ADOPTION OF OPEN EDUCATIONAL RESOURCES AMONG TEACHERS IN A RURAL PUBLIC HIGH SCHOOL IN THE PHILIPPINES

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ABSTRACT

While the adoption of Open Educational Resources among higher education institutions has been widely explored, little is known about its adoption among secondary education institutions. The study was an attempt to address the said gap by providing information on the factors identified in Ajzen's Theory of Planned Behaviour that could lead to the adoption of Open Educational Resources among rural public high school teachers in the Philippines. It was deemed imperative to explore the adoption of Open Educational Resources among high school teachers in the Philippines in line with the recent basic education system shift to K to 12. This study, which surveyed 93 rural public high school teachers, found that in general, the teachers had a favourable perception of Open Educational Resources and their adoption of it could be determined specifically by their attitude and perceived behavioural control, such as perceived self-efficacy and learning autonomy. The study offered recommendations which could provide scholars and practitioners information to ensure that secondary education institutions in the Philippines would also avail of the affordances of OER.

Keywords: *K to 12, open educational resources, secondary education, theory of planned behaviour*

INTRODUCTION

In the Philippines, basic education has undergone a major shift with the implementation of the K to 12 programme through the enactment of Republic Act 10533 (Department of Education, 2015). The programme extended basic education from 10 years to 12 years with the goal of reforming the educational system. Based on the findings of research on similar education programmes abroad, the K to 12 programme introduced Exploratory and Specialised Technology and Livelihood Education for Grades 7 to 10 students in junior high school and made several core subjects mandatory for Grades 11 to 12 students in senior high school. Although deemed by the Department of Education as a step forward in reforming the Philippine educational system, these changes were met with criticisms from different stakeholders. Teachers in secondary education were concerned with overwhelming changes in their duties and obligations as well as in curricula which required advancement in knowledge and skills needed to inculcate the stipulated competencies in students (Shahani, 2015).

Prior to the implementation of the K to 12 programme, the Department of Education had already been cognisant towards the need to improve the knowledge and skills of educators. In 2009, the department piloted an information and communication technology (ICT) tool called Learning Resource Management and Development System (LRMDS) which, according to former Department of Education Secretary, Jesli Lapus, was conceptualised and pioneered out of the knowledge that "the use of ICT is very critical in learning as well as in school management" (ABS-CBN News, 2009). Given the shift from the 10-year basic education system to K to 12 programme, knowledge and skills concerning the use of ICT such as LRMDS is deemed a must for teachers in the Philippines. This is due to the fact that the advent of ICTs is now paving the way for paradigm shifts in various educational systems. As explained by Alfonso (2014a), knowledge has now become non-linear. Instead of relying completely on what is said by teachers or in textbooks, learners can now refer to a wide array of Internet resources and construct knowledge through interaction with people across "classes, disciplines, borders, and cultures" (Alfonso, 2014b).

To address these developments in the field of education, open education practitioners from across the globe gathered in 2007 to formulate and sign the Cape Town Open Education Declaration (Arinto, 2017). The declaration, which called for more open and accessible education for all, initiated the Open Education Movement. The movement encourages the free sharing of resources, promotion of economic efficiency, prevention of duplication and restrictive practices, and improvement of access to different groups of stakeholders (Alfonso, 2014). Part of this movement is the Open Educational Resources (OER) movement, which aims to democratise learning materials by encouraging educators worldwide to develop resources on the Internet which are open and available for all. According to The Organisation for Economic Co-operation and Development (as cited in Garcia, Serrano & Alip, 2017), OER are "digitised materials offered freely and openly for educators, students, and self-learners to use and reuse for teaching, learning, and research" (Garcia, Serrano, and Alip, 2017). Wiley, Green, and Soares (2012) also noted that OER are learning materials that come in many forms such as curricula, homework assignments and textbooks, and exist for "all levels of education, from kindergarten through college."

With these developments in the Philippine educational system, there is a need to explore secondary school teachers' adoption of more advanced teaching strategies which will help them to address concerns inherent in the recent shift towards K to 12. As literature shows, OER empower both learners and educators by giving them access to an entire body of literature and allowing them to localise content to better fit their needs (Garcia, Serrano, & Alip, 2017; Arinto, 2017). Hence, its promotion and adoption particularly among Philippine secondary school teachers could be deemed relevant.

