole dimensions indicated that there were no statistically significant differences between the means. Where the significant level is more than (0.05). In other words, there were no statistically significant differences between the responses of the sample on the practice degree of faculty members of assessment for learning based on

gender. The value of (t = 0.670) for the whole dimensions indicated that there was no statistically significant difference between the means, where the significant level is more than (0.05). In other words, there were no statistically significant differences between the responses of the sample on the practice degree of faculty members of assessment for learning according to faculty.

Table 13 below shows the results of a one-way analysis of variance in the practice degree of faculty members of assessment for learning in the effective feedback, sharing learning objectives, effective questions, and peer and self–assessment dimensions due to the academic rank and teaching experience.

Table 13: The results of analysis of variance of differences between the means of responses of sample about the practice degree of faculty members of assessment for learning

			Sum of Squares	df	Mean Square	F	Sig.
Academic Rank	AvSL	Between Groups	3.223	2	1.611	4.791	.009
		Within Groups	84.755	252	.336		
		Total	87.977	254			
	AvEF	Between Groups	2.743	2	1.371	3.693	.026
		Within Groups	93.575	252	.371		
		Total	96.317	254			
	AvEQ	Between Groups	5.623	2	2.811	6.976	.001
		Within Groups	101.551	252	.403		
		Total	107.173	254			
	AvPS	Between Groups	1.142	2	.571	1.648	.194
		Within Groups	87.332	252	.347		
		Total	88.475	254			
	AvTOT	Between Groups	2.970	2	1.485	5.518	.005
		Within Groups	67.827	252	.269		
		Total	70.797	254			
Teaching experience	AvSL	Between Groups	1.956	2	.978	2.865	.059
		Within Groups	86.022	252	.341		
		Total	87.977	254			
	AvEF	Between Groups	1.194	2	.597	1.582	.208
		Within Groups	95.123	252	.377		
		Total	96.317	254			
	AvEQ	Between Groups	1.473	2	.737	1.756	.175
		Within Groups	105.700	252	.419		
		Total	107.173	254			
	AvPS	Between Groups	1.336	2	.668	1.931	.147
		Within Groups	87.139	252	.346		
		Total	88.475	254			
	AvTOT	Between Groups	1.416	2	.708	2.571	.078
		Within Groups	69.381	252	.275		
		Total	70.797	254			

Table 13 shows that there are significant statistical differences in all dimensions of the instrument based on academic rank where the significant level is less than 0.05 meaning that there are significant statistical differences between the responses of the sample on the practice degree of faculty members of assessment for learning according to academic rank. On other hand, there were no statistically significant differences in all dimensions of an instrument based on teaching experience where the significant level was greater than (0.05). In general, there were no statistically significant differences between the responses of the sample on the practice degree of faculty members of assessment for learning according to teaching experience.

To know the direction of the differences in the academic rank, or to find out in favor of any of the four academic ranks, the Tukey test of the post-comparisons was used.

Table 14: The results of Tukey test for differences between the periods of the academic rank of faculty members of assessment for learning

Mean	(I) Rank	(J) Rank	Mean Difference (I-J)	Std. Error	Sig.
3.41	Professor	Associate Professor	-.3226	.3813	.832
		Assistant Professor	-.1694	.3317	.956
		Lecturer	.4740	.3464	.523
3.29	Associate Professor	Professor	.3226	.3813	.832
		Assistant Professor	.1532	.2746	.944
		Lecturer	.7966*	.2922	.039
3.44	Assistant Professor	Professor	.1694	.3317	.956
		Associate Professor	-.1532	.2746	.944
		Lecturer	.6434*	.2236	.026
3.62	Lecturer	Professor	-.4740	.3464	.523
		Associate Professor	-.7966*	.2922	.039
		Assistant Professor	-.6434*	.2236	.026

Table 14 shows that there were statistically significant differences between academic ranks in favor of lecturers.

Discussion of the Results

The results of the study indicated that the faculty members practice assessment for learning with a medium degree on the whole scale. These results are consistent with the study of (Alsbeeh, 2017; Al-Ahmadi, 2014; Hasan, 2012). The results are also consistent with the study of (Alsbeeh, 2017; Burns, 2010; Volante & Beckett, 2011) the effective feedback dimension was in the first rank. It is also consistent with the study of (Alsbeeh, 2017; Ryan, 2015; Almazrue, 2014; Volante & Beckett, 2011(that the peer and self–assessment dimension was in the last rank in the scale. However, is inconsistent with (Alshamrani, 2017, Ryan, 2015; Almazrue, 2014).

This is due to most faculty members using traditional evaluation practices, such as focusing on tests and grading, not to support student learning. As for the feedback dimension, it ranked first with high practice degree, because it is considered one of the basic skills practiced by the faculty member continuously to reach the goals. Sharing learning objectives dimension comes second with high practice degree, that is because most faculty members clarify the goals and work plan for students, by brainstorming, defining assignments, or discussing them with the required reports and information. The effective questions dimension comes third with a medium practice degree, this is because most faculty members do not listen to all students 'questions, inquiries, and their discussion with these questions. In addition, most faculties do not ask questions that stirring or motivate students' higher thinking skills or open-ended questions. This is because there is not enough time to do this. Peer and self–assessment dimensions came the last with a medium practice degree, because of the lack of efficiency and lack of educational qualification among some members of the teaching staff to use peer assessment, and their indifference to self-assessment. This type of assessment needs training to acquisition students' ability to make judgments. There is a great focus on grades and poor participation in assessment by students. In addition, the scarcity of training programs that aimed to spread assessment practices, such as tools and strategies, also focuses on the theoretical, non-applied side.

The results showed that there were no statistically significant differences between the responses of the sample on the practice degree of faculty members of assessment for learning practices according to gender. This is because the faculty members constrain the same instructions, directions, and plans. In addition, they received the same training programs. This result is consistent with the study of (Ryan, 2015; Al-Bashir and Barham, 2013; Sharah and Zaza, 2013). However, is inconsistent with the study of (Otaibi, 2018; Refaee et al., 2012; Albursan et al., 2015).

The results showed that there were no statistically significant differences between the responses of the sample on the practice degree of faculty members of assessment for learning practices according to faculty. This is because the faculty members live under one-university educational conditions. This result is consistent with the study of (Otaibi, 2018; Refaee et al., 2012). However, is inconsistent with the study of (Alshamrani, 2017; Ryan, 2015; Sharah and Zaza, 2013).

The results showed that there were statistically significant differences between the responses of the sample on the practice degree of faculty members of assessment for learning practices based on academic rank in favor of lecturers. This is because the lecturers or the assistant professors have an interest in the assessment program and process in general. This is because of their great enthusiasm, motivation, and desire for their proficiency in university teaching, which reflects positively on their satisfaction and attitudes. In addition, they were affected by the training courses that are still present in their minds.

The results also showed that there were no statistically significant differences between the responses of the sample on the practice degree of faculty members of assessment for learning practices based on teaching experience. This is because faculty members develop from themselves through courses, and cooperation between them. In addition, their possessing of assessment skills were led to reducing the variance and the differences in the number of experience years. This result is consistent with the study of (Otaibi, 2018; Alshamrani, 2017; Alsbeeh, 2017; Al-Bashir and Barham, 2013). However, is inconsistent with the study of (Ryan, 2015; Sharah and Zaza, 2013; Al-Ahmadi, 2014).

Recommendations

It is recommended to conduct training programs and workshops on strategies of assessment for learning in teaching practices in the classroom by distributing faculty members to groups, and each group contains several lecturers, assistant professors, associate professors, and professors. Also, when formulating the plan for any curriculum, it should focus on enriching the content on assessment activities, which enhance self and peer assessment skills. Furthermore, emphasizing the use of assessment for learning in the classroom because it provides some important ideas that can help both the teacher and students, and integrate them into the processes of thinking, creativity, dialogue, and decision-making, where the educational process is in the minds of both the teacher and the learner. The necessity of exchanging experiences between all faculty members, through exchanging attendance between them for lectures, or by holding weekly or monthly meetings to develop knowledge and skills about methods and strategies of assessment for learning. In addition, the relationship between students and faculty members must be good and effective, so that the teacher listens to students 'questions, discusses them, motivate them, and poses questions that stimulate students' higher skills. Training students on some assessment for learning processes is highly recommended, and conducting further studies about assessment for learning from students' viewpoint, or by using new tools such as observation card, case Study, classroom observation, personal interviews, etc. In the end, conducting further studies about the effectiveness of assessment for leaning on some cognitive and emotional variables.

Conclusion

This paper aimed to investigate and analyze the practices of assessment for learning among the faculty members at Saudi Universities. The results showed that the practice degree of assessment for learning among the faculty members was medium, where feedback dimension, ranked first with high practice degree. Sharing learning objectives dimension comes second with high practice degree, followed by the dimension of the effective question where came third with a medium practice degree. Peer and self–assessment dimensions came up the last. In addition, it also showed, there were no statistically significant differences in the practice degree of faculty members of assessment for learning according to gender, faculty, and teaching experience. While

there were statistically significant differences in all dimensions of assessment for learning based on academic rank.

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PERFECTIONISM AND ACADEMIC PROCRASTINATION AMONG MALAYSIAN UNDERGRADUATES: COPING STRATEGY AS A MEDIATOR

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ABSTRACT

Many undergraduates face the problems of academic procrastination. Therefore, it is necessary to determine the factors associated with academic procrastination so that strategies can be planned to tackle the issue. This study uses the transactional model of stress and coping theory and personality-coping-outcomes theory as a framework. We use this framework to examine whether perfectionism is associated with academic procrastination. Besides, we use this framework to examine whether coping strategy mediated perfectionism's effects on academic procrastination. The purposive sampling method was used to recruit 229 undergraduates in Malaysia to complete a survey. A partial least structural equation model was used to analyze the data. The results showed that perfectionism is associated with academic procrastination. Besides, coping strategies are statistical mediators for the effects of perfectionism on academic procrastination. The findings support the generalization of the theoretical models to understand the mechanism of academic procrastination. Workshops and training can be provided to undergraduates to be aware of the relationships between personality and academic procrastination and the importance of using appropriate coping strategies.

Introduction

Procrastination is defined as voluntarily delaying or escaping from tasks that should be prioritized over less urgent tasks (Steel, 2007). Procrastination is a phenomenon that is widespread among society (Uzun Ozer et al., 2014). Ferrari et al. (2005) estimated that about 20% of men and women in the United States had practiced procrastination in daily life.

In academic settings, it is estimated that over 75% of college students are academic procrastinators who usually do assignments, paper writing, or exam preparation when deadlines are close (Steel, 2007). Ferrari et al. (2005) also stated that 75% to 95% of students from the US, Australia, and the UK have academic procrastination problems.

Different negative consequences of academic procrastination on academic performance and psychological health have been reported. Aziz and Tariq (2013) surveyed 201 Pakistan adolescents and indicated that procrastination is negatively associated with life satisfaction among Pakistan students. Hairston and Shpitalni (2016) conducted an online survey among 598 US participants aged 18-37, and they reported that procrastination is positively associated with lower academic performance and sleep disturbance. Andangsari et al. (2018) surveyed 320 undergraduate students in Indonesia, and they reported that academic procrastination is positively correlated with emotional and social loneliness.

Besides, studies also found associations between academic procrastination and substance abuse. Westgate et al. (2017) stated that 1106 undergraduates from the united states reported a significant association between academic procrastination and higher alcohol craving levels and consumption. Melaku et al. (2015) also reported that 329 medical undergraduates in Ethiopia who experienced a higher level of academic stress due to procrastination have accounted for a higher percentage of substance abuse and consumption of alcohol.

Even though academic procrastination is one of the most prevalent practices adopted by undergraduates, yet research on underlying causes of academic stress is still unclear (Ratsameemonthon, 2015). Based on the transactional model of stress and coping and the theory of personality-coping-outcomes, personality and coping strategies can be associated with academic procrastination. Accordingly, we use these two theories to examine the associations between personality and academic procrastination. Besides, we use these two theories to examine whether the coping strategy is a mediating factor for the effects of personality on academic procrastination.

