

EVALUATION OF PRE-SERVICE TEACHERS OF GOOGLE FOR EDUCATION ONLINE TRAINING MODULES

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ABSTRACT

Responding to the needs of digital learners requires higher education institutions to continuously innovate their curriculum in order to develop teachers equipped with 21st century skills in technology integration. One such e-learning initiative is the integration of Google for Education (G4E) online training modules. This research aims to determine the experiences and evaluation of sixty-seven (67) pre-service teachers who took the G4E fundamentals online training modules as part of their educational technology course. Results of the survey show highly appropriate ratings for the online learning features and moderate ratings for the ARCS motivational design features of the G4E modules. The data also indicates that students in higher levels access and spend more time doing the G4E modules. Duration of access is fostered by quality of online learning – i.e. fast online access. Among the ARCS motivational design features, the satisfaction features proved to be the primary strength of the G4E modules. Pre-service teachers who frequently access the modules reported doing the modules in advance and expressed willingness to take another G4E online training module. Additionally, the attention and relevance features significantly contributed to their willingness; whereas the confidence features significantly contributed to their readiness to take the G4E certification exam. Recommendations on how to improve the integration of the G4E online training modules are presented.

Key words: *ARCS, E-learning, Google for Education, Motivational design, Online Learning, Pre-service teachers*

INTRODUCTION

As part of the Br. Andrew Gonzalez, FSC – College of Education’s mission to produce teachers responsive to the changing times, the students are exposed to various e-learning trainings in their pre-service education. One such initiative for SY2015-2016 is the exposure to Google for Education (G4E) online training modules with the aim of improving their technological, pedagogical and content knowledge in integrating Google for Education tools. Since e-learning often requires students to be highly motivated and committed to learning (Huynh, Umesh, & Valachich, 2003) due to less social interaction with peers or an instructor compared to traditional learning, it is important to examine the evaluation and experience of

students towards the modules in order to develop effective strategies and for continuous improvement of such initiative.

21st century teachers and pre-service education

Pre-service teachers will be coming into classrooms comprised of 21st century learners. Part of their future role is to develop the information, media and technology skills among their students (Partnership for 21st Century Skills, 2015). In order to accomplish this, the International Society for Technology in Education sets standards for teachers which include design and development of digital age learning experience and assessments, modeling of digital age work and learning, and promotion and modeling of digital citizenship and responsibility (ISTE, 2015). To be able to successfully fulfill their responsibilities, teachers have to be exposed in their pre-service education to trainings not just about technology skills and applications, but about pedagogical methods of incorporating various technologies in their teaching (Snider 2003 as cited by Oakley 2008).

Efficacy of E-Learning

E-learning or electronic learning is a type of learning and teaching wherein the activities are mediated by Information and Communication Technologies (ICTs) (Naidu, 2006). In e-learning, the role of internet is highlighted in facilitating the asynchronous as well as synchronous activities. As Resta & Patru (2010) define it, e-learning is learning by communicating using the internet and interacting with content accessed on the internet, all within the context of sound pedagogy. This involves the use of different technologies such as audio, video, screencasts and learning management systems.

A lot of studies have examined the effectiveness of online instruction as compared to traditional face-to-face instruction in improving not just student learning but other factors such as technological application skills (Kuo, Song, Smith, & Franklin, 2007). Students who have e-learning instruction for all or part of their course performed better and outperformed their face-to-face counterparts (US Department of Education, 2010; Shachar & Neumann, 2010). E-learning is also advantageous in terms of offering more flexibility and convenience of learning (Jaggars, 2013). This is since students have more access and time digesting the information (Rashty, n.d.). Students also prefer learning and interacting online, expressing higher satisfaction and rating learning as more effective when mediated with technology (Radovic-Markovic, 2010).

ARCS Model of Motivational Design

In designing Computer Assisted Instruction (CAI), one model that can be used to guide developers is the ARCS Model by Keller (2010). This motivational design model is anchored on the expectancy-value motivation theory identifying "effort" as the major measurable motivational outcome.

For effort to occur, the person must value the task and believe he can succeed in the task. This means that the learning task needs to be presented in a way that is engaging and meaningful to the student, and in a way that promotes positive expectations for the successful achievement of the objectives (Small, 1997).