This research attempted to dissect factors which could lead to the adoption of OER by rural public high school teachers. In particular, the research was guided by Ajzen's Theory of Planned Behaviour (Ajzen, 1991) in seeking to determine whether rural public high school teachers' adoption of OER could be predicted by any of the following factors: (1) attitude; (2) subjective norms; and (3) perceived behavioural control. Recommendations as to how scholars and practitioners could provide information to ensure that secondary education institutions in the Philippines would avail of the affordances of OER will also be given.

FRAMEWORK

The study used Ajzen's Theory of Planned Behaviour (Ajzen, 1991), which highly supports the use of empirical evidence in determining behavioural variance. It assumes that human behaviour could be predicted using three interrelated belief systems: (1) behavioural beliefs which can lead to a favourable or unfavourable attitude towards a behaviour; (2) normative beliefs which can result in subjective norms or expectations about one's behaviour; and (3)

control beliefs which can determine one's perceived behavioural control with regard to factors that can aid or prevent the actual behaviour.

In applying the Theory of Planned Behaviour to this study, the researchers relied on Cheon, Lee, Crooks and Song (2012) operationalisation of the beliefs which determined attitude, subjective norms, and perceived behavioural control. The behavioural beliefs used to predict attitude were: (1) perceived ease of use of OER and (2) perceived usefulness of OER in teaching high school students. Those used to predict subjective norms were: (1) instructor readiness to use OER; and (2) student readiness to use OER. With regard to perceived behavioural control, these two factors were considered: (1) perceived self-efficacy to use OER; and (2) learning autonomy to use OER. Attitude, subjective norms and perceived behavioural control were all used to predict intention. Figure 1 shows how the framework was used in the study. The researchers deemed that both actual behavioural control towards OER and actual adoption of OER would not be covered as these were best studied using a combination of survey and process documentation.
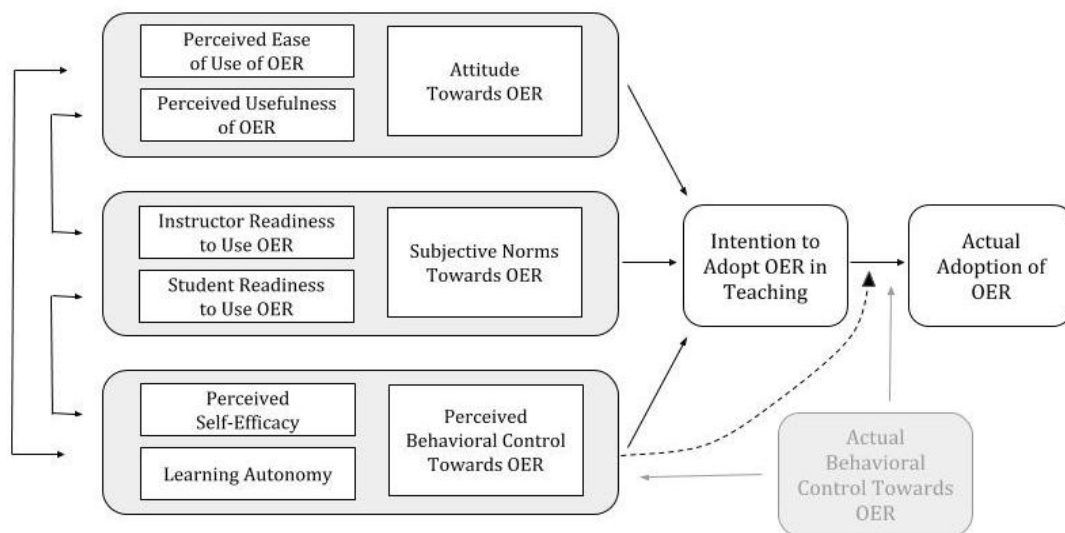

Figure 1: Conceptual Framework of the Study

Many studies used the Theory of Planned Behaviour and its factors to predict the adoption of technology and digital learning materials for teaching purposes. Mijares, Bustamante, Ayo, Anacio, and Jotic (2017) reported that among university pre-service teachers, perceived ease of use and usefulness could predict one's attitude towards OER while subjective norms were dependent primarily on students' influence. In terms of behavioural control, the existence of technology and a sense of efficacy were deemed as significant factors. Overall, Mijares et al. (2017) found that for university pre-service teachers, attitude and subjective norms could determine their adoption of OER in university teaching. The importance of attitude also resonated with the results of a study conducted by Kreijns, Vermeulen, Van Acker, and Van Buuren (2014). They found that the adoption of digital learning materials for teaching rested primarily on teachers' attitude towards the materials and less on the subjective norms and perceived behavioural control. Similar results were also found by Mtebe and Raisamo (2014) whose study focused on higher education instructors in Tanzania. Accordingly, attitude, specifically ease of use, could determine instructors' adoption and use of OER in teaching while subjective norms such as social expectancy and facilitating factors were deemed insignificant.