Theoretical Framework

The transactional model of stress and coping theory states that before an individual decides on which coping strategies to utilize, the individual will appraise the stress level brought on by a situation they are facing (Lazarus & Folkman, 1984). According to Folkman (2013), appraisal is a continuous process of evaluation. Primary appraisal asks the question, "Am I okay?" The secondary appraisal asks the question, "What can I do?". Different coping strategies will be adopted in the secondary appraisal based on primary appraisal results (Folkman, 2013).

Coping is defined as continually changing thoughts and behaviors to manage specific external and internal demands that are appraised as stressful (Folkman & Moskowitz, 2004). The coping method can be categorized into adaptive and maladaptive forms (O'Connor & O'Connor, 2003). Adaptive coping aids in protecting an individual's psychological well-being, such as problem-focused coping, consisting of planning to tackle the problems. Maladaptive coping can lead to a decline in an individual's psychological well-being, such as dysfunctional coping that consists of self-blaming and denial (Holton et al., 2016).

Suppose the individual perceived the stressful situation as an acceptable challenge, having the resources and capabilities to overcome the challenge. The individual is more likely to utilize strategies that focus on problem-solving such as actively searching for solutions. However, if the individual appraises the event as highly stressful, the individual is more likely to choose strategies that avoid or delay the task to temporarily reduce the stress (Sirois & Kitner, 2015).

Nonetheless, the transactional model of stress and coping theory does not consider the possible effects of personality. The personality-coping-outcome theory is, therefore, can be regarded as an extension of this theory. The personality-coping-outcome theory proposes that personality influences the adoption of coping strategies differently when encounters stressful situations, which further affects the adjustment (Gallagher, 1996).

Personality and academic procrastination

Studies have reported the association between personality and academic procrastination. Popoola (2005) suggested that procrastination can be regarded as a failure of self-regulation, as it is a person's habit of putting their responsibilities off to the last minute. Zhang et al. (2018) recruited 1184 undergraduate students in China and found a negative association between self-regulation and academic procrastination. Prihadi et al. (2018) recruited 60 college students in the Penang state of Malaysia. They found that students who possessed a higher internal locus of control are less likely to have academic procrastination problems. Siah et al. (2018, 2019, 2020) recruited Malaysian undergraduate students for a survey and found that grit personality is negatively associated with academic procrastination, academic adjustment, and academic performance.

Besides, perfectionism has also been found to be associated with academic procrastination. Perfectionism is a multidimensional personality trait that refers to extremely high standards that

an individual imposes on oneself (Frost et al., 1990). Perfectionists continuously strive to achieve flawless performance, are concerned about others' judgment towards them, and have low tolerance towards failure and imperfection. They may also impose their standards onto others for others to achieve their ideal ways of perfection.

Hewitt and Flett (1991) further conceptualized perfectionism into three forms: Self-oriented perfectionism, other-oriented perfectionism, and socially prescribed perfectionism. Self-oriented perfectionism puts a high standard for personal perfection. It motivated them to strive for personal perfection, and they are highly self-critical if they fail to meet these expectations. Other-oriented perfectionism puts a high standard of perfection for others and perceives others should strive for their perfection. They are highly critical of others who fail to meet these expectations. Socially prescribed perfectionism believe that others expect them to be perfect and that others will be highly critical of them if they fail to meet these expectations, so they also put a high standard for personal perfection and motivate to strive for personal perfection (Hewitt & Flett, 1991; Stoeber, 2014).

Kurtovic et al. (2019) suggested that self-oriented perfectionism is considered adaptive. Other-oriented and socially prescribed perfectionism is considered maladaptive. Therefore, it is expected that self-oriented perfectionism is negatively associated with academic procrastination. Besides, other-oriented and socially prescribed perfectionisms are positively associated with academic procrastination. However, according to a meta-analysis conducted by Xie et al. (2018), the associations between perfectionism and procrastination are inconsistent. Hashemi and Latifian (2014) surveyed 480 undergraduates from a university in Iran. Their findings showed that self-oriented perfectionism is negatively associated with academic procrastination. However, socially prescribed perfectionism is positively associated with academic procrastination. Bong et al. (2014) surveyed 306 seventh graders from South Korea. They found that self-oriented perfectionism is negatively associated with academic procrastination. However, no significant association was found between socially prescribed perfectionism and academic procrastination. Ghosh and Rosh (2017) surveyed 150 undergraduates and postgraduate students in India, but they found that all three types of perfectionism are positively associated with academic procrastination.

Perfectionism and Coping Strategies

From the transactional model of coping and stress theory and the personality-coping-outcomes theory, the inconsistent results of the associations between perfectionism and academic procrastination can be related to coping strategies. Some studies have found different coping strategies adopted by different types of perfectionism. Hill et al. (2010) surveyed 206 British athletes. They reported that self-oriented perfectionism is more likely to practice problem-focused coping and thus more likely to achieve their goal. However, socially prescribed perfectionism is more likely to use avoidance-focused coping and thus more likely to experience burnout. Gnilka et al. (2012) also surveyed 329 undergraduate students in the united states.

Those with maladaptive perfectionism tend to adopt disruptive coping strategies such as escaping instead of those adaptive perfectionists. Park et al. (2010) surveyed 508 undergraduates from universities in South Korea. They reported that men with perfectionistic concerns are more likely to use maladaptive coping strategies.

Some studies also reported the associations between different coping strategies and procrastination. Sirois and Kitner (2015) conducted a meta-analysis of five published papers, three theses, and seven unpublished data. The results revealed that maladaptive coping is positively associated with procrastination. However, adaptive coping is negatively associated with procrastination. Burns et al. (2000) survey 157 undergraduates from the united states and found significant correlations between vigilance coping strategies and perfectionism, between avoidance coping strategy and perfectionism, and between avoidance coping strategy and procrastination. Lowinger et al. (2016) surveyed 255 Asian international college students who studied in six different universities in the united states. They also reported that collective and engagement coping strategies are negatively associated with procrastination. However, avoidance coping strategy is positively associated with procrastination.

Some studies have reported the mediating effect of coping strategies on the relationships between perfectionism and different outcomes. Ashby and Gnilka (2017) surveyed 329 undergraduate students from the United States. They reported that distraction and emotion-focused coping mediates the effects of maladaptive perfectionism on stress, and problem-focused coping strategy mediates the effects of adaptive perfectionism on stress. Gnilka et al. (2012) also survey 329 undergraduates from an urban south-eastern university in the United States. Their results also found that coping strategies mediate the effect of maladaptive perfectionism on anxiety. Noble et al. (2014) survey 405 united states undergraduate students from an urban south-eastern university. Their findings also found that coping strategies mediate the effect of perfectionism on depression.

Perfectionism, Coping Strategies, and Academic Procrastination

However, to our knowledge, no study has been conducted to examine the relationships among perfectionism, coping strategies, and academic procrastination and the mechanism that links these three factors together. Athulya et al. (2016) did explore the relationship between procrastination, perfectionism, and coping strategies among 192 undergraduates and postgraduates in Bengaluru. They did find significant correlations between perfectionism and coping strategy, but they did not find significant correlations between procrastination and coping strategies. Besides, they did not further examine the mechanism that links the three variables. Burn et al. (2000) also find correlations between perfectionism with some coping strategies and procrastination, but they also did not further examine the mechanism that links the three variables.

Aims of the study

Research Framework

Accordingly, this study aims to use the transactional model of stress and coping theory and personality-coping-outcomes theory as a framework to examine whether perfectionism is associated with academic procrastination. Besides, we also use this framework to examine whether coping strategies mediate the effects of perfectionism on academic procrastination. We did not include other-oriented perfectionism in this study since other-oriented perfectionism is usually excluded from undergraduates' studies. It is suggested that other-oriented perfectionism is more relevant to children or adolescents (Bong et al., 2014; Hashemi & Latifian, 2014).

The conceptual framework, research questions, and hypotheses are as follows:

Research Questions:

1. Whether perfectionism is a significant predictor of academic procrastination?
2. Does coping strategy mediate the effects of perfectionism on academic procrastination?

Hypotheses:

H1a: self-oriented perfectionism is negatively associated with academic procrastination.

H1b: socially prescribed perfectionism is positively associated with academic procrastination.

H2a: problem-focused coping strategies are a statistical mediator for the effect of self-oriented perfectionism on academic procrastination.

H2b: problem-focused coping strategies are not a statistical mediator for the effect of socially prescribed perfectionism on academic procrastination.

H2c: dysfunctional coping strategy is not a statistical mediator for the effect of self-oriented perfectionism on academic procrastination.

H2d: dysfunctional coping strategy is a statistical mediator for the effect of socially prescribed on academic procrastination
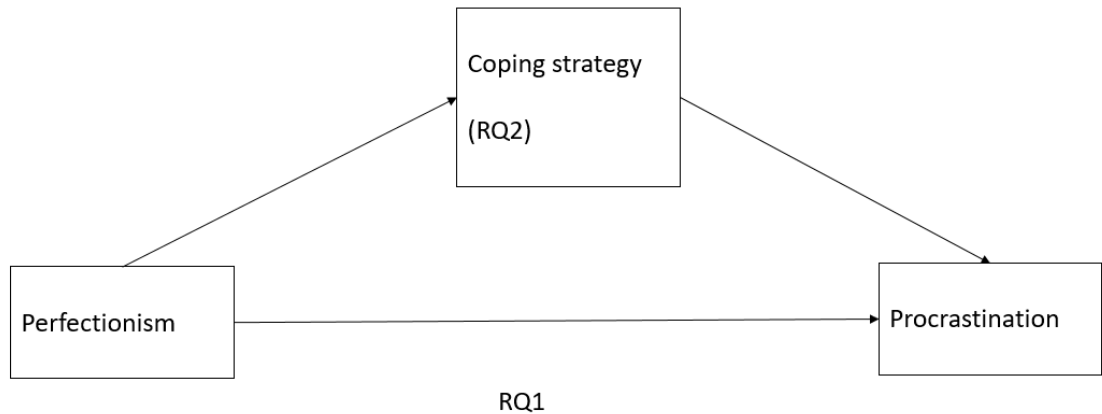
Figure 1: Conceptual Framework

Methodology

Participants

The age group for undergraduate students is 19-25. The participants recruited were 266 undergraduate students from a university. However, 37 incomplete responses were removed from this study. The valid number of participants in the study is 229. The sample size was larger than the 98 minimum sample size determined using the G*Power program calculation. The mean of ages is 22.19 (SD = 1.67). Among them, 57.2% were female, and 42.8% were male.

Measurements

The online survey was used to collect data. There are four sections in the Google online survey form: Demographic information, the short form of multidimensional perfectionism scale, Brief COPE, and short-form of academic procrastination scale.

Demographic information: Participants were asked to fill in their ages and gender in this section.

Short Form of Multidimensional Perfectionism Scale (MPS-H): Ten items from the short-form version of the multidimensional perfectionism scale (Hewitt et al., 2008) were used to assesses two types of perfectionism: self-oriented perfectionism and socially prescribed perfectionism. There are five items in each type of perfectionism. Participants were required to rate on a seven-point Likert scale (1= "disagree" and 7 = "agree"). A sample of self-oriented perfectionism is "One of my goals is to be perfect in everything I do", and a sample of socially prescribed perfectionism is "The better I do, the better I am expected to do". The scale's internal

consistency is found to be from .70 to .86 (Stoeber, 2018). A higher mean score indicates that participants are more likely to have the type of perfectionism.

Brief COPE: The Brief COPE was developed by Carver (1997). The scale consists of 28 items. Participants need to answer from a four-point Likert scale (1 = "I haven't been doing this at all", 4= "I've been doing this a lot"). The problem-focused subscale consists of six items that include active coping, instrumental support, and planning. A sample item in the problem-focused subscale is "I've been taking action to try to make the situation better". The dysfunctional coping strategies subscale consists of 12 items that included behavioral disengagement, denial, self-distraction, self-blame, substance use, and venting. A sample item in the dysfunctional coping subscale is "I've been using alcohol or other drugs to help me get through it". The problem-focused subscale's internal consistency is .84, and the dysfunctional coping subscale is .75 (Cooper et al., 2008). A higher mean score indicates that the participants are more frequently adopt a particular coping strategy.

