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Research Article

VALIDITY AND RELIABILITY OF AN INSTRUMENT FOR STUDENT EVALUATION OF CLASSROOM TEACHING

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ABSTRACT

The instrument was grounded in the model of classroom teaching, students' evaluations of teaching effectiveness research, principles of effective teaching and adult learning. Exploratory factor analysis was conducted to uncover factors that represented the data. The principle axis factoring extraction method and promax rotation procedure resulted in seven factor structures. Some of the factors were not well defined, thus the instrument was revised. Test-retest correlations were high ($r \geq .70$) and internal consistency analysis indicated that students responded consistently to its eight sub-scales and items. Results of the correlational analysis suggested that all LISET's scales contributed significantly to students' perceptions of learning. The best predictors of students' learning were Rapport with Students ($\beta = .354$ and Sig. = .000), Speaking Skills ($\beta = 0.331$ and Sig. = .000) and Clarity of Presentation and Explanation ($\beta = 0.265$ and Sig. = .002). Results of this study suggested that the LISET survey instrument has acceptable psychometric properties and it captures eight dimensions of teaching components namely, "Self-rated Learning Outcomes", "Rapport With Students", "Clarity of Presentation and Explanation", "Organization of the Lessons", "Stimulation of Student Interest", "Effective Speaking", "Questioning Skills" and "Lecturer Support for Student Assessment". Some of the significant conclusions reached in the study were: (1) the results confirmed the multidimensionality of student evaluation of teaching, (2) the LISET instrument has reasonable content, construct and criterion validities, and (3) the LISET instrument can be used by teacher educators with reasonable degree of reliability.

KEYWORDS

Classroom teaching, exploratory factor analysis, student evaluation of teaching, student's perception.

INTRODUCTION

Students' perceptions of the teaching and learning context shape their approaches to study and ultimately the quality of the learning outcomes (Prosser & Trigwell, 1999). This understanding recognizes that the outcomes of learning belong to students and, while influenced by the teaching input, are ultimately determined by the students. Teachers can only explicitly influence some components of the learning process before it passes into the hand (heads) of students (Sezen-Barrie, 2018). Using students' perceptions to evaluate the classroom teaching as propagated in this study is not about judging whether lecturers' teaching is of "high or low quality", rather it is about understanding students' judgment regarding the quality of teaching from their points of view (Ramsden & Durkin, 2020). Students possess "self-insight" into how to make overall evaluations of teaching effectiveness (Harrison et al., 2016). Self-insight is a form of meta-cognition in that it reflects peoples' awareness of the nature and processes involved in their own understanding (Harrison et al., 2016). The population for this study was adults graduated students. It is assumed that after 11 or more years in the educational system, interacting with dozens of teachers and university lecturers and experiencing thousands of hours of instructions, students are reasonably reliable and accurate judges of lecturers' teaching performance. This assumption was supported by research findings of Hare et al. (2018). The Postgraduate Science students in her study gave high ratings on several aspects of classroom teaching. These aspects were (1) the clarity of lessons taught, (2) the effort directed to relate theory to practices as well

as to encourage reflection during their lessons and (3) the lecturers' assistance in preparing students for classroom experience. However, students gave low ratings to (1) the lecturers' lesson plans, and (2) the choice of teaching methods and materials. Hare et al. (2018) cross-validated the students' assessment by observing the lecturers' lessons in the classroom. She found that it was indeed apparent that most of the lecturers presented clear and well-structured lessons and were often mindful in helping students to relate what had been taught to classroom realities. It was also evident that trainers taught using a limited range of teaching aids. The teaching materials such as books and lecture notes were often dull and not motivating.

LITERATURE REVIEW

"Good teaching starts from the student's perspectives" (Wimsatt et al., 2016). The term "perspective" refers to a view or a particular way of thinking about something (Kharuddin & Ismail, 2017). The term "perceive" also carries the same meaning that is to understand or think of something in a particular way (Kharuddin et al., 2019). Another term that is closely related to the terms "perceive" and "perspective" is "perception", which signify an idea, a belief or an image you have as a result of how you see or understand something (Sezen-Barrie, 2018) or an insight gained by perceiving or an awareness of something (Kharuddin et al., 2017). According to the Information-Processing theory, "perception" is the most important element in the process of learning because it is the first mechanism that receives

information or stimuli from human senses before it is stored, processed and retrieved (Slavin, 2003). What and how much information is registered and processed depends on how important and significant one perceives the information to be. According to this theory, perception of stimuli is not as straightforward as reception of stimuli; “rather, it involves mental interpretation and is influenced by our mental stage, past experience, knowledge, motivation and many other factors” (Slavin, 2003).