The ARCS Model focuses on four (4) essential strategy components for motivating students. These are attention, relevance, confidence, and satisfaction (Keller, 2006; Keller, 2010). Attention strategies refer to design features that arouse and sustain the learners' curiosity and interest. Relevance strategies refer to design features that link learning tasks to learners' needs, interests, and motives. Confidence strategies refer to design features that help learners develop a positive expectation for successful achievement. Satisfaction strategies refer to design features that provide extrinsic and intrinsic reinforcement for effort. The ARCS model can also be used as a tool for evaluating the design features of CAI modules under the four strategies.

Conceptual Framework

This evaluation study was based on the premise that design features of the Google for Education online training modules contributes to the learners' experience towards the modules. Evaluation for this study will be guided by two evaluation frameworks. The first involves the evaluation of the online learning features of G4E online training modules. The second involves the evaluation of the G4E online training modules based on the ARCS model of motivational design – that is, evaluation of design features for attention, relevance, confidence and satisfaction strategies. These features affect the pre-service teachers' experience in the G4E online training modules – pertained to as their effort in terms of actual use of the modules. Taken together, the results of the evaluation will enable the identification of the critical success factors of the online training modules. Figure 1 shows the framework used in the study.

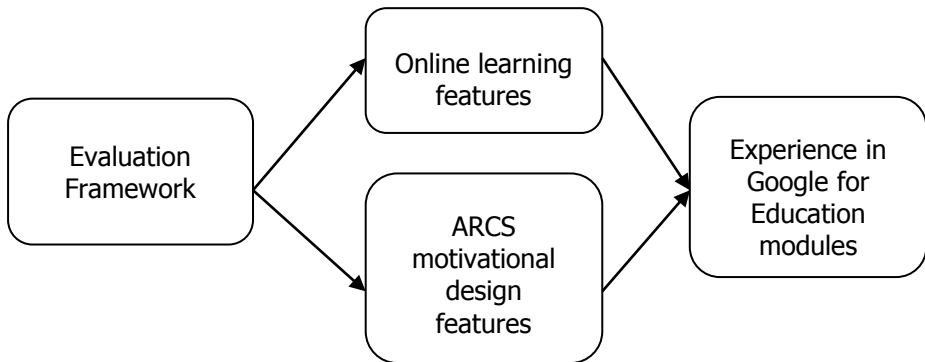


Figure 1. Conceptual paradigm for Evaluation of Pre-service Teachers of Google for Education Online Training Modules

Research Objectives

The objective of the study was to describe the experience and evaluation of pre-service teachers towards the Google for Education online training modules. Specifically, it aimed to answer:

1. What is the evaluation of pre-service teachers of the Google for Education online training modules in terms of:
 - a. Online learning features
 - b. ARCS motivational design features
2. How is the various features related to their experience with the G4E online training modules?
3. Which other factors contribute to their experience?

METHOD

This was a descriptive mixed method study which aims to describe the experiences and evaluation of pre-service teachers of Google for Education (G4E) online training modules. The G4E modules are online training modules for teachers composed of two main tracks, namely Fundamentals Training and Advanced Training, which equips teachers with best strategies for integrating Google for Education tools in their classroom. It also aims to develop the computer science knowledge and skills of teachers through multimedia instruction, reflection, web-based activities and assessment. Under the Fundamentals Training there are 13 units spanning from engaging in professional growth and leadership, increasing efficiency and saving time and facilitating and inspiring student learning and creativity.

Sixty-seven (67) students served as the participants for the study and took G4E Fundamentals Training modules as part of their Educational

Technology (EdTech) course. The modules were optional for students and consent forms were provided. An orientation was given to the students on the nature and outline of the modules. The link to the G4E modules were made available through the course's Sakai online learning management system. Recommended units to accomplish for the various weeks and proof of completion outputs were also given. Support with the modules was also provided via face-to-face consultation and through an online discussion forum.