Short Form of Academic Procrastination Scale (APS-S): There are five items on this scale. Participants were requested to give their agreement on each item by using a 5-point Likert scale (1 = "disagree". 5 = "agree"). A sample item is "I put off projects until the last minute". A higher mean score indicates a greater tendency to procrastinate on academic tasks. The internal consistency reliability for this scale is .87 (Yockey, 2016).

Research Procedures

After getting approval from the university's Scientific and Ethical Review Committee (U/SERC/236/2019) the purposive sampling method was used to recruit participants that only those who are undergraduates were invited. Purposive sampling is a non-probability sampling method where the sample selection is based on the sample's fit for the study with special inclusion and exclusion criteria (Daniel, 2011). The online survey form was used to collect data. The hyperlink of the online google survey form was shared on social media such as Whatsapp, Facebook, and Instagram to undergraduates in the university. Participants need to read the first page of the survey form that included the study's information, such as the research and confidentiality objective. Only those who click the box to indicate they have read the information and agree to continue the study are then proceeding to the three scales that aim to measure their perfectionism, coping strategies, and procrastination. All the responses of participants were then recorded for data analysis.

Data Processing and Analysis

The data was keyed in an excel file. Partial Least Square Structural Equation Modelling was used to analyze the data by using the SmartPLS program. The measurement model assessment was conducted at the first stage to examine the scales' reliability and validity and the structural model to examine the hypotheses.

Results

Measurement Model

Construct reliability and discriminate validity: As shown in table 1, since the composite reliabilities are equal to or above the recommended values of .7 (Hair Jr et al., 2016), the findings suggested that all measurements' latent constructs are acceptable. The results also show that the measurements' discriminant validity is acceptable, as the Heterotrait-Monotrait ratios of all scales are below the critical values of .85 (Henseler et al., 2015).

Table 1: Construct Reliabilities and Discriminate Validities of All Measurements

	Composite Reliability	1	2	3	4	5
1. **Dysfunctional**	.81	.53				
2. **Problem-focused**	.81	.15	.66			
3. **Academic procrastination**	.91	.30	-.19	.82		
4. **Self-oriented perfectionism**	.83	-.01	.35	-.13	.74	
5. **Socially prescribed perfectionism**	.74	.30	.09	-.03	.30	.66

Coefficient of Determination, Effect Size, and Collinearity Statistics of Measurements: The analyses' results were shown in Table 2. The variance inflation factor of all scales was also below 5, indicating no collinearity issue was found (Hadi et al., 2016). Besides, the results of r^2 reveal a medium effect size of the predictors on academic procrastination, problem-focused, and dysfunctional coping strategies (Cohen, 1992). However, the results of f^2 indicate that each predictor has a small effect size on dependent variables (Hair Jr et al., 2016).

Table 2: Coefficient of Determination (r^2), Effect Size (f^2) and Collinearity Statistics (VIF) of Measurements

Dependent variables	Predictors	r^2	f^2	VIF
Problem-focused		.12		
	Self-oriented perfectionism		.13	1.09
	Socially prescribed perfectionism		.01	1.09
Dysfunctional		.11		
	Self-oriented perfectionism		.01	1.09
	Socially prescribed perfectionism		.12	1.09
Procrastination		.20		
	Problem-focused		.06	1.01
	Dysfunctional		.14	1.16
	Self-oriented perfectionism		.01	1.28
	Socially prescribed perfectionism		.02	1.23

Structural Model

As shown in Table 3, we control gender as some studies have reported that gender is associated with procrastination (Khan et al., 2014; Xie et al., 2018). The results showed that no significant association was found between perfectionism and procrastination, ps > .05. Self-oriented perfectionism is positively associated with problem-focused coping strategy, p < .001, and problem-focused coping strategy is negatively associated with procrastination, p = .001. Socially prescribed perfectionism is positively associated with dysfunctional coping strategy, p < .001, and dysfunctional coping strategy is positively associated with procrastination, p < .001.

Table 3: Results of the Partial Least Structural Equation Modelling

	Beta	Std Error	T value	P Values
Perfectionism → Procrastination				
Self-oriented perfectionism → Procrastination	-.02	.08	.22	.827
Socially prescribed perfectionism → Procrastination	-.12	.08	1.44	.150
Perfectionism → Coping				
Self-oriented perfectionism → Problem-focused	.35	.06	6.02	**< .001**
Self-oriented perfectionism → Dysfunctional	-.11	.11	1.03	.305
Socially prescribed perfectionism → Problem-focused	-.01	.08	.16	.872
Socially prescribed perfectionism → Dysfunctional	.34	.08	4.27	**< .001**
Coping → Procrastination				
Problem-focused → Procrastination	-.24	.07	3.28	**.001**
Dysfunctional → Procrastination	.36	.08	4.63	**< .001**
Gender	-.21	.06	3.52	**< .001**

Mediating Effect

As shown in Table 4, the specific indirect effect indicated that problem-focused coping strategy is the statistical mediator for the effect of self-oriented perfectionism on procrastination, $p = .007$. Following the decision tree from Zhao et al. (2010), the results indicate an indirect-only mediation as the direct effect of self-oriented perfectionism on procrastination is not significant, $p = .827$. The results also showed that dysfunctional coping strategy is an indirect-only mediation as the direct effect of socially prescribed perfectionism on procrastination is not significant, $p = .150$.

Table 4: Results of Mediating Effects

	Beta	Std Error	T value	P Values*
Mediating Effect				
Self-oriented perfectionism → Problem-focused →Procrastination	-.08	.03	2.70	**.007**
Socially prescribed perfectionism → Problem-focused → Procrastination	.01	.02	.16	.872
Self-oriented perfectionism → Dysfunctional → Procrastination	-.04	.04	1.06	.288
Socially prescribed perfectionism → Dysfunctional → Procrastination	.12	.04	3.15	**.002**

Discussion

Academic procrastination is a common problem experienced by undergraduates. Studies revealed that academic procrastination negatively affects academic performance and psychological health and increases their substance abuse. Therefore, it is necessary to determine the factors associated with academic procrastination. Based on the findings, strategies can be implemented to assist undergraduates in reducing their academic procrastination. This study adopts the transactional model of stress and coping theory and personality-coping-outcome theory as a framework to examine whether perfectionism is associated with academic procrastination. Besides, we also use this framework to examine whether coping strategies mediate the effects of perfectionism on academic procrastination.

For the first research question, our results showed that both self-oriented perfectionism and socially prescribed perfectionism are not associated with academic procrastination. These results are not consistent with the findings of Hashemi and Latifian (2014) and Bong et al. (2014), who reported that socially prescribed perfectionism is positively associated with academic procrastination. Nonetheless, Xie et al. (2018) conducted a meta-analysis. They reported that the associations between perfectionism and procrastination are inconsistent, and they suggested examining other factors that mediate or moderate the relationships.

Accordingly, in the second research question, we adopted the personality-coping-outcome theory and the transactional model of stress and coping theory as a research framework to examine the mediating effects of coping strategy on perfectionism's effects on academic procrastination. As expected, the results showed significant indirect effects that indicated significant mediating effects of coping strategy. Based on the mediating results, since self-oriented perfectionism is more likely to adopt the problem-focus coping strategy that consists of planning to tackle the problems, they are less likely to have academic procrastination. In contrast, since socially prescribed perfectionism is more likely to adopt the dysfunctional coping strategy that consists of self-blaming and denial, they are more likely to have academic procrastination.

Implications and recommendation

In terms of theoretical contribution, this study's findings indicate that the personality-coping-outcome theory can be applied to understand the mechanism that affects academic procrastination among undergraduates. Therefore, this framework will help plan strategies to reduce academic procrastination among undergraduates with socially prescribed perfectionism. In terms of practical contribution, the findings suggested that using appropriate coping strategies would reduce their academic procrastination. Workshops to bring awareness of different types of perfectionism and coping strategies and their relationships to academic procrastination may help undergraduates adapt better in their academic study.

Limitation

However, the interpretation of the findings should be cautious. As the sample is recruited from a university in Malaysia, the results may not generalize to undergraduates in other institutions. Future studies may need to recruit more samples from diverse settings, demographics, and academic backgrounds to examine the robustness of the findings. Besides, as the data is collected using a cross-sectional design that only a statistical mediator can be proposed, future studies may need to use a longitudinal study to examine the cause-effect explanation and the mediating effect.

Conclusion

In conclusion, the results are consistent with the prediction of the personality-coping-outcome theory. Perfectionism indirectly affects academic procrastination through the coping strategy they used. In other words, it is not the perfectionism that makes them procrastinate in their study, but the coping methods they adopted. If a proper coping strategy is adopted, socially prescribed perfectionism is also can reduce their academic procrastination.

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RASCH MODEL FOR MEASURING THE VALIDITY AND RELIABILITY OF THE PEERS ONLINE LEARNING INTERACTION QUESTIONNAIRE (POLI-Q) FOR HIGHER EDUCATION COURSE

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ABSTRACT

Developing a valid and reliable instrument to measure peer online learning interaction for knowledge construction is crucial for instructors, instructional designers, and researchers. The valid and reliable instrument in understanding student's perception of the course online peer interaction is for learning purposes. Thus, this study aims to test the validity and the reliability of the developed Peer Online Learning Interaction Questionnaire (POLI-Q) for higher education courses. POLI-Q consists of seven constructs which are question, answer, comment, discussion, information sharing, scaffolding, and reflection with five Likert Scales. The validity and reliability were tested using Rasch Model analysis. The findings of the Rasch Model analysis confirmed that POLI-Q is valid and reliable to measure peer online interaction that is related to learning. However, the instrument validity of the response spread across scales analysis resulted in excluding the scale number 1 (Strongly Disagree) which was not represented in the results while the other 4 scales were supported. Hence, it is recommended that the POLI-Q can be used by the instructors, instructional designers, and researchers to measure peer online learning interaction for higher education courses.

Keywords: Peer online interaction, Online learning, Knowledge construction, Higher Education, Developing POLI-Q, Rasch Model analysis

Introduction

Knowledge construction is the process of acquiring knowledge and making new meanings. Knowledge is constructed by learning participants' interaction with each other in the learning environment (Säljö, 2004). Therefore, interaction is essential for knowledge construction through which the learners make new meaning of what they learn (Damşa & Ludvigsen, 2016). Learning interaction is that of a two-way topic focusing on communication to promote learning and deeper understanding. It is the way where learners seek clarification through asking questions, explaining, and clearing points, and reflecting the level of understanding. Therefore, deeper learning is encouraging all learners to take the opportunity to collaborate and discuss with others, and to understand ideas from different sources and points of view. The interaction is an educational activity that contributes to the success of the online course and enhances students' motivation and learning process (Ossiannilsson, 2012). Moore (1989) identified three types of interaction that take place in online interaction and distance learning. The three types of interaction are learner-content interaction, learner instructor interaction, and learner-learner interaction (Peer Interaction). However, this study focuses only on peer interaction. Nonetheless, Moore (1989) considered peer interaction as the valuable and essential resource for learning. Consequently, the way that peers learning interaction takes place in online learning environment has actually been explored in previous studies such as Zhu (1996), and Pena-Shaff and Nicholls (2004). Both studies analyzed the actual process of students' knowledge construction and construction of meaning through online interaction and discussion (Zhu, 1996 and Pena-Shaff & Nicholls, 2004).

However, the researchers' focus was on analyzing the written form of students' interaction while students' attitude towards content-based online discussion is still not widely studied. The importance of investigating students' attitudes about the process of knowledge construction through content-based discussion is to help researchers draw a valid and accurate conclusion through triangulating their findings. Therefore, the use of a survey approach will help researchers acquire information about participants' behavior, attitude, belief, and reason for action in the investigated topic (Bulmer, 2004). Moreover, a survey also helps researchers extract information about the attitude that is considerably difficult to measure through observational techniques (McIntyre, 1999). Nonetheless, the intensive review of the literature showed that there is a lack of survey instruments to measure students' perceived content-based discussion for knowledge construction through online peer interaction. In this respect, this study is an effort to develop the Peer Online Learning Interaction Questionnaire (POLI-Q) which will be a significant contribution to provide a valid and reliable survey instrument for measuring peer online interaction dimension. The instrument is hoped to help the researchers to collect information that measures the attitude towards peer interaction for knowledge construction.

