MNNF Publisher
ISBN NO: 978-967-17324-9-6

Enhancing Learning via Out-of-class Learning Inventory

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ABSTRACT

The central focus of the implementation of Outcome-Based Education (OBE) is structured educational system, which focuses on what students are able to do successfully at the end of their learning experiences. In short, the ultimate outcome of OBE is student learning. With regards to the preset study, the focus is on language learning. Successful language development is associated with active out-of-class learning activities engagement. Against this background, this Out-of-Class Learning Inventory (OoCLI) is devised to assist teachers in engaging students' out-of-class language learning. In doing so, an Outcome-Based Assessment (OBA), ELC231 test battery is used as the assessment to be measured. The items were devised based on generated themes from semi-structured interviews of 11 informants, which were then validated using Item Objective Congruence (IOC) method. A total of 65 students responded to the 6-point Likert scale survey and this is followed by scrutinizing the validity and reliability of the items using Rasch Measurement. 4 criteria were employed, namely item and person reliability, separation index, item fit and item polarity. Item reduction were done to gain the best fit of the items to Rasch model. A total of 14 items were deleted, leaving only 20 items with 1 open-ended item. Having shown evidence of high reliability and statistical validity, OoCLI may therefore be employed for assessing students' out-of-class learning, as well as a self-assessment inventory for the students.

Key Words: OBE, OBA, out-of-class learning, thematic analysis, IOC, Rasch

1. INTRODUCTION

Malaysia has in recent years announced its decision to implement Outcome-Based Education (OBE) at all higher learning institutions with the focus on developing world class human capital. It has to be noted that assessment is the key component of OBE system, i.e. aligning the assessments methods to the course outcomes. In order to ensure that all Learning Outcomes (Los) are achieved, it is imperative to employ Constructive Alignment (CA), in which, the Course Outcomes (Cos) are aligned to the Teaching and Learning Activities (TLAs), and the Assessment Tasks (ATs). Assessment methods include assignments, tests, quizzes, final exams, projects and etc. ATs must be manageable, some

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ISBN NO: 978-967-17324-9-6

TLAs as part of assessment task, design rubrics, ask students to reflect, requires a portfolio to be kept and set tasks that are practical to be carried out by the students. In addition, OBE system emphasizes on continuous assessment by means of employing formative and summative assessments, as well as authentic assessment. Hence, teachers are to align their assessment methods with the outcome statements. Since OBE is student-centered and the central focus is on student learning, it is important for learners to know their strengths and weaknesses, as well as their further development needs. It is worth noting that learning comprises diverse formal and informal setting experiences that complement each other (Colley, Hodkinson & Malcolm, 2003; National Research Council, 2009). In other words, in-class and out-of-class learning, in which the former is formal and the latter is informal setting. Bäumer et al., (2011, p. 92) pointed out that these two settings are viable in building "a complex web of synchronic as well as chronological learning opportunities". With regards to language learning, out-of-class learning has been empirically proven to have positive correlation with language gains (Inozu et al, 2010; Larsson, 2012; Richards, 2009; Sundqvist, 2011). Finding and employing various out-of-class opportunities for learning has been observed in successful language learners (Benson et al., 2003; Borrero & Yeh, 2010) Therefore, assisting language learning in constructing quality out-of-class learning experiences is deemed imperative (Blyth & LaCroix-Dalluhn, 2011; Stickler & Emke, 2011). It is against this backdrop that the researchers devise this OoCLI with a twofold purpose; to serve teachers and students. OoCLI may aid teachers to assess students' out-of-class learning practices, which may culminate in enhanced learning process. Information on students' out-of-class learning practices would be available to the teachers and this may help teachers to use this information in their teaching. Apart from that, this inventory may serve as a self-assessment, in which the students, while answering the inventory may become aware of their out-of-class activities and thus, assess themselves. This will provide some awareness in the students about their out-of-class learning practices. In doing so, the inventory is devised to gain access to 'what' (learning content, materials, tasks, etc.) and 'how' (the rate and sequence of learning) students learn outside of the classroom, including their test preparation and challenges faced outside of the class.

2. THE DEVELOPMENT OF OoCLI

This inventory is developed by means of employing both qualitative and quantitative methods. Table 1 demonstrates the methods applied and the outcomes of the methodologies.