A four-part questionnaire was used to evaluate the Google for Education Online Training Modules at the end of the course. Part A surveyed the students' profile. Part B contains 6 items rated on a 4-point scale to evaluate the online learning features of the modules adapted from the Lee, Mohammed and Altamimi (2015) containing subscales for quality of online learning (0.89 alpha value) and feasibility of online learning (0.90 alpha value). Part C of the questionnaire evaluated the ARCS motivational design features of the modules using the Instructional Materials Motivation (IMMS) Survey of John Keller (2006). The IMMS is based on Keller's ARCS model of motivational and contains 36 items rated on a 5-point scale across four areas of Attention, Relevance, Confidence and Satisfaction (0.96 reliability estimate). Part D looked into the actual use of G4E modules. The survey was administered online via www.surveymonkey.com. Interview with the students about their experiences using the G4E online training modules was also conducted.

Mean scores for the online learning features and ARCS motivational design features were computed. Correlation was also done with their experiences to determine relationships, with T-test and ANOVA to check significant differences. Interview responses served as support for the quantitative data.

RESULTS AND DISCUSSION

Profile of participants

The 67 participants are aged 17-24 years old, composed of 46 females (69%) and 21 males (31%). Majority of the participants are second year students (60 out of 67 or 90%), full time students (64 out of 67 or 95%) and enrolled in 20 units on average. Half of the participants (34 out of 67 or 51%) are Early Childhood Education major students. There were 14 Science Education, as well as English major students (21%) and there were 5 of the participants are Educational psychology majors (7%). The participants have high access to technology as 59 out of 67 (89%) reported to have their own laptop computers, 65 (98%) have smartphones and 64 (96%) have internet access at home.

Evaluation of G4E modules

The participants' evaluation of the G4E modules in terms on online learning features is presented in Table 1 below. All items have been rated as highly appropriate by the participants, with being able to learn at own pace, anytime anywhere ($M = 3.54$, $SD = 0.70$) rated as the most appropriate flexibility feature. On the other hand, feasibility of learning online ($M = 3.40$, $SD = 0.74$) rated as the most appropriate quality feature.

The results suggest that students prefer the practicality of making the G4E modules available online, particularly for the flexibility it can afford to them. This confirms the claim of various studies on course flexibility as a factor that influence students view of e-learning (Jaggars, 2013; Gandema & Brown, 2012).

Table 1. Evaluation of G4E modules online learning features

	Mean	SD	Verbal Interpretation
<i>Quality of Online Learning</i>	3.36	0.71	Highly Appropriate
Ease of accessing the system	3.34	0.73	Highly Appropriate
Speed of accessing the system	3.34	0.66	Highly Appropriate
Feasibility of learning online	3.40	0.74	Highly Appropriate
<i>Flexibility of Online Learning</i>	3.42	0.76	Highly Appropriate
Can plan own learning schedule	3.42	0.80	Highly Appropriate
Can learn at own pace, anytime, anywhere	3.54	0.70	Highly Appropriate
Can learn independently without a teacher	3.31	0.76	Highly Appropriate
Online Learning Features	3.39	0.73	Highly Appropriate

The participants' evaluation of the G4E modules in terms on motivational design features are presented in Table 2 below. The relevance dimension got the highest rating ($M = 3.52$, $SD = 0.87$) and was seen as mostly true, while the confidence dimension got the lowest rating ($M = 3.28$, $SD = 0.88$) and was seen as moderately true. The results reiterate the critical role of perceived usefulness as a main determinant for acceptance of e-learning systems (Tarhini, Hone & Liu, 2014; Lee, Hsieh & Chen, 2013).

Table 2. Evaluation of G4E modules motivational design features

	Mean	SD	Verbal Interpretation
Attention	3.29	0.89	Moderately true
Relevance	3.52	0.87	Mostly true
Confidence	3.28	0.88	Moderately true
Satisfaction	3.49	0.87	Mostly true
Motivational design	3.40	0.88	Moderately true

Two items under the satisfaction dimension got the highest rating, namely "Completing the exercises in the modules gave me a satisfying feeling of accomplishment" ($M = 3.82$, $SD = 0.88$, Mostly true) and "It felt good to successfully complete the modules" ($M = 3.82$, $SD = 0.99$, Mostly true). The highest rated item in the relevance dimension was "The content of the modules will be useful to me" ($M = 3.68$, $SD = 1.01$, Mostly true).