Therefore, this study focuses on measuring POLI-Q instrument validity and reliability. Testing the instrument validity refers to the degree to which an instrument accurately measures what it

intends to measure. However, instrument reliability refers to the degree to which an instrument yields consistent results. Therefore, POLI-Q validity and reliability will be measured using the Rasch model underscoring the POLI-Q quality through Point Measure Correlation. Moreover, POLI-Q validity is analyzed through the response spread across scales while the reliability is analyzed by person separation reliability value.

Literature Review

Online Learning

In recent years, a wide variety of online tools that support online learning are available for users. Therefore, online learning is getting more popular especially among learners (Phirangee, 2016). Online learning provides the facilities for online discussion forums where learners share a resource, discuss ideas, have access to others' ideas, and reflect on their ideas (Hewitt, 2005). The convenience of online learning has attracted the concern and attention of students and universities, as access to online courses can be done at any time from anywhere, allowing learners to study at their convenience (Bolliger & Inan, 2012). Moreover, the facilitative nature of the online learning environment helps students engage in learning and allows for repeated exposure to learning activities (Shih et al., 2013). Furthermore, interaction in online learning increases students-centered learning promoting more participation in the interactive discussion forum (Akhter & Mahmood, 2018). Therefore, there is a trend by many colleges and universities to transform the traditional classes into blended or fully online courses to allow for easier access to their courses and meet the needs of a diverse student population (Keengwe & Kidd, 2010). Additionally, the trend towards online learning is stressed by academic leaders who plan to move to offer more online courses to compensate for the decrease in traditional course offering and to reduce the educational cost yet maintaining the effectiveness of learning (Allen, Seaman, Straut, and Poulin, 2016 and Wordu & Chinda, 2019).

Online Interaction and Learning

It is argued that " interaction is education at its most fundamental form" (Shaleand Garrison, 1990). However, with the advent of internet technology, online interaction is a way of interaction that takes place in an online environment. Online interaction allows people to communicate and interact regardless of they are geographically far from each other. In education, online interaction for learning is an opportunity given to learners to communicate beyond the classroom time that allows them to gain knowledge and improve skills in a different academic setting (Espitia & Cruz, 2013) and to reflect on their thinking and experience through the discourse with other students and instructor (Balaji & Chakrabarti, 2010). Therefore, online interaction has been recognized as a vital element of a successful online and blended learning process (Moore, 1989; Su, Magjuka, and Lee, 2005; Hurst, Wallace, and Nixon, 2013). The frequency and the content of online interaction are found to be the indicators of students' success and persistence in the course (Shelton et al., 2017). Online interaction was categorized into three types and labeled as learner-content interaction, learner-instructor interaction, and learner-learner interaction (Moore,

1989). Those types of online interaction can be accomplished either asynchronous or synchronous interaction modes. In this study, the focus is on learner-learner interaction (peer interaction) as it reflects the learners' interactivity to promote learning.

Peer Interaction

Peer or learner-learner interaction is considered as one of three essential types of interaction that are necessary for creating effective instruction (Moore, 1989). Peer interaction is defined as communication between one learner and other learners, alone or in group settings, with or without the presence of an instructor (Moore & Kearsley, 2011). It can be between one-to-one students or among a group of students sharing the same course and guided by their instructor. Students are required to master peer interaction skills as it is critical for achieving collaborative and cooperative tasks where learning can occur as a result of peer interaction alone (Anderson, 2003). Hence, peer interaction was seen a long time ago as the key to the learning process due to the collaboration that is resulted from the interaction (Palloff & Pratt, 1999). Peer interaction for learning is mainly a type of collaboration where students collaborate to accomplish the shared goal through actively exchanging knowledge and ideas (Sidek et al., 2018). Therefore, students should be given the opportunity for peer interaction learning activities such as discussion and peer assessment to encourage more connection with peers and the instructor and content (Sidek et al., 2018). Hence, online interaction was found to have a positive impact on students' success and academic performance through more frequent interaction, interaction content, and better social presence (Shelton et al., 2017; Al-dheleai et al., 2020; Al-dheleai & Tasir, 2020 and Al-dheleai et al., 2020).

Researchers considered asking questions, providing answers as important components of knowledge construction and peer online discussion (Tawfik et al., 2020; Liu et al., 2013). Moreover, reflection and questioning are effective to engage online learners (Liu, 2019 & Furnari, 2014). Hancock and Rowland (2017) reported that students feel comfortable to share information and to respond to a discussion, to ask questions, to challenge, and argue other participants' statements. In an online discussion forum, active learning is promoted through involving peers in a collaborative learning and knowledge sharing process, reflections, and information exchange (Nor et al., 2010). Additionally, peer's participation in online forum discussion showed cases of peers agreement and disagreement with each other statements and arguments; explanation and negotiation of meaning, scaffolding, knowledge sharing, reflections on learning and understanding as a result of participation in online discussion (Nor et al., 2010). Peers scaffolding developed peer's assistance in online learning discussion (Hsieh, 2017). Therefore, the reported studies show the importance of Zhu model peer online interaction component for this research study.

Underpinning research model & theory

Peer interaction (Zhu, 1996)

Various studies had been carried out to develop content analysis instruments to analyze student-student interaction**.** For instance, Zhu (1996) developed the measurement tool to analyze the types of students' participation and their roles in the electronic discussion. According to Zhu (1996), students' roles in the electronic discussion were categorized to reflect the meaning of the messages such as questions, answers, information sharing, discussion, comment, reflection, and scaffolding. Furthermore, Fahy et al. (2000) made some changes to Zhu's analytic tool to come up with a new tool called Transcript Analysis Tool (TAT). TAT classified learners' online interaction into five categories, which are vertical questions, horizontal questions, statements, reflections, and scaffolding. Lastly, Pena-Shaff and Nicholls (2004) findings, students' knowledge construction through their participation in the discussion through posting statements that express clarification, interpretation, conflict, assertion, judgment, and reflection almost related to the process of knowledge construction.

Table 1: Peer Interaction Constructs Definition Based on Zhu 1996

Construct	Definition
Question	Seeking answers from more capable class members by posting information-seeking questions for more understanding
Answer	Providing specific information to answer information seekers questions
Reflection	Self-evaluation through showing the level of improvement in own understanding after going through reading/learning.
Comments	Comment with agreement/disagreement on reading tasks or on other members ideas and shared information
Discussion	Sharing personal understanding of the discussion topic
Information Sharing	Elaborating on topics/concepts under discussion through sharing more information about the topic/concept.
Scaffolding	Providing guidance and suggestions

It appears that Zhu's interaction model was the source of other lately developed models. Therefore, this study opted to develop a survey instrument that measures the peer interaction component of Zhu's model. The purpose of the developed instrument is to provide a valid survey to be used as a data collection instrument for future research when measuring the perception towards peer online interaction is concerned. POLI-Q reflects students' engagement in collaborative and reflective activities to construct knowledge through social interaction. Through social interaction, the chance is given to those who seek answers from more capable class members by posting information-seeking questions for more understanding (Question). Moreover, those who like to provide answers and exchange ideas are allowed to elaborate during the discussion through reflective thought (Reflection), comments on reading tasks or on other members ideas, and shared information (Comment), providing specific information to answer information seekers questions (Answer), sharing personal understanding during discussion

(Discussion), elaborating on topics under discussion through information sharing (Information Sharing) and providing guidance and suggestions (Scaffolding) (Zhu, 1996).

The survey instrument will be an additional validation of the existing peer online interaction content analysis instruments based on Zhu's peer interaction component of the meaning negotiation for knowledge construction model. The survey can be used as an instrument to measure the perception towards peer online interaction in higher education courses.

Item response theory and Rasch model

Item response theory (IRT) accurately improves test scoring and test items development (An & Yung, 2014). Therefore, IRT models are widely used in large-scale assessment programs (Carlson & Davier, 2013). One of the most used IRT models in IRT applications is the Rasch model (RM) (An & Yung, 2014). RM is generally the same as the measurement of a parameter in IRT or which is also shown as Latin Trait Theory (LTT) (Dawis, 1987; Bond & Fox, 2007). RM is a mathematical formula that specifies the form of the relationship between items that operationalize one construct. This model is not primarily concerned about total scores and not all items are treated as equal contributions to the total score. That is, difficult items are weighted more highly than easier items when estimating the level of knowledge ability. The RM assumption is that respondents with high ability have the probability to answer more questions correctly than respondents with a lower ability (Bond & Fox, 2007). The RM model is used to analyze the data from instruments to measure the variables that cannot be measured directly, such as the characteristics of ability, attitude, and personality. This measurement model is used primarily in areas related to psychometric theory and techniques of measurement in psychology. This model shows the probability of people's ability to measure item difficulty (Wright & Masters, 1982). RM can convert the qualitative data to linear measurement. Moreover, it converts raw data into ration scale on a common interval scale (Linacre, 2002).

Objectives

The objectives of this study are:

1. To analyze POLI-Q instrument quality through correlation, fit, and dimensionality analysis.
2. To analyze POLI-Q instrument validity of the response spread across scales.
3. To analyze POLI-Q instrument person separation reliability value.

Methodology

For the instrument to be valid and reliable, empirical evidence of its validity and reliability is required to be used to measure the construct that is intended to measure. Fowler (1995) asserted that "a good question produces answers that are reliable and valid measures of something we

want to describe". Therefore, this study was intended to test POLI-Q validity and reliability through applying the Rasch Analysis approach using Winsteps software.

Peer Online Learning Interaction (POLI-Q) was developed by the researchers to reflect Zhu's (1996)'s peer interaction knowledge construction categories in online learning to be used in quantitative and survey research that measure student's perception and attitude of peer online learning interaction. POLI-Q contains seven constructs which are question, answer, comment, discussion, information sharing, scaffolding, and reflection. Refer to the Appendix for complete POLI-Q questionnaire constructs and items.

Research Design

The Master of education students were exposed to one semester of online interaction via the university learning management system discussion forums and the use of social networking tools. Several discussion topics were posted by the instructors for discussion by students. The student-centered learning and the student's participation in the discussion were given the emphasis and encouraged by the instructors to give students more control of their learning. At the end of the semester, the students were asked to voluntarily respond to the POLI-Q questionnaire.

Sample and Data Collection

This study data was collected from 49 postgraduate students from the school of education in one of the Malaysian public universities. The respondents were 35 female and 14 male students where 45 respondents' ages ranged between 25 and 35 years old while only 4 respondents reported their age more than 35 years old. Moreover, 26 respondents were full-time students while the other 24 were part-time students. This study sample was purposively selected from postgraduate students who attended ICT in an education course and were exposed to online discussions as part of the learning process and activities before responding to this survey.

The study sample of 49 respondents is considered adequate for validity and reliability test using the Rasch model. Previous researchers argued that Rasch analysis can be conducted and be useful even with a small sample size (Linacre, 1994). Linacre (1994) argued that one of the fundamental Rasch analysis books was based on analyzing 18 items with a sample of 35 respondents (Linacre, 1994); Linacre, (1994) mentioned "Best Test Design" book written by (Wright & Stone, 1979).

Research Ethics

In respect to the research ethics standards, the respondents were given the option either to participate in the study or to withdraw at any time. Moreover, the participants were assured that the data will be used only for the research purpose and the participants are anonymous with no personal information that reveal their identity was required.

Data Analysis

Rasch Analysis approach is used to evaluate the strength and the quality of the instrument (Boone, 2016). Interestingly, the Rasch Analysis approach evaluates instrument quality through item-fit (Boone et al., 2013) and the person-fit statistics where researchers can omit the weak items or the respondents who provide unusual answering patterns (Dawis, 1987 and Boone, 2016). Therefore, the POLI-Q instrument was developed using five Likert scales. The validity and reliability test were tested via the Rasch Model analysis approach using Winsteps software. The data analysis was done using item correlation and fit, dimensionality; response spread validity across scales, and the person separation reliability. The findings of the validity and reliability of POLI-Q instrument analysis are reported in the following sections.