Prosser and Trigwell (2016) present another perspective on the importance of “perception” in the teaching-learning process. In their Presage-Process-Product model of student learning as depicted in Figure 1, “perception” is seen as an important element in affecting students’ learning outcomes (Prosser & Trigwell, 2016). The model indicates that Students’ perceptions are seen to be an interaction between their prior experiences of teaching and learning, and the present teaching and learning context itself. The model indicates that what affects students’ learning most directly are students’ perceptions of the teaching-learning context, rather than the teaching methods themselves (Ramsden & Durkin, 2012; Prosser & Trigwell, 2016; Kharuddin et al., 2020). Parallel with the Information Processing Theory, this model points out that students’ perceptions are the most vital element in the teaching-learning process because they are the filter to all input (Barrie, 2001). Students’ perceptions of the teaching and learning context

shape their approaches to study and ultimately the quality of the learning outcomes (Prosser & Trigwell, 2016). This understanding recognizes that the outcomes of learning belong to students and, while influenced by the teaching input, are ultimately determined by the students. Teachers can only explicitly influence some components of the learning process before it passes into the hand (heads) of students (Barrie et al., 2015).

Using students’ perceptions to evaluate the classroom teaching as propagated in this study is not about judging whether lecturers’ teaching is of “high or low quality”, rather it is about understanding students’ judgment regarding the quality of teaching from their points of view (Ramsden & Durkin, 2012). Students possess “self-insight” into how to make overall evaluations of teaching effectiveness (Harrison et al., 1996). Self-insight is a form of meta-cognition in that it reflects peoples’ awareness of the nature and processes involved in their own understanding (Sezen-Barrie, 2018). The population for this study was adults graduated students. It is assumed that after 11 or more years in the educational system, interacting with dozens of teachers and university lecturers and experiencing thousands of hours of instructions, students are reasonably reliable and accurate judges of lecturers’ teaching performance.

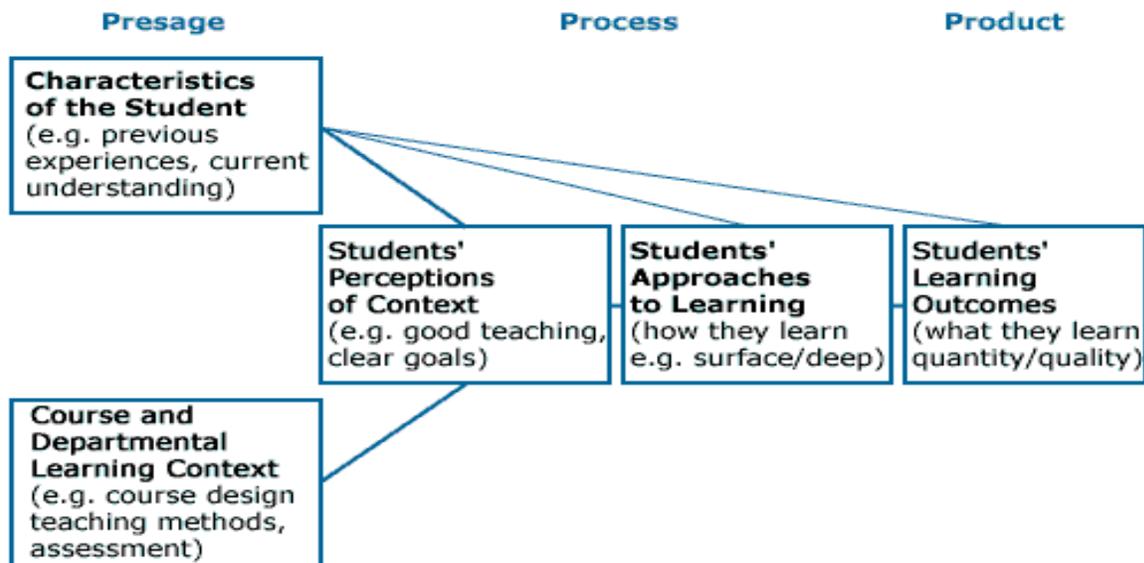


Figure 1: Presage-Process-Product Model of Student Learning

METHODOLOGY

This study attempted to develop a valid and reliable student evaluation of teaching questionnaire for student evaluation of classroom teaching. This study involved the exploration, description and explanation of students' perceptions of teaching performance in teacher training institutions. Data were needed from a relatively large number of students at one point of time in instrument development and validation (Kharuddin et al., 2020). The researcher needed to obtain the results from the data analyses relatively quickly, so the instrument can be developed and validated according to the predetermined stages. Therefore, this study employed survey research method using cross-sectional survey design (Babbie (1998) to develop and assess the validity and reliability of the instrument. Surveys are the preferred approach for collecting data from large numbers of students about their college experiences (Ouimet, Bunnage, Carini, Kuh & Kennedy,