While the studies cited above found that not all factors or related factors in the Theory of Planned Behaviour could predict teachers' adoption of technology and digital learning

materials in teaching, this might not be the case for studies conducted among students. Cheon et al. (2012) found that among students enrolled in a higher education institution, the adoption of mobile technology for learning could be predicted using all three factors of attitude, subjective norms and perceived behavioural control and could account for 87.2% of the intention to use mobile technology in learning. Attitude was also successfully predicted by perceived ease of use and usefulness of technology. Similarly, subjective norms were also predicted by both instructor and student readiness while perceived behavioural control was determined by perceived self-efficacy and learning autonomy.

Given the few studies available on OER adoption by high school teachers specifically, a study in view of the shift in the educational system was imperative and could provide data to pave the way for secondary school education in the Philippines to utilise OER.

RESEARCH METHODOLOGY

Participants

The researchers selected a rural public high school situated in a second-class municipality with one of the highest poverty rates in the province. The said rural public school employs 118 teachers and teaches over 3,000 students. The researchers opted for non-random sampling by distributing questionnaires to all the teachers. A total of 93 teachers returned their accomplished questionnaires. These teachers had an average age of 33, and 70 of them were women. These teachers were also handling Grades 7 to 12 classes and had been teaching for an average of 6.6 years.

Among the teachers, 52 (56%) reported having Internet access at home and 66 (71%) reported having Internet access in school. The majority had the following mobile devices: 78 (84%) had smartphones and 89 (96%) had laptop computers. Eighty-five (91%) also reported having social media accounts. In terms of frequency of use, the majority reported that they used their smartphones, laptop computers and social media accounts often or always.

Data Collection

A questionnaire adapted with permission from Cheon et al (2012) was distributed to the 118 teachers. The questionnaire was divided into four parts, whereby the first part introduced the study and provided the UNESCO definition of OER. The second part gathered the teachers' demographic information while the third part determined their ownership and use of Web 2.0. The final part comprising 30 questions tackled the 10 factors of Ajzen's Theory of Planned Behaviour. These factors were measured using a seven-point Likert scale (1 - totally disagree; 2 - somewhat disagree; 3 - disagree; 4 - neither agree nor disagree; 5 - somewhat agree; 6 - agree; and 7 - totally agree).

Data Analysis

The data gathered were encoded in the Statistical Package for the Social Sciences (SPSS). Reliability measures were checked for all the 10 factors of Ajzen's Theory of Planned Behaviour. Except for the construct of perceived self-efficacy which was close to the acceptable Cronbach's Alpha of .70 (Santos, 1999), all of the factors reported high internal consistencies. (See Table 1)

Table 1: Internal Factor Reliability

Factors	Cronbach's Alpha
Perceived Ease of Use	.919
Perceived Usefulness	.924
Attitude	.928
Instructor Readiness	.870
Student Readiness	.943
Subjective Norm	.905
Perceived Self-Efficacy	.686
Learning Autonomy	.898
Behavioural Control	.942
Intention	.938

Descriptive measures were computed for all parts of the questionnaire while the test of assumptions was conducted to ensure the suitability of applying multiple linear regression to the data gathered on the 10 factors of Ajzen's Theory of Planned Behaviour.

The scatter plots generated showed a linear relationship between the independent variables (attitude, subjective norms and perceived behavioural control towards OER) and the dependent variable (intention to adopt OER).

In terms of multicollinearity, the variance inflation factor (VIF)and tolerance scores were computed. The results showed no multicollinearity among variables since VIF scores were below 10 and tolerance scores were above 0.2.

The independence of residuals was examined through the Durbin-Watson test which yielded a value of 1.9. Aside from independence, the residuals also had constant variance and normality as exhibited in the scatterplot and p-plot.

Lastly, the researchers computed for Cook's distance values and found no outliers that influenced the model. Since all the assumptions for multiple linear regression were met, the researchers pushed through with multiple linear regression.