Findings

POLI-Q Correlation and fit findings

POLI-Q validity was measured based on Point Measure Correlation (PTMEA Corr.). PTMEA Corr. is one of the early detections of construct validity (Bond and Fox, 2007). The good correlation values of the items should be ≥ .20. For the analysis of these constructs items, the result expected mean square (MNSQ) infit analysis value should be $0.4 < x < 1.5$, and the PTMEA value should be $+0.2 < x < 1$ (Bond & Fox, 2007).

As shown in Table 1, all POLI-Q items were correlated positively with a correlation value of > .20. These findings confirm that all items are at a very good fit which indicates that their suitability to be used for statistical analysis. Items' suitability under schedule also shows the information for mean square (MNSQ) to make it easier for outlier detection or misfit. Table 1 also shows the item fit analysis of POLI-Q and suggests that all items are positive and fit. Therefore, the data showed an acceptable correlation for this POLI-Q.

As shown in Table 1, the lowest correlation values were 0.56, 0.61, and 0. 62 for items SSI.IS2, SSI.R1, SSI.C2 respectively, and the highest values of item correlation were 0.78, 0.79, 0.80 for items SSI.D1, SSI.S1, SSI.A3, SSI.S3, SSI.D2 and SSI.A1 respectively. Therefore, correlation analysis indicated that all POLI-Q items were correlated positively with a correlation value of > .20 which indicating an acceptable correlation for this POLI-Q as early evidence of construct validity.

Items' suitability under schedule also shows the information for mean square (MNSQ) to make it easier for outlier detection or misfit. The item fit analysis was determined by MNSQ to determine which items could be considered as the most difficult items. Items SSI.C2, SSI.C4, and SSI. IS2 with outfit values (1.56, 1.54, 1.46) respectively were the most difficult items. However, considering the acceptable expected mean square (MNSQ) infit analysis value as $0.4 < x < 1.5$, the item fit analysis of POLI-Q and suggest that all items are positive and fit including the three items SSI.C2, SSI.C4, and SSI.IS2. The findings of both analyses of correlation and

item fit to confirm that all items are at a very good fit which indicates that their suitability to be used for statistical analysis.

Table 1: Item Correlation and Fit Analysis of POLI-Q

MEASURE	MODEL S.E.	INFIT		OUTFIT		PT-MEASURE		EXACT MATCH		ITEM
		MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	OBS%	EXP%	
-1.11	0.27	1.35	1.1	1.56	1.7	A .62	.68	68.1	73.0	SSLC2
-0.58	0.31	1.19	.8	1.54	1.8	B .64	.71	70.2	73.1	SSLC4
-0.59	0.33	1.33	1.6	1.46	1.2	C .56	.66	66.0	72.4	SSLIS2
0.01	0.35	1.21	1.0	1.30	1.0	D .61	.69	76.6	77.3	SSLR1
-0.71	0.3	1.25	1.1	1.29	1.0	E .65	.71	68.1	72.1	SSLQ2
-0.61	0.28	1.12	.6	1.28	1.0	F .65	.71	57.4	68.6	SSLQ1
-0.52	0.33	1.07	.4	1.23	.7	G .63	.67	68.1	72.7	SSLIS3
0.91	0.33	1.16	.8	1.17	.7	H .68	.73	70.2	73.8	SSLR3
0.73	0.32	1.17	.8	1.16	.7	I .68	.72	70.2	72.8	SSLR2
-0.36	0.3	1.04	.2	1.00	.1	L .73	.74	66.0	71.9	SSLD4
0.18	0.29	1.02	.2	.99	.1	M .73	.73	72.3	71.4	SSLQ3
-0.46	0.31	.99	.0	.94	-.1	N .73	.72	72.3	72.7	SSLS4
0.07	0.29	.98	.0	.99	.0	n .76	.75	74.5	69.6	SSLA4
1.21	0.36	.88	-.5	.98	.0	m .72	.71	85.1	77.3	SSLS2
0.84	0.36	.98	.0	.91	-.2	1 .72	.71	74.5	77.0	SSLC3
-0.56	0.35	.97	.0	.87	-.3	k .69	.67	72.3	76.0	SSLIS1
-0.63	0.32	.91	-.3	.76	-.8	j .75	.70	78.7	74.6	SSLD3
-0.65	0.31	.87	-.5	.82	-.6	i .74	.71	80.9	72.6	SSLA2
-0.65	0.39	.84	-.6	.83	-.4	h .72	.67	85.1	81.4	SSLC1
1.14	0.32	.81	-.9	.80	-.8	g .79	.74	74.5	73.0	SSLA3
1.44	0.32	.79	-1.0	.79	-.9	f .79	.74	85.1	73.3	SSLS3
-0.13	0.34	.78	-1.1	.68	-1.0	e .75	.68	78.7	74.0	SSLIS4
0.47	0.35	.75	-1.2	.65	-1.3	d .78	.70	85.1	77.2	SSLD1
0.74	0.35	.74	-1.3	.59	-1.7	c .80	.71	80.9	76.2	SSLD2
0.79	0.37	.71	-1.3	.60	-1.3	b .78	.69	87.2	79.3	SSLS1
-0.71	0.3	.69	-1.4	.59	-1.7	a .80	.71	87.2	72.1	SSLA1

POLI-Q dimensionality findings

POLI-Q instrument direction that measured using Rasch analysis is found to be satisfactory. In RM analysis, a satisfactory dimensionality, which is determined by raw variance explained by measures should be more than 40%, and unexplained variance in 1st contrast which should be ≤ 15. Table 2 shows the raw variance explained by measures was 45.5%, which was more than 40%, and the unexplained variance in 1st contrast was 6.6%, which is less than 15 as an expected value determined by unexplained variance in 1st contrast.

Table 2: Dimensionality Analysis

	-- Empirical --			Modelled
Total raw variance in observations	= 61.5	100.0%		100.0%
Raw variance explained by measures	= 33.5	54.5%		53.9%
Raw variance explained by persons	= 23.4	38.1%		37.7%
Raw Variance explained by items	= 10.1	16.4%		16.2%
Raw unexplained variance (total)	= 28.0	45.5%	100.0%	46.1%
Unexplained variance in 1st contrast	= 4.1	6.6%	14.6%	
Unexplained variance in 2nd contrast	= 3.2	5.2%	11.5%	
Unexplained variance in 3rd contrast	= 3.0	4.8%	10.5%	
Unexplained variance in 4th contrast	= 2.6	4.3%	9.4%	
Unexplained variance in 5th contrast	= 2.2	3.6%	7.9%	

POLI-Q response spread validity across scales findings

Rasch analysis determines the validity of the response probabilities being spread fairly across scales. Both table 3 and figure 1 show the summary of the category structure on a scale gradation and size structure of the intersection. The column arrangement observation (observed count) shows the respondents' answers given to the ranking scale.

As shown in Table 3, the most frequent answer is the scale of respondents ranking 4 which is 24 (51 %). The next grading scale that respondents selected was scale 5 of 17 (36%). The scale 3 had 4 (9%) respondents. While the least grading scale of least was scale 2 with 2 (4%) respondents. However, Rasch analysis deleted the scale number 1 which was not presented in the results of Calibration scaling analysis. Generally, Table 3 shows that the responses patterns obtained started from -1.82 logit and moved up monotonously towards +2.76 logit signifying that the patterns of respondents' answers are normal.

Table 3: Calibration Scaling Analysis

CATEGORY	OBSERVED			OBSVD SAMPLE		INFIT	OUTFIT	STRUCTURE	CATEGORY
LABEL	SCORE	COUNT%		AVRGE	EXPECT	MNSQ	MNSQ	CALIBRATN	MEASURE
2	2	2	4	-1.82	-1.90	1.09	1.01	NONE	(-3.67)
3	3	4	9	-1.92*	-1.03	.14	.06	-1.62	-2.09
4	4	24	51	1.35	.84	1.19	1.66	-1.32	.28
5	5	17	36	2.76	3.28	1.66	1.47	2.94	(3.44)

```
        -+---------+---------+---------+---------+---------+---------+--------+-
   1.0 +                                                                    55+
       |22222                                                        555555   |
       |    22                                                     555        |
       |      22                                                 55           |
    .8 +        2                            444444            55             +
       |         22                        44      44       5                 |
       |           2                      4          4     5                  |
       |            2                    4            4   5                    |
    .6 +             2                  4              44 5                    +
       |              2                4                4 5                    |
    .5 +               2              4                  *                     +
       |               2              4                 5 4                    |
    .4 +                2   4                          5    4                  +
       |               33**33                         5      4                |
       |             33   42   33                     5       4               |
       |            3   4  2    33         55          4                      |
    .2 +          33    4   2     3       5             44                    +
       |        33      44    2     33  55               44                   |
       |      333      4        22    ***                  444                |
       |33333    4444          ***5   33333                   444444          |
    .0 +*********555555555555555  222222222***********************************+
        -+---------+---------+---------+---------+---------+---------+--------+-
        -5        -3        -1         1         3         5         7
```
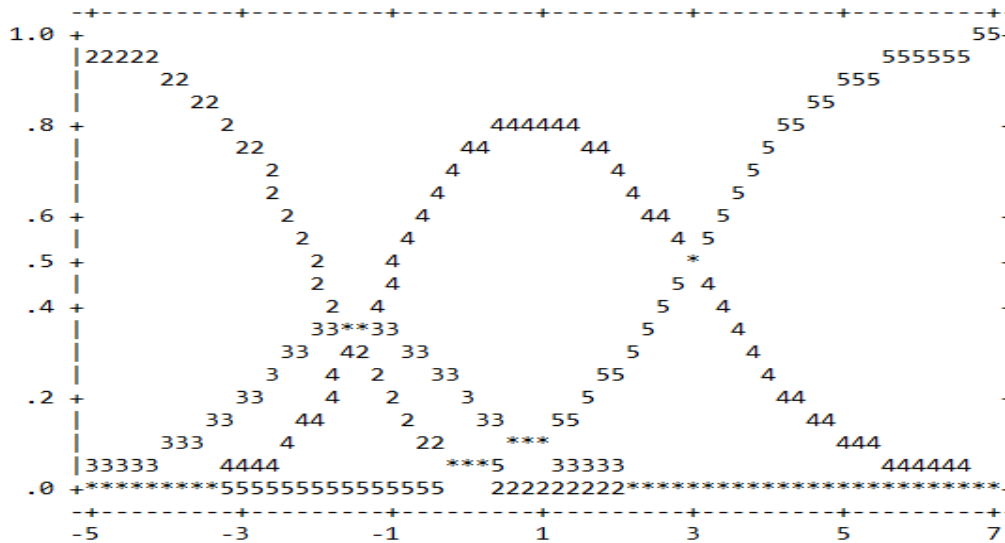
Figure 1: Category Structure of POLI-Q

POLI-Q person separation reliability findings

For accepting reliability in Rasch analysis, the reliability value should exceed 0.50 (Linacre, 2007; Bond and Fox, 2007), and acceptable separation should be more than 2 (Fisher, 2007). Consequently, RM analysis is to measure POLI-Q reliability. Therefore, person separation and reliability along with item separation and reliability were conducted and the findings are shown in Tables 4 and 5. The person separation value was 4.62 with high person reliability with a value of .95. Similarly, item reliability was high with a value of 0.80 whereas item separation was 1.99, Hence, the item and person reliability findings tell that the number of respondents 49 with the number of items 28 are reliable to measure POLI-Q instrument where both showed strong reliability level.

Table 3: Person Separation and Reliability

	Raw Score	Count	Measure	Infit		Outfit	
				IMSQ	ZSTD	OMSQ	ZSTS
Mean	117.1	28	1.70	.99	-.4	1.00	-.4
S.D	13.2	0.0	2.43	.74	2.1	.75	2.1
Real RMSE	.49						
ADJ.SD	2.07						
Separation	4.26						
Person reliability	.95						

Table 4: Item Separation and Reliability

	Raw Score	Count	Measure	Infit		Outfit	
				IMSQ	ZSTD	OMSQ	ZSTS
Mean	205.0	49	.00	.99	.0	1.00	.0
S.D	5.8	0.0	.75	.19	.8	.28	.9
Real RMSE	.34						
ADJ.SD	.67						
Separation	1.99						
Item reliability	.80						

Discussion

The purpose of this study was to develop a Peer Online Learning Interaction Questionnaire POLI-Q. The content and the structure of the survey questionnaire were based on the previous studies related to learning interaction among students in an online environment. Hence, assessing the psychometric properties is vital for any instrument to be used as a reliable and valid measurement tool (Mofreh et al., 2020). Thus, the quality of the developed instrument was tested using several analyses of RM analysis including Point Measure Correlation, fit, and dimensionality analysis.