2004). No attempt had been made to investigate the changes in students' perceptions of classroom teaching after several years that need longitudinal survey design. Nor does it attempt to investigate the effectiveness of students' feedback on lecturers teaching performance that need experimental interventions. As such, the researcher perceived the cross-sectional survey design was more practical than other methods for conducting this study. This study was developed and implemented through three phases over the course of a three-year period: (1) Phase I: development of instrument blueprint, (2) Phase II: administration of the instrument to a development sample and refinement of the final instrument, and (4) Phase III: further assessment of validity and reliability of scores obtained from the final instrument. The research framework that illustrates the implementation of the research activities is summarized in Figure 2.

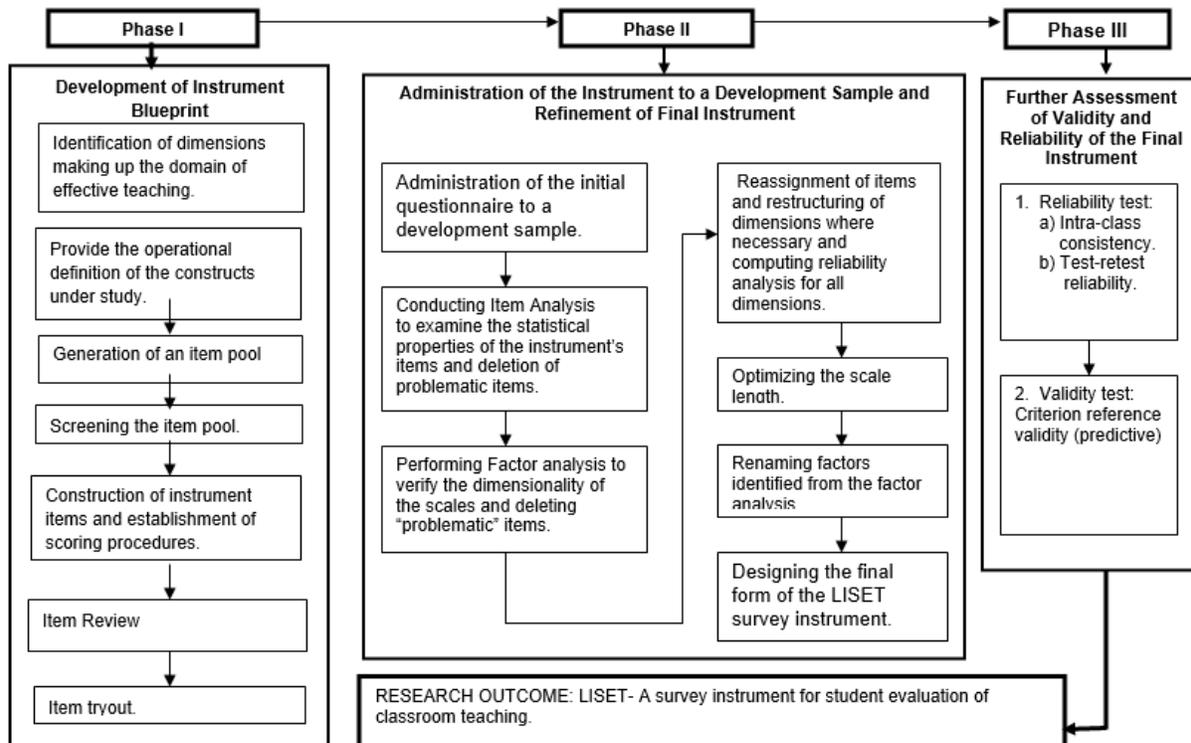


Figure 2: Research Framework: The Implementation of the Research Activities

Reviewers are asked to rate each item based on its importance to evaluate lecturers' teaching effectiveness. Table 1 (see next page) presents the mean and standard deviations of each item as rated by the reviewers. The table shows that five items are rated by the lecturers as "not important" and "not at all important" to evaluate their teaching effectiveness in the classroom. The mean of these items is in the range of 1.60 to 2.40 and the standard deviation of the items are relatively low (.65 and below) indicating the agreement among the respondents of the irrelevance of these items in providing information about their teaching performance. Thus, these items are dropped from the instrument blueprint. Several items exhibited high standard deviation (more than 1.0), indicating the disagreement among the respondents of the relevance

of these items to provide information about their teaching performance. The items are:

1. Provides handouts on important topics (item 27),
2. Uses media effectively (item 51),
3. Stresses important points (item 53),
4. Uses graphs or diagrams to facilitate explanation (item 55),
5. Incorporates personal teaching experience in his lesson (item 61).
6. Gives constructive feedback on work in progress (item 71).

The mean of these items are in range of 2.80 to 3.52, indicating that as a group, respondents perceived these items are of moderate importance in providing information about their teaching performance. At this point, these items are retained for items review process. Compared to lecturers, students gave higher ratings to all items in the instrument blueprint. These findings indicate that students perceived all items are of “moderately importance” to “very important” to evaluate lecturers’ teaching performance. However, the mean did not reflect group consensus on several items since the values of standard deviation of the items are huge (more than 1.00). Items that have high means and high standard deviations are:

1. I have learned something valuable from this course (item 3),
2. I did extra reading to follow up points raised in the classroom (item 5),
3. I have learned and understood the subject materials of this course (item 6),
4. Answers questions satisfactorily (item 21),
5. States objectives of each lecture (item 38), and
6. Uses appropriate examples/ analogies to explain the content of the subject (item 49).

Paraphrased Items	Lecturers				Students			
	"Importance" Criterion		"Ability to Rate" Criterion		"Importance" Criterion		"Ability to Rate" Criterion	
	M	SD	M	SD	M	SD	M	SD
1. My interest in this subject increased.	3.44	.51	4.48	.71	4.58	.65	3.89	.85
2. Feel motivated to learn this subject.	4.48	.51	4.44	.65	4.14	.83	4.06	.86
3. Have learnt something valuable from this course.	4.04	.68	4.16	.75	4.64	1.18*	3.89	.78
4. Gained confidence to teach the subject to my students.	3.60	.76	2.48*	.64	4.19	.67	2.17	.65
5. Did extra reading to follow up points raised in the classroom.	3.96	.68	4.08	.76	4.00	1.07*	4.06	.75
6. Have learnt and understood the subject materials of this course.	4.18	.54	3.88	.88	4.54	1.34*	3.83	1.0
7. Improve my presentation skills through class presentation.	3.16	.80	3.76	.72	4.08	.69	3.94	.71
8. My knowledge level in this area is greatly increases.	4.40	.50	4.12	.60	4.08	.60	3.97	.70
9. Incorporates humor in his/her teaching.	2.92	.81	4.16	.75	4.22	.72	4.03	.81
10. Exhibits pleasant facial expression while teaching.	3.60	.76	4.00	.76	4.36	.64	4.11	.785
11. Speaks in a dramatic or expressive way.	3.88	.73	3.96	.79	4.22	.68	3.83	.94
12. Uses gestures with hands to emphasize his ideas.	3.92	.70	3.84	.75	4.22	.68	4.00	.76
13. Moves about while teaching.	4.44	.51	3.84	.69	4.14	.68	3.61	.84
14. Exhibits facial gestures or expression to stress important points.	3.16	1.03	3.88	.73	4.11	.62	3.92	.84
15. Extends eye-contact to the whole class.	4.32	.63	4.00	.82	4.25	.69	3.75	.60
16. Uses variety of teaching strategies to encourage students' participation.	3.68	.85	3.88	.78	4.28	.59	4.11	.71
17. Accepts students' ideas and opinions.	4.40	.50	4.04	.73	4.22	.64	4.08	.73
18. Invites students to share ideas and opinions.	4.12	.60	4.04	.73	4.22	.68	2.44	1.23
19. Welcomes questions from students.	3.16	.90	3.96	.73	4.11	.62	3.75	.65
20. Incorporates students' ideas in class discussion.	4.00	.64	3.92	.76	4.14	.72	4.50	.61
21. Answers questions satisfactorily.	4.14	.58	4.00	.76	4.46	1.39*	4.53	.56
22. Periodically, asks questions to check students understanding.	2.40	.64	3.88	.73	4.64	.59	4.11	.62
23. Asks if students understand before proceeding to next topic.	4.32	.56	4.04	.73	4.31	.62	4.22	.72
24. Invites students to share their knowledge and experience.	3.52	.96	4.36	.76	4.36	.68	4.83	.45
25. Varies the questions to elicit right answers when students provide incomplete or wrong answers.	3.12	.83	4.00	.71	4.17	.65	4.06	.75