RESULTS AND DISCUSSION

The data gathered through the seven-point Likert scale survey showed in Table 2 indicated that the rural public high school teachers perceived OER and its adoption favourably. The majority of the statements were given a rating of six except for the construct of perceived behavioural control and its predictors: perceived self-efficacy and learning autonomy. In this regard, it could be deduced that the rural public high school teachers only somewhat agreed that they were provided with facilitating surroundings to adopt OER for their classes.

Table 2: Teachers' Perception and Adoption of OER

Scale/Items	Mode	Median	Mean	SD
Perceived Ease of Use (PEU)	**6.00**	**5.67**	**5.54**	**.99**
PEU1: I believe OER are easy to use.	6.00	6.00	5.61	.98
PEU2: I believe OER are easy to access.	6.00	6.00	5.46	1.06
PEU3: I believe OER are easy to understand.	6.00	6.00	5.54	.94
Perceived Usefulness (PU)	**6.00**	**6.00**	**5.86**	**.76**
PU1: I believe OER would improve my ability to teach	6.00	6.00	5.97	.72
PU2: I believe OER would allow me to get my work done quickly.	6.00	6.00	5.86	.78
PU3: I believe OER would be useful for my students' learning.	6.00	6.00	5.76	.77
Attitude (A)	**6.00**	**6.00**	**5.62**	**.86**
A1: I would like teaching more if I use OER.	6.00	6.00	5.60	.88
A2: Using OER in teaching would be a pleasant experience.	6.00	6.00	5.68	.87
A3: Using OER in my coursework is a wise idea.	6.00	6.00	5.58	.85
Instructor Readiness (IR)	**6.00**	**5.83**	**5.61**	**.79**
IR1: I think teachers would be in favour of utilising OER for their subjects.	6.00	6.00	5.57	.82
IR2: I think teachers would believe that OER could be useful materials for their subjects.	6.00	6.00	5.68	.77
IR3: I think teachers have the skills to use OER in their teaching.	6.00	6.00	5.56	.79
Student Readiness (SR)	**6.00**	**5.67**	**5.51**	**.83**
SR1: I think students would be in favour of utilising OER for their subjects.	6.00	6.00	5.48	.80
SR2: I think students would believe that OER could be useful materials for their subjects.	6.00	6.00	5.57	.85
SR3: I think students have the skills to use OER for their subjects.	6.00	6.00	5.47	.84
Subjective Norms (SN)	**6.00**	**5.67**	**5.45**	**.79**
SN1: Most people in school would think it would be fine to use OER in teaching.	6.00	6.00	5.43	.83
SN2: I think other teachers would be willing to use OER.	6.00	6.00	5.52	.75

SN3: Most people in school would be in favour of using OER in teaching.	6.00	5.50	5.41	.80
Perceived Self-Efficacy (PSE)	**6.00**	**5.00**	**5.14**	**.98**
PSE1: I am confident about using OER for my subjects.	6.00	6.00	5.45	.83
PSE2: Using OER for my subjects would not challenge me.	4.00	5.00	4.62	1.25
PSE3: I would be comfortable using OER for my subjects.	6.00	5.00	5.34	.87
Learning Autonomy	**6.00**	**5.41**	**5.42**	**.78**
LA1: I would be able to access OER for my subjects.	5.00	5.00	5.37	.79
LA2: I would have more opportunities to create knowledge for my subjects using OER.	6.00	6.00	5.56	.72
LA3: I would be able to control the pace of learning in my classes with OER.	6.00	5.00	5.34	.82
Behavioural Control (BC)	**5.00**	**5.00**	**5.07**	**1.03**
BC1: I have sufficient knowledge to use OER.	5.00	5.00	4.92	1.06
BC2: I have sufficient control to make a decision to adopt OER for my subjects.	5.00	5.00	5.12	1.03
BC3: I have sufficient self-confidence to make a decision to adopt OER for my subjects.	5.00	5.00	5.15	.99
Intention (I)	**6.00**	**5.67**	**5.46**	**.79**
I1: I predict I would use OER for my subjects.	6.00	5.00	5.42	.79
I2: I plan to use OER.	6.00	6.00	5.49	.80
I3: I intend to adopt OER for my subjects.	6.00	6.00	5.48	.78

Multiple linear regression was conducted to predict attitude, subjective norms and perceived behavioural control, and the capacity of these factors to predict the intention to adopt OER. Table 3 summarises the analysis of the results through the proportion of variation in the intention to adopt OER as explained by the factors (R^2 and Adjusted R^2) and the standardised coefficients (β) or the unit increase in the intention to adopt OER for every unit increase in the factors.