Table 1: Methods and outcomes of OoCLI development

Method/Instrument		Outcome/Product
Qualitative	Face-to-face semi-structured Interview (n=11)	Themes
Qualitative	Inter-rater (n=2)	Items for survey (n= 36)
Quantitative	IOC (n=5)	Reviewed items for survey (n= 36)
Quantitative	Rasch Measurement (reliability, separation index, item polarity and item fit)	Validated items for survey (n= 20)

For the purpose of the present study, ELC231 test battery was chosen as the assessment. Therefore, students who have taken ELC231 in UiTM, Penang Branch Campus were approached as the respondents of this study. An individual face-to-face semi-structured interview was employed to gain insights from the students on their out-of-class learning experience in the course of attending ELC231. Purposeful sampling was employed, i.e. students who have taken ELC231 were chosen on voluntary basis as the informants in

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ISBN NO: 978-967-17324-9-6

order to better understand how they experienced learning with the influence of OBE. A lecturer was approached and asked for voluntary participants. 11 students volunteered to be interviewed at their free time. The students were contacted via WhatsApp and an appointment was set for the interview, which lasted for about 30 to 45 minutes.
The students were first explained briefly about the study and some background knowledge were provided so that they will be able to answer the interview questions. The students were then explained about ethical issues and they signed the consent letter. A recorder was used to record the interview for the purpose of transcriptions later for data analysis. The interviews were then transcribed and analyzed by means of thematic analysis. The researchers looked for main ideas in the interviews and this is done twice to ensure that there are no main ideas being overlooked. After that, the main ideas from each interview were combined and the themes were formed. A qualitative phenomenological method was employed to provide grounds for investigating a phenomenon as lived and experienced by a number of individuals rather than focusing on differences between individuals, building theories or documenting case studies (Creswell, et.al, 2007). Also, this method allows participants the opportunity to narrate their experiences with as much detail as possible, including their subjective reflections and judgments (Smith et al., 2009). To ensure the reliability of the generated themes, a Professor in the area of Language Testing in IIUM and a lecturer in UiTM who has the experience of teaching ELC231 were approached to rate the generated themes. The ratings were computed and the inter-rater reliability for the generated themes is 90.5%.

To reiterate, the focus of this OoCLI is 'what' (i.e. learning content, materials, tasks, etc) and 'how' (i.e. the rate and sequence) learning is going on outside of the classroom, as well as students' test preparation and challenges faced. Consequently, the generated themes were categorised accordingly. 36 (34 + 2 open ended) items were devised from the generated themes using 6-point reflect me Likert scale, i.e. very untrue of me to very true of me and were divided into 4 sections, namely activities, assessment, motivation to learn and challenges faced.

It is noteworthy that the content of the survey items have to be appropriate and met the objectives of the study. Therefore, these items were rated and reviewed by 5 expert judges to establish content validity. The expert judges were given 6-point scale from Very Irrelevant to Very Relevant. Item objective congruence (IOC) method (Rovinelli & Hambleton, 1977) was employed to measure the fit of individual items to content domain and to enable individual items to be assessed quantitatively. UiTM lecturers who have the experience of teaching ELC231 were approached as the expert judges and granted their agreement on voluntary basis. Since assessments in the OBE system is criterion-referenced, IOC is the preeminent step employed to validate criterion-referenced test (McCowan& McCowan, 1999) as how well the items measure the objective can be answered by means of IOC method. More specifically, a content expert will evaluate each item by giving the item a rating of 1 (for clearly measuring), -1 (clearly not measuring), or 0 (degree to which it measures the content area is unclear) for each objective (Turner & Carlson, 2002). The calculation of IOC index was done based on the degree to which an item measures (or does not measure) a specific objective. In deciding the cut off score, Rovinelli and Hambleton (1977) propose that "if one-half of the content specialists judged an item to be a perfect match to an objective, while the others were not able to make a decision, the computed value of the index would be .50".

The 36-item survey was distributed to students who have taken ELC231 and the respondents were informed that their participation was voluntary. Electronic survey, i.e. Google Form is utilized as a platform to disseminate the survey and 65 respondents answered the survey. To confirm the construct validity of the survey, the data were analyzed using Winsteps Rasch software version 3.72.1 (Linarce, 2009). According to Baghaei (2008), the Racsh model has been used widely to analyse questionnaires and construct

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ISBN NO: 978-967-17324-9-6

validity. Moreover, data that fitted the model indicates a valid test, in which a construct is underlying the covariance among the items and causes the item responses (Baghaei & Tabatabaee Yazi, 2016; Borsboom, 2008). Therefore, 34 items and 65 participants were subjected to the Rasch analysis to estimate the fit of data to the model. 4 criteria to assess the usefulness of measurement, i.e. reliability and validity are reported namely, person and item reliability, separation index, item polarity, and item fit.