Paraphrased Items	Lecturers				Students			
	"Importance" Criterion		"Ability to Rate" Criterion		"Importance" Criterion		"Ability to Rate" Criterion	
	M	SD	M	SD	M	SD	M	SD
26. Provides wait time after posing a question for students to think about the answers.	4.28	.68	4.04	.73	4.33	.53	4.69	.52
27. Provides handouts on important topics.	2.92	1.45*	3.84	.85	4.03	.77	4.53	.65
28. Keeps focus on the main topic or discussion.	3.84	.75	3.88	.83	4.31	.58	4.06	.83
29. Provides explanation that is direct to the point.	4.28	.54	3.80	.87	4.11	.75	4.72	.51
30. Follows class schedules as specified in the Teaching Plan.	4.48	.51	4.32	.56	4.17	.65	4.64	.59
31. Explains the objectives of the lessons at the beginning of the class sessions.	3.40	.71	4.32	.56	4.19	.62	4.53	.70
32. Ties up the lessons by summarizing important points.	3.72	.74	4.28	.68	4.31	.62	4.22	.72
33. Starts the class sessions on time.	3.36	.64	4.16	.80	4.22	.76	4.17	.84
34. Explains the course outline at the beginning of the semester.	3.80	.71	4.36	.64	4.22	.72	4.61	.64
35. Presents the topics in a logical sequence as specified in the syllabus.	3.56	.87	4.32	.63	4.28	.66	4.67	.63
36. Teaches at appropriate pace.	4.40	.64	4.32	.69	4.28	.66	4.25	.69
37. Reviews topics covered in previous lectures at the beginning of each class session.	4.48	.51	4.16	.62	4.28	.68	4.34	.59
38. States objectives of each lecture.	1.70*	.64*	4.52	.59	4.42*	1.34*	4.31	.75
39. Gives lectures that facilitated taking notes.	3.20	.64	4.44	.58	4.39	.60	4.42	.60
40. Previews topic to be covered in the next lesson.	4.00	.71	4.54	.66	4.37	.73	4.67	.68
41. Uses comprehensible language to explain.	2.80	.87	4.08	.76	4.00	.72	4.47	.70
42. Speaks clearly in explaining the content of the subject.	3.32	.80	4.20	.64	4.28	.62	4.50	.65
43. Speaks at a rate, which allows me time to comprehend the points made.	4.28	.61	4.28	.68	4.19	.67	4.56	.61
44. Speaks with variety in tone of voice while teaching.	4.12	.67	3.84	.75	4.03	.70	4.42	.73
45. Speech is audible.	4.04	.68	4.04	.84	4.33	.63	4.58	.60
46. Speaks fluently in explaining the content of the subject without excessive pauses or "ums" and "ahs".	4.60	.50	3.92	.76	4.14	.64	4.56	.56
47. Provides relevant examples to facilitate students' understanding.	4.20	.64	4.28	.61	4.14	.54	4.42	.55
48. Demonstrates the application of theories to actual classroom situations.	2.08*	.60*	4.40	.64	4.17	.65	4.47	.70
49. Uses appropriate examples/ analogies to explain the content of the subject.	4.28	.61	4.28	.74	3.92	1.20*	3.97	.74
50. Explains using simple common terms.	4.20	.64	4.12	.67	4.11	.62	3.94	.71
51. Uses media effectively.	3.52	1.12*	4.44	.71	4.28	.66	4.03	.77
52. Summarizes major points.	4.44	.51	4.00	.71	4.11	.62	4.58	.55