Point Measure Correlation (PTMEA) was conducted to achieve the first research objective by analyzing the POLI-Q instrument validity. Consequently, the findings indicated that POLI-Q instrument items and constructs are valid and reliable. Therefore, POLI-Q constructs good validity was confirmed since there were no negative PTMEA values. The PTMEA values of items were more than 0.20 and had good dimensionality as evidence of good construct validity.

The second objective of this study was to check how the responses spread across the scales to determine the used scale's validity. Therefore, POLI-Q rating scales showed that only 4 scales were valid where RM analysis deleted the scale number 1 which was not presented in the results of Calibration scaling analysis.

The RM analysis measured reliability with person separation reliability of POLI-Q was conducted to achieve the third research objective. The statistical findings showed the ability of the items to separate persons with different levels of the concept measured. The POLI-Q items reliability items showed that each item could be described by the level of its difficulty. Thus, the findings of this study indicated that the developed instrument can be used as a measurable predicator for POLI-Q.

The findings of this study were supported by many studies which used Rasch Model analysis for testing the construct validity (Wolfe et al., 2004; Fox & Jones, 2009; Forkmann et al., 2009; Aziz et al., 2008; Mofreh et al., 2014; Mofreh et al, 2018).

In general, the POLI-Q obvious validity and reliability show that Zhu's (1996) peer interaction is still perceived as valid for peer online discussion and knowledge construction. Moreover, Zhu's (1996) peer online interaction appeared to be accepted by learners in the current time and can be achieved using the new online interaction tools such as social media tools. Posting discussion messages with different types of meanings reflected in Zhu (1996) peer interaction was perceived as essential in the online learning process as learners can achieve the shared goals through student-centered discussion and collaboration with other participants to complete learning tasks (Anderson, 2003; Palloff & Pratt, 1999; Sidek et al., 2018 and Iv et al., 2020). Peer online interaction can take place when students post statements that express questions, answer, information sharing, discussion, comment, reflection, and scaffolding during the process of knowledge construction. Therefore, the developed POLI-Q instrument can be used as a measurement instrument to measure learners' attitudes towards peer online interaction specifically when the interaction is for meaning and knowledge construction. Furthermore, the POLI-Q instrument can be employed to measure peer online interaction using computer supported interaction besides newly appearing online interaction mediums including social media tools (Al-dheleai & Tasir, 2017).

Implications

Developing a valid and reliable instrument to measure peer online learning interaction for knowledge construction is crucial for instructors, instructional designers, and researchers, as it enables them to understand peer interaction's impact on learning. Therefore, this study was an effort to develop a reliable and valid instrument to measure peer online learning interaction POLI-Q using Rasch Model analysis. Accordingly, POLI-Q can be used by the instructors, instructional designers, and researchers to measure peer (student-student) online learning interaction and knowledge construction. University instructors and researchers can use POLI-Q to understand how learners perceive the meaning construction patterns that take place during

peer online learning interaction as part of the process of their learning and knowledge construction. Instructors and instructional designers must design online learning activities and discussion forums based on learners' feedback to meet learners learning behavior and needs. Developing learning activities and discussion patterns based on learners' preferred learning behavior and need will highly contribute to the better quality of students learning and performance.

POLI-Q can be used by higher education lecturers and researchers to measure learners' course online interaction. POLI-Q provides a reliable finding on attitude towards peer online interaction which allows the universities lecturers to facilitate and improve a collaborative learning process through peer online interaction for better learning and understanding. The data collected using the POLI-Q survey can guide higher education instructional designers to design collaborative online learning interaction topics and activities that trigger peer discussion and meaning negotiation that facilitates learner's knowledge construction.

Limitations and recommendations for future research

Although data analysis showed POLI-Q as a valid and reliable instrument to measure peer online learning interaction for knowledge construction, there are however some limitations that might need to be considered in the future use of the instrument. That is because the sample of this study was limited to postgraduate students in the school of education. Therefore, it is recommended that future research need to target students from both undergraduate as well as postgraduate students. Moreover, future researchers might need to extend the sample of their studies to include students from different faculties and fields to test the instrument validity and reliability. The wider sample from different programs will ensure higher reliability and enable researchers to judge POLI-Q validity to measure peer online interaction for knowledge construction across higher education programs and fields.

Conclusion

To conclude, the finding of Rasch Model analysis showed that POLI-Q is a valid and reliable instrument to measure peer online interaction for knowledge construction. The students support the idea that their online interaction for knowledge construction is supposed to focus on the measured patterns in the developed instrument. The reliability and validity of the instrument are fundamental features in the evaluation of any measurement instrument for more accurate and reliable research (Mohajan, 2017). Therefore, POLI-Q provides a reliable instrument to measure university students' attitudes towards online interaction activities during their learning and knowledge construction. The instrument shows the types of discussion patterns that are more important to boost students' collaborative involvement in the online discussion during the process of learning and knowledge construction at the higher education level.

Appendix

POLI-Q Questionnaire

CODE	Statement
	Question
SSI-Q1	I could post my questions to other course participants.
SSI-Q2	Students' questions were related to the course content.
SSI-Q3	Posting questions helped me to find an appropriate answer from other course participants.
	Answer
SSI-A1	I actively posted my answers to other course participants' questions.
SSI-A2	I could post my answers to other course participants' questions.
SSI-A3	I received answers to my questions from other course participants.
SSI-A4	Students' answers helped me to understand the course content.
	Comments
SSI-C1	I actively commented on other students' posts.
SSI-C2	I could comment on other students' course-related posts.
SSI-C3	Other students commented on my course-related posts.
SSI-C4	Comments from peers on course-related posts helped me to understand the course content.
	Discussion
SSI-D1	I could participate in the course-related peer discussion.
SSI-D2	Other students participated in the course-related discussion.
SSI-D3	Students' discussion was related to the course content.
SSI-D4	The course-related discussion helped me to understand the course content.
	Information sharing
SSI-IS1	I could participate in sharing information with other students (ex: website link, video, document)
SSI-IS2	Other students shared information (ex: website link, video, document).

SSI-IS3	Information sharing by students was related to the course content.
SSI-IS4	Information sharing by peers helped me to understand the course content.

Scaffolding

SSI-S1	I could provide information to support peer students' understanding of the course content.
SSI-S2	Other students provided information to support my understanding of the course content**.**
SSI-S3	Students' support helped me to understand the course content.
SSI-S4	I actively provided information that supports students understanding of the course content.

Reflection

SSI-R1	I could post statements that reflect my level of course content understanding.
SSI-R2	Other students posted statements that reflect their level of the course content understanding.
SSI-R3	My posts, comments, and discussion reflected a good level of the course content understanding.

Acknowledgment

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A HIERARCHICAL LINEAR MODEL OF ALUMNI SURVEY ON INDIVIDUAL COMPETENCY, INSTITUTIONAL SERVICE, AND JOB SATISFACTION IN A CASE UNIVERSITY IN TAIWAN

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ABSTRACT

Alumni surveys are important tools for detecting students' problems, trends in learning outcomes, and planning for students' common competencies for their careers. Feedback on the alumni's employment status, job satisfaction, and gathering insights for institutional quality improvements are some of the major objectives of alumni surveys. A variety of factors at individual and organizational levels exert influences on students' job satisfaction. Through the 'Hierarchical Linear Model' (HLM), one can detect these influences at multiple levels. In the present study, an alumni survey was analyzed. Factors related to individual competency were professional skill, information technology application, communication and teamwork, and learning autonomy. Factors at the organizational level were related to institutional services, such as teachers, equipment facilities, administration, reputation, and service-learning. The study analyzed 4,931 individuals and 88 groups in the survey on undergraduates' alumni feedback questionnaires after their graduation during four academic years. The basic statistics, correlation, and HLM analysis were carried out. The results demonstrate that individual factors and institution variables are positively related. The 'teacher' and 'administration' had a positive relation to alumni's job satisfaction. The institution's service-learning training had a significantly positive moderated effect with information technology application and learning autonomy on their job satisfaction.

Keywords: Alumni survey, Individual competency. Institutional service, Job satisfaction, Hierarchical linear model

Introduction

Alumni surveys are important tools for university management in detecting students' problems, trends in learning outcomes, and policy formulations for students' careers. Feedback on alumni's preferences, current employment status, experiences, and satisfaction with all areas of their education from academic (quality of professors and departments) to student life (campus life, extracurricular activities, technology resources) are some of the major objectives of alumni surveys. Such surveys provide important insights into the institution's quality improvement. Lüer and Aebi (2017) stated that continuous and repeated alumni surveys help in detecting students' needs, problems, and learning trends and outcomes for further policy formulation. Meaningful advice from employers, professionals, and recent graduates and their industry experiences could help policymakers make graduates' capabilities more meaningful (de St Jorre & Oliver, 2018). In 2014, Taiwan's Ministry of Education (MOE) initiated a project on alumni surveys. The main purpose of alumni surveys was to improve Taiwan's higher education system to produce talents required by the industries. MOE assessed alumni' career paths, career situations, and learning items (their part-time or full-time work status, career choices, how long it took them to find the first job, their needs, and perceived gaps between their training and current work, competency acquisition, work locations, job satisfaction, and congruence). A high level of alumni's dissatisfaction at workplaces warrants a helping hand by the alma mater and a revisit to graduates' training strategies.

Among all learning items in the MOE survey, findings regarding job satisfaction are worth further attention and evaluation, as these are directly related to the individual's competency (Agrawal et al., 2019). A variety of individual and organizational factors influence job satisfaction (Austin & Gamson, 1983). Herzberg (1966) identified 14 important factors that affect job satisfaction: achievement, recognition, the work itself, responsibility, possibility of advancement, possibility of growth, salary, job security, interpersonal relations, technical supervision, agreement with company policies, administration, work conditions, personal life, personal skills, welfare in working places, and educational support in universities. Many researchers used the regression method to detect the influential factor and job satisfaction at workplaces (Fassoulis & Alexopoulos, 2015; Lu et al., 2016; Villar-Rubio et al., 2015; Yildirim et al., 2016). However, the inter-factorial effects among individual and organizational factors are difficult to comprehend by the simple regression model. Standard statistical tests rely heavily on the assumption of independence of the observations, but the individual observations at the same institution are, in general, not independent. Hence, a more suitable multilevel method, the 'Hierarchical Linear Model' (HLM), should be adopted to analyze the data.

In the HLM method, individuals and groups are conceptualized as a hierarchical system of individuals nested within groups, with individuals and groups defined at different levels (Hox et al., 2018). The advantage of HLM is that it can deal with problems at multiple levels and can support more parameters estimation models in the same school for researchers (Hofmann, 1997; Woltman et al., 2012). There are educational research applications, where pupils are nested

within schools, family studies with children nested within families, medical research with patients nested within hospitals, and biological research with teeth nested within different persons' mouths (Hox, 1998). In the HLM, it is necessary to design the research from top to bottom and explore the main effect and the moderated effect from the organizational perspective. Hence, the HLM was used in the present study to detect the multilevel effects in the alumni survey. From the existing database collected by the Ministry of Education (MOE), Taiwan, the management in the case university wanted to understand the relationship among graduates' competency, organizational role, and job satisfaction. This can help the university administration understand the factors that may affect students' careers and take corrective measures while graduates are still on the campus and before their graduation.

In this study, students are nested within various departments at the case university. Therefore, the departments have been considered as 'group level' in the multilevel system. Although alumni belonged to different academic years, questions related to job satisfaction were the same. It is based on the concept that repeated measures; data collected at different intervals and under different conditions are nested within each participant (Raudenbush & Bryk, 2002; Osborne, 2000). Therefore, alumni of the case university were clustered into the group level by various departments and academic years at the same time. The total number of groups (N=88) fulfilled the minimum number requirement (N=30) in the HLM analysis. The questionnaire items were the same during different academic years, and the participants come from the same university, so the data fits the dependent rule in the HLM hypothesis.