It was found that only perceived usefulness (β = .671, p<.001) could significantly determine the attitude of rural public high school teachers towards OER. Subjective norms were found to be significantly predicted by instructor readiness (β = .408, p<.001) and student readiness (β = .352, p<.01). Meanwhile, learning autonomy (β = .411, p<.001) and perceived self-efficacy (β = .335, p<.01) were both found to be significant predictors of perceived behavioural control.

The findings on the prediction of attitude, subjective norms, and perceived behavioural control of the rural public high school teachers shared similarities and differences with the findings of Mijares et al. (2017) who focused on the same factors, but among higher education pre-service teachers. In contrast, Mijares et al. (2017) found that the attitude

towards OER of pre-service teachers in the university could be predicted by both perceived ease of use and perceived usefulness. However, the present study supported the empirical evidence found by Mijares et al. (2017) whereby peer and student influence could predict subjective norms towards OER and perceived self-efficacy and facilitating factors such as technology and resources could determine perceived behavioural control.

Table 3: Factors Predicting Rural Public High School Teachers' Adoption of OER

Factors	R^2 (Adjusted R^2)	Beta (β)
Attitude	**.570 (.561)**	
Perceived Ease of Use		.139
Perceived Usefulness		.671***
Subjective Norm	**.476 (464)**	
Instructor Readiness		.408***
Student Readiness		.352**
Perceived Behavioural Control	**.466 (.454)**	
Perceived Self-Efficacy		.335**
Learning Autonomy		.411***
Intention	**.473 (.455)**	
Attitude		.382***
Subjective Norms		.160
Behavioural Control		.313***

Note: *p<.05; **p<.01; ***p<.001

Multiple linear regression with all three factors of attitude, subjective norms, and perceived behavioural control as predictors yielded the following results: R^2 = 473, F(3.88) = 26.37, p<.001. Only attitude (β = .382, p<.001) and perceived behavioural control (β = .313, p<.001) deemed as highly significant predictors. This means subjective norms operationalised and predicted in terms of instructor and student readiness did not contribute to the regression model. It could also be said that the model with the three factors as predictors could only account for 47.3% of the variance of OER adoption among rural public high school teachers.

These findings offered a unique perspective in comparison to other studies about the adoption of OER, technology and digital learning materials which were previously cited (Cheon et al., 2012; Kreijns et al., 2014; Mtebe & Raisamo, 2014; Mijares et al., 2017).

CONCLUSION

The study attempted to understand how secondary education institutions, particularly rural public high schools, could adopt OER and avail of its affordances. The findings showed that

attitude and perceived behavioural control were significant determinant factors. This means that for rural public high school teachers, the usefulness of OER and their capacity to control its use could encourage them to employ OER in their teaching. The findings disregarded the notion that peer and student readiness are considered when adopting technology-based materials such as OER. Given the importance of attitude and the lack of consideration for peer readiness, it can be derived that for rural public high school teachers, teaching is an individual pursuit and their intention of adopting OER could rely on their personal affective faculties, behavioural predisposition and cognition. Meanwhile, the lack of consideration for student readiness implied a linear nature of knowledge transfer such that the teachers would have a free hand in determining the materials used for class without seeking recommendations and feedback from students. This also reinforced the need for control in the intention to adopt OER. In this regard, education scholars and practitioners must look into the incorporation of OER in secondary education institutions by focusing on their usefulness and flexibility in such a way that the teachers could control and tailor-fit the OER based on classroom needs. In the same way, education scholars and practitioners may also promote the use of OER via Web 2.0 technologies since the profile of the teachers surveyed in this study showed that the majority owned mobile devices and used social media. The study also resulted in a model that could only account for 47.3% of the variance in the intention to adopt OER. While these pointed to the Theory of Planned Behaviour factors (Ajzen, 1991) that education scholars and practitioners must focus on, other theories of technology adoption such as the Technology Acceptance Model and the Unified Theory and Acceptance of Use of Technology must be tested to determine whether other factors could account for OER adoption. The factors can be individually dissected to thicken the literature about OER adoption among secondary education institutions in future studies. Discussions may also continue to pave the way for the conceptualisation and implementation of initiatives such as the LRMDS. This calls for more institutional actions on the part of the Department of Education and the cooperation of secondary education institutions.

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