In Rasch measurement, both item and person reliability are reported to indicate that the items can measure consistently. A value that is more than 0.7 is deemed significant and proposes that the items can measure consistently (Bond & Fox, 2007). Apart from the reliability value, the isolation index value is also looked into as the isolation index yield the isolation against the difficulty level according to the item. According to Linacre (2005), value of greater than 2.0 yields good isolation index. It has to be noted that the reliability of OoCLI is acceptable, in which the real person reliability index is 0.77 and model person reliability index is 0.84. This implies that the scale discriminates very well between the persons. The isolation index is slightly low as the real person separation index is 1.85 and the model person separation index is 2.33. The reliability of the items for OoCLI are higher, which is yielded in real item reliability (0.93) and model item reliability (0.94). Similarly, the isolation index values are also good, i.e. real item separation index is 3.71 and model item separation index is 3.94.

The next criterion is employed to determine if the items are measuring in the same direction by means of scrutinizing the item polarity. Items showing positive PT-Mea Corr value, which is more than 0.3 are good items, while items with negative value of PT-Mea Corr need to be dropped or reviewed as the items signifies no focus to the dimension being assessed (Bond & Fox, 2007). 8 items (item number 10, 13, 25, 30, 31, 32, 33, and 34) have PT-Mea Corr values of less than 0.3. The researchers moved on to the next criteria before deciding which items to be deleted by means of scrutinizing the fit indices. The fit indices exhibit productive measurement for survey data with rating scale. In Rasch model, perfect fit is indicated in the values of Outfit and Infit mean squares (MNSQ), which ranges from 0.6 to 1.4 (Wright & Linacre, 1994, Bod & Fox, 2007). As a result, 4 items were identified to not having the perfect fit, i.e. items 25, 15, 10, and 21. Because of the lack of fit to the model, the items were then scrutinized and decisions on item reduction were made and a total of 14 items were deleted. The items were deleted due to low values in item polarity and item fit. Apart from that, the items were carefully chosen so that they will not distort the survey as a whole. The 14 items deleted include items number 1,10,13,15, 25, 26, 27, 28, 29, 30, 31, 32, 33 and 34, leaving 20 items and 1 open-ended item. Items from 2 sections, namely motivation and challenges were dropped as some of the items in these sections are misfitting items. Hence, the survey has only 2 sections, i.e. activities and assessment. The challenges section is converted into an open-ended item. Following the item reduction, the 4 criteria were reanalyzed. The person reliability index has become higher; real person reliability index is 0.85 and model person reliability index is 0.89. Similarly, the isolation index also increases, i.e. real person separation index is 2.34 and model person separation index is 2.78. The item reliability values go a bit lower but are still good; real item reliability (0.89) and model item reliability (0.90). The real item separation index is 2.84 and model item separation index is 3.01. This information is presented in the Summary Statistics Winsteps Output Table (Table 2). Apart from person and item reliability, the value of Cronbach Alpja coefficient (0.89) suggests that there is a high level of interaction between 65 persons and 20 items. Notably, an instrument having very good psychometric internal consistency is considered a highly reliable instrument.

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ISBN NO: 978-967-17324-9-6

Table 2: Summary Statistics

SUMMARY OF 65 MEASURED (EXTREME AND NON-EXTREME) PERSON

	TOTAL SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	99.8	21.0	1.43	.31				
S.D.	11.3	.0	1.09	.20				
MAX.	126.0	21.0	6.71	1.83				
MIN.	63.0	21.0	-.72	.21	.11	-5.0	.11	-4.9
REAL RMSE	.43 TRUE SD	1.00	SEPARATION	2.34	PERSON RELIABILITY		.85	
MODEL RMSE	.37 TRUE SD	1.03	SEPARATION	2.78	PERSON RELIABILITY		.89	
S.E. OF PERSON MEAN = .14								

PERSON RAW SCORE-TO-MEASURE CORRELATION = .91
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .89