In Figure 1, alumni are considered at the individual level, while the groups as the organization level. In the MOE alumni survey design, the individual competency included professional skill, information technology application, communication and teamwork, and learning autonomy. The group factors of institutional service included teacher, equipment facilities, administration, institution's reputation, and service-learning. Through HLM, the main and moderated effects have been analyzed and discussed.

The objectives of the present study are: (1) to diagnose the outcome of individual competencies and institutional service, (2) to evaluate the correlation among scores of individual and organizational factors (3) to find the main and moderated effects between individual and organizational levels through HLM analysis. It is hoped that by this analysis, some meaningful indicators would emerge that may help the university management in the planning of students' career paths.
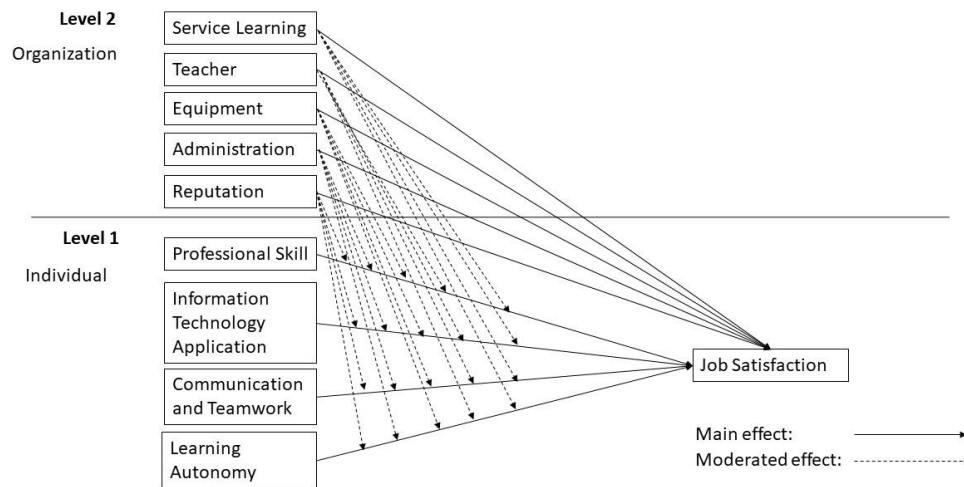
Figure 1: HLM Models

Literature Review

Individual Competency and Job Satisfaction

Spencer and Spencer (1993) defined competency as 'an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation.' In the literature on human resource management, competency is defined as "a set of observable performance dimensions, including individual knowledge, skills, attitudes, and behaviors, as well as collective team process, and organizational capabilities that are linked to high performance and provide the organization with sustainable competitive advantage" (Athey & Orth, 1999). Jung and Shin (2015) identified five key competencies for the university's administrative staff: organizational understanding, problem-solving, interpersonal, informational, and global competency. Also, competency is a combination of attitude, behavior, knowledge, and skill that contribute to an individual's needs and success (Mah & Ifenthaler, 2017; McCall & Flyers, 1998). In Taiwan, undergraduates and graduates are the primary labor force; therefore, many higher education institutions pay attention to alumni feedback to improve their competencies and competitiveness (Agrawal et al., 2021). MOE's alumni survey contains four common competencies: professional skill, information technology application, communication and teamwork, and learning autonomy. Several previous studies have found that competency positively relates to job satisfaction (Campion et al., 2011; Chao, 2016; Lee et al., 2015; Sani et al., 2016). However, Jung and Shin (2015) in Korea found that interpersonal skills affect overall job satisfaction. Therefore, in this paper, common competency is detected to understand alumni's job satisfaction in the case of a university in Taiwan.

Institutional Service and Alumni's Job Satisfaction

Besides individual competency, an institution also plays an important role in alumni's job satisfaction (Ratanavaraha et al., 2016; Schmalbach & Quesada Ibargüen, 2011). According to Seng and Ling (2013), institutional service includes instructors, curriculums, learning resources, and student engagement dimensions, while learning resources include administrative support and advanced equipment facilities. It has been found that graduates' personal academic motivation at school, administrative support, and program satisfaction are positively related to the institution's reputation (Blau et al., 2016; Blau, 2019; Elsharnouby, 2015; Munisamy et al., 2014). In addition, labor education and service-learning promote graduates' team and good citizenship spirit, enhance their public service attitude, leadership, volunteer spirit, and employability skills (Busch, 2018; Hardin-Ramanan et al., 2018; Holmes et al., 2021; Seider et al., 2011). Therefore, in the present study, the intuitional factors were analyzed to find the correlation and moderated effects on individual factors.

HLM Theory and Application

In the multilevel regression model, we have data in J groups and a different number of individuals Nj in each group. On the individual level (level one), we have the dependent variable Yij and the explanatory variable Xij, and on the group level (level two), we have the explanatory variable Zj. Thus, we have a separate regression equation in each group similar to Hox (1998):

$$Yij = b0j + b1j\ Xij + eij. \qquad (1)$$

The bj are modeled by explanatory variables at the group level:

$$b0j = r00 + r01\ Zj + u0j, \qquad (2)$$

$$b1j = r10 + r11\ Zj + u1j. \qquad (3)$$

Substitution of (2) and (3) in (1) gives:

$$Yij = r00 + r10\ Xij + r01\ Zj + r11\ ZjXij + u1j\ Xij + u0j + eij \qquad (4)$$

There are regression analyses, moderated effect, and residual tolerance in the HLM equation (4).

The hierarchically structured data analysis, based on appropriate statistical models, has application in several research areas. In the education field, most of the HLM studies are at two levels – (i) students and (ii) institutions (Atas & Karadag, 2017; Bowers & Urick, 2011; Valente & Oliveira, 2009). However, considering satisfaction as another factor, HLM analysis has been carried out (Kim & La, 2018; Eason et al., 2018). In a separate study, Zhang et al. (2018) demonstrated a multilevel moderated effect between students and school. Therefore, in the present research, the institution's role (factors) was analyzed through HLM analysis to understand its alumni competency effects.

Methodology

Participants and Procedure

The case university in the present study follows the Ministry of Education's higher education guidelines in Taiwan. In this study, the secondary data was used to extract the information from the MOE's alumni's survey database, mainly to understand the employment status and job satisfaction of students who graduated from 22 departments in five colleges (Management, Informatics, Humanities, and Social Sciences, Design, and Science and Engineering) during four academic years (2015 to 2018) in the case university.

The alumni from 2015 to 2018 were invited to participate in the survey. Finally, 4931 members answered the questionnaires and were used as the sampling pool. The survey report's data analysis was based on the case university's common topics and was coordinated by the students' affairs office's student development center. The survey data was used only for research purposes and with no business motive. The participants were unaware of the hypotheses, and the questionnaire did not include the participants' details, with their names kept anonymous. Therefore, a strict ethical procedure was followed as per the exemption regulations of the Institutional Review Board (IRB) review in the Ministry of Health and Welfare, Taiwan. All data were stored securely, with access limited to the researchers.

Measures and Research Design

In this study, the data was analyzed through basic statistics, correlation, and HLM analysis. About the inferential test of the correlation analysis, the variables between the individual competency and organization's service could evaluate their positive or negative effects among the samples. To explain and avoid the collinearity and the main effect estimation error, the independent variables between individual and organizational levels were necessary to transfer to new numbers in the HLM analysis. The level one factors were assigned into cluster mean centers. The level two factors were computed into grand mean centers. From the fixed effect estimation and the moderated effect of HLM, the dependent factor of job satisfaction could be evaluated correctly.

There are 4,931 records in the undergraduates' alumni feedback questionnaires from 22 departments for four academic years from 2015 to 2018. The groups are clustered into 88 groups from total alumni (Level-2 N=88). There are over 15 individual records in each group. It fits the samples of Hox (1998) 50/20 to 100/10. The resulting data sets comprised 4931 members of 88 groups. The average number of participants per group was 44 (SD=26.72), ranging from 19 to 125. Groups were studied in the field of Management (43.3%), Informatics (13.9%), Humanities and Social Sciences (17.3%), Design (12.9%), or Science and Engineering (12.5%).

To illustrate how models were developed and tested using HLM, all the analyses were performed using HLM software version 6, which is available for download online (Raudenbush et al., 2006). Besides the cross-analysis of moderated effect, the mixed linear models were carried out

through SPSS 22. The level one factors were transferred into cluster mean centers, and the level two factors were computed into grand mean centers. From the fixed effect estimation, the moderated effect was evaluated.

Control Variables

The questionnaire items included the students' four core competencies, feedback on labor education, employment counseling measures, and suggestions to the university. From the learning experience in the case university, there are two items in the survey. One is the individual competency, and the other is the satisfaction of the organization's service (institutional role).

At individual (Level 1), the inputs were professional skill (PS), information technology application (IT), communication & teamwork (CT), learning autonomy (LA). In organization variables (Level 2), the inputs were a teacher (T), equipment (E), administration (A), reputation (R), and service-learning (S). The competency included four items (Cronbach's α values=.92). The institutional group service included five items (Cronbach's α values=.94). It meant that the reliability was good enough. Participants' ratings were based on 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). Through HLM analysis, the output (Job Satisfaction) could evaluate the main and moderated effects of Level 1 and Level 2 inputs.

Results

Basic Statistics and Correlation Analysis

Among the four items of individual competencies, the average was higher than 3.45 (Table 1). It means the alumni agreed that they have enough competency from learning on the campus. In addition, the scores of institutional service were higher than 3.40, indicating that the alumni were satisfied with the teacher and equipment facilities at the case university. To understand the relationship between individual and organizational variables, the correlation analysis was carried out first. All items are positively related. Especially the institutional factors of teacher, equipment, administration, and reputation have a strong positive correlation (the coefficient is approaching .9).

Table 1: Correlation

	M	SD	1	2	3	4	5	6	7	8	9
1. PS	**3.45**	1.02	1								
2. IT	**3.49**	1.06	.723**	1							
3. CT	**3.51**	1.13	.755**	.732**	1						
4. LA	**3.52**	1.13	.732**	.718**	.830**	1					
5. T	**3.51**	1.17	.729**	.671**	.753**	.730**	1				
6. E	**3.51**	1.17	.706**	.665**	.746**	.728**	.893**	1			
7. A	**3.47**	1.09	.678**	.639**	.706**	.700**	.843**	.855**	1		
8. R	**3.49**	1.12	.721**	.673**	.752**	.738**	**.899****	**.896****	**.893****	1	
9. S	**3.41**	1.13	.529**	.526**	.581**	.572**	.608**	.613**	.604**	.624**	1

Note: **< .01 (two-tailed test)

PS: professional skill; IT: information technology application; CT: communication & teamwork; LA: learning autonomy; T: teacher; E: equipment; A: administration; R: reputation; S: service-learning.

Aggregation Issues

Since these variables were measured at the individual level, their aggregation to the group level was required for further analyses. We, therefore, calculated intra-class correlations (ICC1) and reliability of group means (ICC2) as per the previous report (Klein & Kozlowski, 2000).

1. Random ANOVA Model

The outcome variable is satisfactory.

Level-1 Model

$$Y_{ij} = b_{0j} + e_{ij}.$$ *(b is the intercept, and e is the error term)*

Level-2 Model

$$b_{0j} = r_{00} + u_{0j}$$

ICC (1) =0.44/ (0.44+0.51) =0.463 (ICC>0.138 high within related) and ICC (2) =0.976. Different groups have different satisfactory. An addition, the p-value <0.05 indicates that different groups will create significant differences in job satisfaction.

2. *The Random Coefficient Regression Model*

The independent variables of level 1 are professional skill (PS), IT implication (IT), communication & teamwork (CT), and learning autonomy (LA). The summary of the model is as below.

Level-1 Model

$$Y_{ij} = b_{0j} + b_{1j}*(PS) + b_{2j}*(IT) + b_{3j}*(CT) + b_{4j}*(LA) + e_{ij}.$$

Level-2 Model

$$b_{0j} = r_{00} + u_{0j}$$

$$b_{1j} = r_{10} + u_{1j}$$

$$b_{2j} = r_{20} + u_{2j}$$

$$b_{3j} = r_{30} + u_{3j}$$

$$b_{4j} = r_{40} + u_{4j}$$

The deviation is from 10,984 to 10,497. The Variance component is from .507 to .438.