Two of the lowest rated item was in the confidence dimension namely, "Many of the pages had so much information that it was hard to pick out and remember the important points" ($M = 2.64$, $SD = 0.95$, Moderately true) and "The modules were more difficult to understand than I would like for it to be" ($M = 3.05$, $SD = 0.95$, Moderately true). Another low rated item was "The amount of repetition in the modules caused me to get bored sometimes" ($M = 2.71$, $SD = 0.94$, Moderately true). in the attention dimension. This was echoed during the interview with the participants saying that the length of the content, specifically the amount of text the modules have is too long. These long texts led to the modules to "get boring," "felt so long and uninteresting" and "can be dragging."

Other design considerations suggested by the participants are to have more visuals (presentations and videos) and interactions on the modules and not simply texts. Additionally, they mentioned that having more output-based activities to try out the concepts is better instead of simply learning in way of information which they tend to easily forget. This is supported by Liaw & Huang (2012) that interactive learning environments as predictors to self-regulation in e-learning environments.

Experiences using G4E modules

Majority of the participants accessed the module once a week (67%) followed by 2-3 times a week (32%). Duration of access is either for 31-60 minutes (37%) or less than 30 minutes (35%). There were 14% of participants who reported 1-1.5 hours of duration of access and 6% who reported 1.5-2 hours and 2-3 hours duration. Almost half of the participants (49%) mentioned that they accomplish the modules late or have backlog, while 35% finished the modules on time and 15% in advance. At the end of the course, 31 out of the 67 participants (46%) were able to finish all 13

modules. There was a completion average of 8.18 out of 13 modules. Given a chance, 53% mentioned intention to take another G4E online training modules and 44% mentioned willingness to take the G4E certification exam.

Lack of time to do the modules was one of the themes that arise from the interview with the participants. They mentioned the problem of time management since they already have required assignments from other courses that occupy their time, making it a challenge for them to “find the time to finish them (the modules).” As Islam, Beer and Slack (2015) explain, e-learning brings about time management challenges to its users. This is mirrored in Muuro, Wagacha, Oboko & Kihoro’s (2014) study that found out how lack of time to participate served as a challenge for online learners.

Relationship of G4E modules design features and experience

Table 3 presents the correlation table for the Online Learning (OL) features, motivational design features and experiences of the participants. Quality of OL, Flexibility of OL and overall OL Features are strongly interrelated showing consistency of the OL features. Similarly, the ARCS model is consistent with strong correlation between Attention, Relevance, Confidence, Satisfaction and overall Motivational design. It can be observed that OL features are strongly correlated with the ARCS motivational design, specifically for the Relevance and Satisfaction dimension.

Out of all the design features, the feature of quality of online learning is the only one which was associated with the participants’ experience – namely on duration of access. Specifically, this implies that students tend to spend more time with the G4E modules if they are easily accessible and if there is fast online access. During the interview, participants reported slow, weak and unstable internet connection as one of the problems they encountered in completing the modules. This result confirms the how infrastructure is a valid and reliable factor to measure e-learning systems success in terms of user satisfaction (Alsabawy, Cater-Steel & Soar, 2013) and how slow internet connectivity pose as a challenge for learners in an online environment (Muuro, et. al, 2014).

Table 3. Correlation table of G4E modules design features and experience

	1	2	3	4	5	6	7	8	9	10	11	12
1 Quality of OL	-	.87**	.97**	.24	.41**	.19	.32**	.34**	-.10	.28*	-.09	.087
2 Flexibility of OL		-	.97**	.18	.45**	.20	.35**	.35**	-.12	.18	-.12	.007
3 OL Features			-	.21	.45**	.20	.35**	.36**	-.11	.24	-.11	.048
4 Attention				-	.76**	.47**	.71**	.88**	.15	.06	.06	.078
5 Relevance					-	.57**	.87**	.94**	.06	.09	.03	.156
6 Confidence						-	.52**	.72**	.08	-.23	.21	.209
7 Satisfaction							-	.90**	.20	.14	.07	.239
8 ARCS								-	.14	.03	.09	.186
9 Frequency									-	.13	.44**	.336**
10 Duration of access										-	-.11	.134
11 Completion rate											-	.418**
12 Completed modules												-