Items	Lecturers				Students			
	"Importance" Criterion		"Ability to Rate" Criterion		"Importance" Criterion		"Ability to Rate" Criterion	
	M	SD	M	SD	M	SD	M	SD
53. Stressed important points	3.28	1.21*	4.04	.73	4.28	.61	4.67	.53
54. Repeats difficult ideas several times.	3.28	.98	4.16	.80	4.28	.70	4.11	.78
55. Uses graphs or diagrams to facilitate explanation.	3.20	1.19*	4.20	.76	4.36	.64	4.31	.71
56. Writes key terms on blackboard.	4.28	.54	4.08	.76	4.19	.67	4.11	.75
57. Periodically summarizes points previously made.	4.24	.59	3.48	.65	4.28	.74	4.17	.77
58. Defines new unfamiliar term.	4.24	.66	3.96	.68	4.17	.61	4.67	.48
59. Provides individual assistance in class when needed.	4.52	.51	4.16	.69	4.44	.56	4.64	.64
60. Uses appropriate language when interacting with students.	4.28	.61	4.04	.74	4.19	.71	4.42	.73
61. Incorporates personal teaching experience in his lesson.	2.80	.12	4.28	.62	4.08	.60	4.42	.65
62. Respects students as adult learners.	4.12	.63	4.16	.75	4.11	.67	4.14	.68
63. Praises students' answers.	4.44	.51	4.20	.76	3.97	.65	4.33	.72
64. Is open to students' opinion and questions.	3.80	.91	4.16	.90	3.94	.86	4.53	.65
65. Smiles or laughs while teaching.	4.00	.64	4.44	.58	4.08	.65	4.31	.67
66. Praises students for good ideas.	3.36	1.19*	4.28	.74	3.89	.71	4.22	.68
67. Addresses individual students by name.	4.24	.52	4.32	.69	3.97	.69	4.25	.65
68. Makes students feel welcome in seeking help/ advice in or outside class.	3.20	.76	4.20	.41	4.17	.70	4.53	.61
69. Provides examples of assessments/ coursework with excellence as a guide.	1.92*	.51*	4.16	.55	4.14	.64	4.50	.51
70. Explains the quality of work expected from the coursework/ assessments.	4.00	.71	4.28	.61	4.22	.59	4.47	.61
71. Gives constructive feedback on work in progress.	3.48	1.19*	4.44	.58	4.22	.54	4.19	.52
72. Explains the grading scheme clearly.	2.40	.76	4.36	.70	4.14	.68	4.53	.61
73. Gives clear directions for writing the coursework/ assessments.	3.56	.71	4.56	.58	4.22	.68	2.31	.75
74. Provides sufficient time for students to complete the course work.	3.68	.90	4.28	.68	4.25	.60	4.06	.71
75. Returns students' coursework/ assessments to enable them to assess their progress.	1.74*	.61*	3.32	.89	4.21	.58	2.39	.73
76. Is fair in assigning grades.	2.26*	.63*	2.44*	1.23*	4.25	.79	3.19	.65
77. Provides timely, pertinent and comprehensive feedback on work in progress.	3.82	.82	3.21	.68	3.21	.60	2.42*	.76
78. Tells students exactly what is expected of them on assessments.	4.24	.61	3.89	.72	3.11	.68	3.59	.84
79. Comments on assessments are helpful.	4.46	.53	3.01	.39	3.95	.86	2.31*	.63

* The low means and standard deviations of problematic items.

Table 1: Means and Standard Deviations of Items Based on Its Importance and Students Ability to Rate Criteria



CONCLUSION AND DISCUSSION

The respondents of this study are adult learners (Haynes & Knowles, 1984). Results indicate that the majority of them are in the age range of 28 – 31 years old. According to Piaget's Stages of Intellectual Development, this is the stage where a person passes through the stages of "abstract thinking" (formal operational stage) and this is the stage where the mind is capable of dealing with the mastery of thought (Piaget, 1972). As mature students they possess "self-insight" into how to make overall evaluations of teaching effectiveness (Harrison et al., 1996) thus, making them good judges about the intangible products of the classroom: teaching and learning process (McKeachie, 1991; Marsh & Roche, 1997).

Results also indicated that 481 or 37 percent of the respondents are married and 686 or 52.8% of them brought with them teaching and working experience to the classroom. As adults they have different learning preferences and needs than younger students (Houser, 2004). They also have different perceptions and expectations of effective teaching from traditional students (Day et al., 2011). Using student evaluation of teaching survey as propagated in this study, can provide lecturers with information about the learning needs and preferences of this group of students as adult learners. The information can assist lecturers plan class sessions to include several different types of teaching methods and learning activities to reinforce and enhance adults' learning.