SUMMARY OF 21 MEASURED (NON-EXTREME) ITEM

	TOTAL SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	309.0	65.0	.00	.16	.98	-.2	1.06	.2
S.D.	21.0	.0	.50	.01	.33	1.7	.45	2.1
MAX.	343.0	65.0	.96	.19	1.69	3.2	2.24	5.1
MIN.	265.0	65.0	-.93	.14	.59	-2.5	.60	-2.4
REAL RMSE	.17 TRUE SD	.47	SEPARATION	2.84	ITEM RELIABILITY		.89	
MODEL RMSE	.16 TRUE SD	.48	SEPARATION	3.01	ITEM RELIABILITY		.90	
S.E. OF ITEM MEAN = .11								

With regards to item polarity, no item was found to be below the value of 0.3. Finally, the item fit indices are scrutinized. The infit MNSQ values for items 7 and 2 are slightly more than 1.6, while the infit mnsq valuse for items 5 is 0.59. Despite the slight misfitting value, the researchers decided to retain the 3 items as these items are necessary to provide a better understanding of out-of-class learning. To ensure a sound conclusion is drawn, the precision of measurement of OoCLI is evaluated to provide accurate and reliable measurement. The Item Column Fit Order, in which Model S.E or the Standard Error of Measure is scrutinized. A well-targeted instrument should be within 0.5 logits, i.e. < 0.5. With regards to the OoCLI, the Model S.E range between 0.1 to 0.2 logits and this suggests reliable and good Item fit. The 6-point Likert scale of the survey is converted into dichotomous yes or no as suggested by Stone (1998, p.1): “dichotomies in rating scales are more useful than multiple ratings”. His conjecture is based on the prominent Minnesota Multiphasic Personality Inventory (MMPI). Since the objective of this study is to devise an inventory on out-of-class learning, Stone’s view is taken into account.

3. POTENTIAL USE OF OOCLI

For the purpose of this study, only percentages were counted to show how teachers can make use of the data retrieved from the inventory. It was found that majority of the students learn English outside of the class without any specific reference to the curriculum, which means students learn informally and by means of authentic real-life situation. The use of technology is prevalent as most of the students prefer to learn English through discussions with friends (85%), using mobile apps (68%), Instagram (85), Google (83%), YouTube (79%), watch English movies (82%) and listen to English songs (88%) as their out-of-class learning activities. With regards to test preparation, 94 % of students prepare for test when exam is near. 40% recorded that they do not prepare for exam, which means 60% of the students do prepare for their tests. 94% of the students feel that homework given by their lecturer are helpful for their exam preparation. The challenges they faced outside of the class include friends, limited printed materials, packed classes, low proficiency level and they felt that they needed extra English classes.

Teachers may assign students with group work or projects as their out-of-class learning activities. Also, teachers may assign case study or problem-based learning to enhance students’ higher order thinking skill. Moreover, teachers can incorporate technology in their teaching activities, as well as assigning homework or activities outside of the class that may interest the students, i.e. using technology as a platform to learn. There

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ISBN NO: 978-967-17324-9-6

is abundance of electronic teaching platform available, such as Google classroom, Edmodo, to name a few. A follow up discussion about the project may be done in classroom by means of presentation, forum, etc.

It has to be noted that when students are given a project work, which has to be done outside of the class, this may culminate in the sought-after skills that the students could practice in their future career. This will then make their learning worthwhile. As students acknowledge that their learning is worthwhile, they could then justify their learning and find a motivation to learn (Brophy, 1999). It has to be noted that majority of the students felt that homework given by their teachers are useful in their test preparation. Hence, the researchers deem that teachers may assign students with homework that are related to their test preparation. The inventory helps teachers to gain access to students' learning activities outside of the class, apart from enabling students to self-assess themselves with regards to their out-of-class learning. Upon answering the inventory, teachers may go through the items in the inventory one by one with the students. While discussing on the items, teachers may prompt the students to think about their out-of-class learning. This may be followed by encouraging students to learn outside of the class as it will enhance their learning, especially with regards to real-life situation. According to Resnick (1987), in-class learning alone may not be sufficient to prepare students for real-world challenges. Hence, out-of-class learning complements in-class learning as events and objects in physical worlds are openly connected via out-of-class learning. Notably, students of this new age are not dependent on in-class learning as they are found to use various formal and informal resources to support their learning and hence, learning goes beyond in-class language learning contexts (Lai, 2013; Gao, 2010).

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