3. *Intercept Model*

To analyze the effect of institutional factors such as teacher (T), equipment (E), administration (A), reputation (R), and service-learning (S) at level 2, the intercept model is as below.

Level-1 Model

$$Y_{ij} = b_{0j} + e_{ij}.$$

Level-2 Model

$$b_{0j} = r_{00} + b_{01}*(T) + b_{02}*(E) + b_{03}*(A) + b_{04}*(R) + b_{05}*(S) + e_{ij}.$$

The deviation decreased from 10,984 to 10,977.

4. *Complete Model*

The level 1 and level 2 factors are shown in model 4.

Level-1 Model

$$Y_{ij} = b_{0j} + b_{1j}*(PS) + b_{2j}*(IT) + b_{3j}*(CT) + b_{4j}*(LA) + e_{ij}.$$

Level-2 Model

$$b_{0j} = r_{00} + b_{01}*(T) + b_{02}*(E) + b_{03}*(A) + b_{04}*(R) + b_{05}*(S) + u_{0j}$$

$$b1j = r10 + b11*(T) + b12*(E) + b13*(A) + b14*(R) + b15*(S) + u1j$$

$$b2j = r20 + b21*(T) + b22*(E) + b23*(A) + b24*(R) + b25*(S) + u2j$$

$$b3j= r30 + b31*(T) + b32*(E) + b33*(A) + b34*(R) + b35*(S) + u3j$$

$$b4j = r40 + b41*(T) + b42*(E) + b43*(A) + b44*(R) + b45*(S) + u4j$$

In order to explain and avoid the collinearity and the main effect estimation error, the level one factors were transferred into cluster mean centers (PS(C), IT(C), CT(C), and LA(C)). The level two factors were computed into grand mean centers (T(G), E(G), A(G), R(G), and S(G)).

In Table 2, T(G) and A(G) were positive to job satisfaction in the HLM analysis. The service of teachers and administration led to alumni satisfaction in the main effect estimation. Besides, the moderated effect among the professional skill (PS)* service-learning (S), IT implication (IT) * service-learning (S), and learning autonomy (LA) * service-learning (S) had a significant moderated effect on job satisfaction. The institutional training of service-learning with individual good information technology implication or learning autonomy led to reasonable job satisfaction. However, the institutional training of service-learning with individual good professional skills had lower job satisfaction.

In the complete model:

Job satisfaction=3.297-.001*PS(C)-.024 *IT(C)-.007* CT(C)-.006* LA(C)+.016* T(G)-.011* E(G)+.014* A(G)-.011* R(G)-.001* S(G)+.064* PS(C) * T(G)-.048* PS(C) * E(G)+.023* PS(C) * A(G)-.058* PS(C) * S(G)+.049* PS(C) * R(G)-.013* IT(C) * T(G)+.040* IT(C) * E(G)+.007* IT(C) * A(G)-.064* IT(C) * R(G)+.037* IT(C) * S(G)-.026* CT(C) * T(G)+.044* CT(C) * E(G)-.004* CT(C) * A(G)+.025* CT(C) * R(G)-.034* CT(C) * S(G)-.028* LA(C) * T(G)-.027* LA(C) * E(G)+.019*LA(C) * A(G)-.004* LA(C) * R(G)+.048* LA(C) * S(G)

Table 2: HLM Analysis

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.297	.069	88.004	47.940	.000	3.161	3.434
PS(C)	-.001	.031	82.803	-.036	.971	-.062	.060
IT(C)	-.024	.018	55.660	-1.360	.179	-.059	.011
CT(C)	-.007	.026	67.939	-.271	.787	-.058	.044
LA(C)	-.006	.025	74.432	-.261	.795	-.055	.043
T(G)	**.016**	.025	126.361	.628	.531	-.034	.065
E(G)	-.011	.023	118.669	-.478	.634	-.057	.035
A(G)	**.014**	.026	128.092	.521	.603	-.038	.066
R(G)	-.011	.029	128.125	-.394	.694	-.069	.046
S(G)	-.001	.014	52.064	-.054	.957	-.029	.027
Moderated Effect							
PS(C) * T(G)	.064	.033	4261.440	1.921	.055	-.001	.129
PS(C) * E(G)	-.048	.031	3208.460	-1.522	.128	-.109	.014
PS(C) * A(G)	.023	.032	4438.219	.729	.466	-.039	.086
PS(C) * S(G)	**-.058**	.019	3912.894	-3.036	**.002**[*]	-.096	-.021
PS(C) * R(G)	.049	.038	4315.723	1.282	.200	-.026	.123
IT(C) * T(G)	-.013	.032	3532.014	-.395	.693	-.075	.050
IT(C) * E(G)	.040	.031	3846.755	1.294	.196	-.021	.102
IT(C) * A(G)	.007	.030	3598.601	.236	.814	-.051	.065
IT(C) * R(G)	-.064	.037	3692.060	-1.737	.082	-.136	.008
IT(C) * S(G)	**.037**	.018	1806.702	2.125	**.034**[*]	.003	.072
CT(C) * T(G)	-.026	.037	4086.073	-.708	.479	-.098	.046
CT(C) * E(G)	.044	.037	4102.774	1.204	.229	-.028	.117

CT(C) * A(G)	-.004	.034	4249.224	-.119	.906	-.070	.062
CT(C) * R(G)	.025	.044	4310.786	.569	.569	-.061	.110
CT(C) * S(G)	-.034	.020	3266.607	-1.719	.086	-.073	.005
LA(C) * T(G)	-.028	.035	3975.286	-.796	.426	-.096	.041
LA(C) * E(G)	-.027	.034	3718.369	-.792	.428	-.093	.040
LA(C) * A(G)	.019	.034	4321.934	.552	.581	-.048	.086
LA(C) * R(G)	-.004	.042	4365.400	-.099	.922	-.087	.078
LA(C) * S(G)	**.048**	.019	2913.024	2.584	**.010**[*]	.012	.085

Note: [*]< .05 (two-tailed test)

Discussion

Basic Statistics and Correlation

The average among four items of individual competencies (PS, IT, CT, and LA) was higher than 3.45, and the score of the competency in learning autonomy (LA) was the highest (mean=3.52). Recent studies have demonstrated that individuals can develop and enhance their LA competency through e-learning (Cheng et al., 2011; Lan, 2018; Lai, 2019; Snodin, 2013). Therefore, it may be the reason that IT competency was almost 3.5 points and significantly positive to LA in the correlation analysis. Besides, institutional variables, e.g., teacher, equipment, administration, and reputation had a strong positive correlation. These findings conform to other studies that an institution with sufficient resources can retain talents and leads to an excellent performance (Xanthopoulou et al., 2007; Demerouti et al., 2001).

In the present study, several other factors related to alumni's workplace and job satisfaction, such as salary, job title, and the promotion system, remained unknown and hence not covered. This could be a subject for future research. There are three sets of alumni surveys, e.g., one year, three years, and five years after graduation in the case university. In the present study, the alumni survey concerning job satisfaction was carried out after one year of graduation; therefore, participants had limited work experience. Volkwein and Zhou (2003) described those employees' job satisfaction increases when they become more accustomed to their tasks. Besides, inner motivation or aptitude for carrying out tasks positively affects job satisfaction (Houston et al., 2006). Thus, individual students' job satisfaction can be improved by a longer stay in the job and by continuous task learning at the workplace.

The main effect of Institution's Role in Alumni Competency

In the HLM analysis of level two, the institutional factors between 'Teacher' and 'Administration' were positively related to job satisfaction. A good student-teacher relationship can create a secure and satisfying relationship (Agrawal et al., 2019; Furrer & Skinner, 2003; Hughes & Chen, 2011). Higher education institutions need to view students as lifelong commitments that do not end at graduation. Alumni are resources that can provide meaningful and mutually beneficial relationships over time. Maintaining good long-term relationships with alumni is crucial to the success of institutions. Alumni serve many valuable roles, such as building and growing an institution's brand through word-of-mouth marketing. Higher education institutions rely on alumni to provide mentoring, internships, and career opportunities to students. Besides, alumni are a prime target for continuing education opportunities. Advanced professional programs, unlike undergrad programs, are quite profitable because they rely on minimal tuition discounting and financial aid. Alumni have much to offer, including knowledge about current and emerging job opportunities for students, a first-hand external view of the relevance and quality of education and teachers (Moore & Kuol, 2007). With alumni connections and resources, universities can achieve their strategic goals.

Moderated Effect between Institutional Service and Alumni's Job Satisfaction

According to Dewey (1997), service-learning evolves from doing and knowing, emotions, intellect, experience, and knowledge. Results indicate that the moderated effect between institutional and individual variables, institutional training for service-learning, played an important role in job satisfaction. The alumni had proper information technology application or autonomy learning. It has been reported that students with the experience of service-learning and positive social interaction had higher satisfaction levels at the workplace (Cho et al., 2020; Ocal & Altinok, 2016; Wozencroft & Hardin, 2014). Service-learning promotes interpersonal relationships and leads to significant improvement in activities, learning motivation, and job performance (Huang, 2007). However, alumni trained with service-learning and good professional skills had lower job satisfaction, indicating a gap between the teaching at school and the workplace. Bridging this gap involves making school more relevant for both students and employers so that more stakeholders can contribute to the future workforce's education. Creative and innovative partnerships between workplaces and schools are important so that accurate understanding can occur between students and employers. Job shadows, internships, co-ops, mentorships, partner-talks, and creative community projects need to be a regular part of school subjects (Magnifico, 2007). Some scholars suggested that competency-based teaching and learning can improve the curriculum's quality and shorten the gap between theoretical knowledge and vocational application (Agrawal et al., 2021; Gunawardena, 2014; Steel, 2018). Therefore, a service-learning course related to internships and projects can improve the Learn-Practice Fit and workplace satisfaction.

Implications and Recommendations

As a result of rapid technological advancement and globalization, there is a greater need to examine employers' requirements concerning desirable employee competencies. This has led to increasing demand by employers that universities produce practically work-ready graduates. Therefore, it is imperative that higher educational institutions pay much attention to graduates' competency-based teaching and learning. This can shorten the gap between theory and practice and improve students' satisfaction levels at workplaces. Universities must encourage graduates to acquire job-oriented skills and competencies and provide them with higher incentives and resources in the form of awards, subsidies wherever required.

In this study, three sets of alumni surveys were analyzed, e.g., one year, three years, and five years after graduation in the case university. However, the alumni survey concerning job satisfaction was analyzed after one year of graduation; therefore, participants had limited work experience. Since workplace experience is an important variable for the institution to explore alumni's job satisfaction, alumni survey data during three and five years would be interesting for collection and analysis in the future.

Concerning organization, 'Teacher' and 'Administration' at the case university were positive to job satisfaction. Therefore, good student-teacher relationships, innovative pedagogy, passionate and efficient service, and sufficient resources are important strategies for the institution's growth and graduates' career development.

According to the service-learning training, the institutional service with individual information technology application or autonomy learning can improve job satisfaction. There is an e-learning partner plan running for the last three years in the case university. The core value is "life accompanying life and living teaching living." The program helps undergraduates cultivate a spirit of service-learning. The success of the e-learning partner plan could be a model for other curriculums. Besides, service-learning with autonomy learning can help undergraduates to develop independent and mature thinking before they play leadership roles on the campus and beyond.

Learning by doing can enhance the Learn-Practice Fit and bridge the gap between campus and workplaces. Also, a discussion with industry experts in designing curriculums is an important step. The common and professional competencies can be evaluated through a competency assessment system to match campus competency development requirements and students' job satisfaction after graduation.

Conclusions

A multilevel framework was used to test the theory and establish empirical findings in this research to advance alumni career track and institutional development. All the factors between individual competency and institutional service were significantly positive to each other. In the HLM analysis, service-learning positively moderated the information technology application and the learning autonomy to job satisfaction. It is hoped that results in the present study would enrich the research on alumni surveys and stimulate future multilevel analysis.

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