The majority of the respondents are females. Past research studies on teaching effectiveness documented that there was a difference between student evaluations of teaching based on gender (McKeachie, 1991). For example Harrison et al. (1996) found "a gender of student and gender of instructor" interaction, that is female students rated female

instructors higher and male students rated male instructors higher (Marsh & Roche, 1997). Relatively similar findings were reported by Bachen, McLoughlin and Garcia (1999) who found that female students rated female faculty especially high across five teaching dimensions and male faculty comparatively lower, whereas male students did not evaluate male and female professors as significantly different. Another recent study conducted by Houser (2004) found students' perceptions of lecturers' expressiveness (such as warmth, enthusiasm, and extroversion) differ by gender and age. However, male and female lecturers could be effective with students of both genders by studying their feedback about their classroom learning experience using multidimensional SETs instrument as proposed in this study. The information might stimulate dialogue between the lecturer and their students about the best practice that could be effective with students of both genders.

The LISET instrument was not discipline specific. It was developed based on data collected from respondents specializing in six academic disciplines in the Postgraduate Diploma in Teaching Course for primary school. Thus, the instrument has general applicability for students' evaluation of teaching of all subjects of specializations in this course. The systematic approach in developing the LISET instrument provides evidence of validity based on content. A logical process of statistical testing utilizing exploratory factor analysis resulted in the identification of eight factors: "Self-rated Learning Accomplishment", "Rapport With Students", "Clarity of Presentation and Explanation", "Organization of the Lessons", "Stimulation of Student Interest", "Effective Speaking", "Questioning Skills" and "Lecturer Support for Student Assessment". The eight dimensions included in the LISET instrument were considered appropriate for student evaluation of classroom teaching because they

were bound by limit of meaningfulness (these dimensions provide useful information that will help teachers understand their performance and target improvement) and appropriateness (the extent to which students can realistically provide information about their teachers' teaching performance).

Reliability analyses suggest that LISET's items and scales were internally consistent and stable over a short period time (approximately three weeks interval). The internal consistencies and intra-class reliabilities of the eight LISET dimensions were respectable and well within acceptable limits for scales measuring psychological constructs. This finding indicates that the LISET instrument measures several different dimensions of teaching, which can be rated with reasonable degree of reliability. These findings were paralleled with a number of factor analytic studies (Murray, 1983; Marsh and Roche, 1994; Jackson et al., 1996; Barosi et al., 1998) in the following areas: multidimensionality, validity and reliability of SETs instrument in providing information about classroom teaching. Results of this study suggested that the LISET instrument has acceptable psychometric properties and it captures eight dimensions of teaching components namely, "Self-Learning Outcomes", "Rapport with Students", "Clarity of Presentation and Explanation", "Organization of the Lessons", "Stimulation of Student Interest", "Effective Speaking", "Questioning Skills" and "Lecturer Support for Student Assessment". These scales were key findings in this study because they have important characteristics that could assist in defining quality teaching from students' perceptions. It can be concluded that LISET is a multidimensional instrument that has reasonable content, construct and criterion validities. It can be used by lecturers with reasonable degree of reliability. The implication is this instrument can be used by lecturers to collect students' feedback

on their teaching for self-reflection and self-improvement. It could also be used by the administrators to evaluate the effectiveness of the teaching force in teacher training institutions for planning staff development activities or refreshment course. However, further refinement and testing are needed before this instrument can be accepted as a "standard" evaluation tool that can be used by lecturers to gather student feedback about teaching.

Declaration of Conflicting Interests

We certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

REFERENCES

1. Bachen, C. M., McLoughlin, M. M., & Garcia, S. S. (1999). Assessing the role of gender in college students' evaluations of faculty. *Communication Education*, 48(3), 193-210.
2. Barosi, G., Ambrosetti, A., Centra, A., Falcone, A., Finelli, C., Foa, P., ... & Italian Cooperative Study Group on Myelofibrosis With Myeloid Metaplasia, T. (2018). Splenectomy and risk of blast transformation in myelofibrosis with myeloid metaplasia. *Blood, The Journal of the American Society of Hematology*, 91(10), 3630-3636.
3. Barrie, S. C., Bucat, R. B., Buntine, M. A., Burke da Silva, K., Crisp, G. T., George, A. V., ... & Yeung, A. (2015). Development, evaluation and use of a student experience survey in undergraduate science laboratories: The advancing science by enhancing learning in the laboratory student laboratory learning experience survey. *International Journal of Science Education*, 37(11), 1795-1814.