Note: **. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

From the table we can also see that frequency of access correlates with number of completed modules, $r(63) = 0.336, p < .01$. There was also a statistically significant difference between those who access the modules once a week ($M = 6.98, SD = 5.558$) and those who access the modules 2-3 times a week ($M = 10.90, SD = 5.438$) as determined by t-test, $t(58) = 3.106, p < .05$. Frequency was also associated with completion rate, $r(63) = 0.44, p < .01$ and willingness to take another G4E training module, $r(63) = 0.383, p < .01$. This means that students who accessed the modules more frequently tend to do them in advance and are able to complete more modules.

Completion rate is also correlated with number of completed modules, $r(63) = 0.418, p < .01$. There was a statistically significant difference between groups as determined by one-way ANOVA, $F(2,58) = 7.565, p < .01$. A Tukey post-hoc test revealed that the number of modules completed was statistically significantly lower for those who accomplish the modules late compared to those who accomplish them on time ($p = .004$) and for those who completed the modules in advance ($p = .015$). There were no statistically significant differences between those who accomplished the modules on time and in advance ($p = .973$). This means that students who accomplish the modules late complete fewer modules compared to those who do it on time or advance.

Additionally, willingness to take another G4E training correlates significantly with all dimension of the ARCS model except for the Confidence dimension. T-test results also reveals highly significant differences in the Attention, $t(61) = 2.767, p < .01$, Relevance, $t(61) = 3.011, p < .01$ and Satisfaction ratings, $t(61) = 3.403, p < .01$, for those who expressed willingness to take another module. There was also highly significant difference in overall ARCS rating, $t(61) = 3.270, p < .01$. This suggests that motivation levels of participants towards the G4E modules carries over to their desire to take another G4E training.

On the other hand, willingness to take G4E certification exam correlates with Confidence and Satisfaction dimensions. T-test results also reveals significant differences in the Confidence, $t(50) = 2.285, p < .05$ and Satisfaction ratings, $t(50) = 2.321, p < .05$ for those who expressed willingness to take the certification exam. This means that participants' confidence and satisfaction levels with the G4E modules carries over to their willingness to take the certification exam.

There was also observed high association between willingness to take another G4E training and willingness to take the certification exam, $r(52) = 0.392, p < .01$. That is, participants who want to take another course also want to be certified.

Other factors affecting experience

Aside from the design features, year level was correlated with frequency of access, $r(63) = 0.275, p < .05$) and highly correlated with duration of access, $r(63) = 0.332, p < .01$). This means that higher level students access and spend more time doing the G4E modules.

There was also an observed association between student status and frequency of access, $r(63) = 0.286, p < .05$), with part time students (working students) accessing the G4E modules more than full time students. This result again points to the time component needed in accomplishing the modules. Degree also correlated with frequency of access, $r(63) = 0.253, p < .05$), with Science Education major students accessing the module more frequently than students in other majors.

CONCLUSIONS AND RECOMMENDATIONS

The participants expressed highly appropriate ratings for the online learning features and moderate to mostly true evaluation of the ARCS motivational design features of the G4E training modules. Specifically, quality of online learning (i.e. speed of internet access) was rated as the primary online learning feature, contributing specifically to the duration of their access. For ARCS motivational design, the satisfaction dimension was rated as the primary feature affecting their experience with the modules. Frequency of access was also seen as a factor for completion of the modules.

As such, integration of the G4E training modules can be improved by providing adequate internet access to students taking the modules. A computer laboratory schedule can be given as an option for these students to secure such access. It was a good practice to recommend a schedule of what modules to complete, but reminding them to follow the schedule is of importance as well as to prevent backlog. Hands-on activities can also be designed which will ask students to produce outputs based on the content of the modules. It would also be interesting to look into the results of certification exam among the students to determine whether long term learning transpired. Students that will pass the certification training can in turn be tapped to assist future students who will take the G4E training modules.

Future research can look into factors that can play a role to students' success and acceptance of the G4E training modules. Some of these are student e-learning readiness, initial G4E skills, perceived ease of use and usefulness, and self-directed learning levels.

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