4. Conti-Ramsden, G., & Durkin, K. (2017). Language development and assessment in the preschool period. *Neuropsychology review*, 22(4), 384-401.
5. Day, B. W., Lovato, S., Tull, C., & Ross-Gordon, J. (2016). Faculty perceptions of adult learners in college classrooms. *The Journal of Continuing Higher Education*, 59(2), 77-84.
6. Hare, A., Chatwin, M., Field, D., Tan, H. L., & Simonds, A. (2018). Interprofessional education (IPE) for respiratory care in neuromuscular disease (NMD) is feasible, and improves confidence in clinical practice.
7. Harrison, A. O., Moore, R. M., Polson, S. W., & Wommack, K. E. (2019). Reannotation of the ribonucleotide reductase in a cyanophage reveals life history strategies within the viroplankton. *Frontiers in microbiology*, 10, 134.
8. Houser, M. L. (2020). Effective Instructional Practice. *Communication Teacher*, 18(3), 78-81.
9. Hynes, R. K., & Knowles, R. (1984). Production of nitrous oxide by *Nitrosomonas europaea*: effects of acetylene, pH, and oxygen. *Canadian Journal of Microbiology*, 30(11), 1397-1404.
10. Ibrahim, K. F. K., Kharuddin, A. F., Mustafa, Z., Azid, N., & Kharuddin, D. (2020). An International Comparative Study of Student's Attitude towards Science in Four Asian Countries. *Al-Bukhary Social Business Journal*
11. Jackson, D. L., Teal, C. R., Raines, S. J., Nansel, T. R., Force, R. C., & Burdsal, C. A. (1999). The dimensions of students' perceptions of teaching effectiveness. *Educational and Psychological Measurement*, 59(4), 580-596.
12. Kharuddin, A. F., & Ismail, N. A. (2017). Graphing calculator exposure of mathematics learning in a partially technology incorporated environment. *EURASIA Journal of Mathematics, Science and Technology Education*, 13(6), 2529-2537.
13. Kharuddin, A. F., Azid, N., Mustafa, Z., Ibrahim, K. F. K., & Kharuddin, D. (2020). Application of Structural Equation Modeling (SEM) in Estimating the Contributing Factors to Satisfaction of TASKA Services in East Coast Malaysia. *Asian Journal of Assessment in Teaching and Learning*, 10(1), 68-76.
14. Kharuddin, A. F., Azid, N., Mustafa, Z., Kamari, M. N., Ibrahim, K. F. K., & Kharuddin, D. (2020). Determination of Sample Size in Early Childcare Centre (TASKA) Service Project in Malaysia: Classification and Analytical Approach. *Al-Bukhary Social Business Journal*
15. Kharuddin, A. F., Mustafa, Z., Azid, N., Kharuddin, D., Ibrahim, K. F. K., Hong, L. Y., ... & Zahri, Z. A. (2019). Comparison of registration status of Institutional Taska services in East Coast Malaysia. *Southeast Asia Early Childhood Journal*, 8(2), 57-62
16. Marsh, H. W., & Roche, L. A. (1997). Making students' evaluations of teaching effectiveness effective: The critical issues of validity, bias, and utility. *American psychologist*, 52(11), 1187.
17. McKeachie, W. J. (1991). What theories underlie the practice of faculty development?.
18. Ouimet, J. A., Bunnage, J. C., Carini, R. M., Kuh, G. D., & Kennedy, J. (2004). Using focus groups, expert advice, and cognitive interviews to establish the validity of a college student survey. *Research in Higher Education*, 45(3), 233-250.
19. Piaget, J. (1972). The child's conception of physical causality (Vol. 212). Transaction Publishers.
20. Prosser, M. & Trigwell, K. (1999). Understanding learning and teaching: The



experience in higher education. Buckingham:
SRHE & Open University Press, p.12

21. Prosser, M., & Trigwell, K. (1999). Understanding learning and teaching: The experience in higher education. McGraw-Hill Education (UK).
22. Sezen-Barrie, A. (2018). Utilizing professional vision in supporting preservice teachers' learning about contextualized scientific practices. *Science & Education*, 27(1), 159-182.
23. Slavin, J. (2003). Why whole grains are protective: biological mechanisms. *Proceedings of the Nutrition society*, 62(1), 129-134.
24. Wimsatt, L. A., Cooke, J. M., Biggs, W. S., & Heidelbaugh, J. J. (2016). Institution-specific factors associated with family medicine residency match rates. *Teaching and learning in medicine*, 28(3), 269-278.

