Learning Styles and Online Technology Learning Platform among Undergraduate Students in Sarawak

(Gaya Pembelajaran dan Platform Pembelajaran Teknologi Atas Talian dalam kalangan Pelajar Sarjana Muda di Sarawak)

LAU KIAT HIONG[1], *YING-LEH LING[2]
School of Humanities and Social Sciences, Wawasan Open University[1]
Mathematics, Science and Computer Department, Politeknik Kuching Sarawak[2]

Abstract

The purpose of this quantitative descriptive study is to identify the level of students' learning styles, the level of usage towards online technology learning platform and whether there is any significant relationship between students' learning styles as independent variable and usage towards course components in online technology learning platform as the dependent variable. A simple random sampling is employed with a study sample of 30 foundation students comprising 18 males and 12 females all in the non-technical areas from a private higher educational institution in Sibu, Sarawak offering an online technology learning platform. Two instruments adapted from previous researchers, Grasha-Riechmann Student Learning Style Scale and RASE (Resources, Activity, Support, and Evaluation) pedagogical model were used to collect the data in a survey through a questionnaire in August 2018. A pilot study was carried out with test results indicating the value of Cronbach Alpha of .955. Statistical Packages for Social Sciences is used to analyze the quantitative data. The results showed a variable of dependent learning styles and resources that emerged at the highest level with a mean score of 4.72 and 4.55 respectively. Pearson coefficient indicated there is a significant relationship between learning styles and resources (r=.642, p<.05). By implications, students' learning styles are associated with usage towards course components in the online technology learning platform. It is concluded with suggestions for the quality learning process and learning outcomes in an online environment, students are made aware of their learning styles and become more versatile learners with usage towards learning platform. Educators with an emphasis on learning design in activity variable whereas results would be more conclusive if actual academic performance variable is included.

Keywords: Online technology learning platform, Grasha-Riechmann, learning style

* Corresponding author: drylling@poliku.edu.my

INTRODUCTION

The rapid evolution of technology concerning education has changed teaching and learning practices in the 21st century. The emergence of the Internet, World Wide Web, social network sites, Cloud, advanced innovative electronic and digital communication tools with greater bandwidth, and wireless internet connection that allows teaching and learning with increased outreach to significantly increased cohorts of learners in distance learning in e-learning, online, or blended learning worldwide. Educational modalities delivered through online technology learning platforms provide learning anywhere, anytime with much more accessibility, flexibility, and much freedom for students irrespective of age group and at self-paced learning. The online technology learning platform provides learners who find it difficult to access on-campus learning or those who self-select into it. Besides, not only it provides an opportunity for those who want to continue their tertiary education as well as professionals who find it convenient to work and at the same time to learn but also for lifelong learners in pursuit to upgrade and enhance their qualifications to meet the challenges and demands in the contemporary competitive marketplace. With Industrial Revolution 4.0 moving towards digitalization and computerization that impacts all sectors globally, including academic, Schwab (2016) stated that in responding to it, needed an integrated and comprehensive approach to meet the unfolding development. In line with the advent of ongoing development of educational technologies relative to online technology learning platforms, it is important to examine learning styles among students in an online learning environment, even though learners or Generation Net and Millennials learners who are more technology savvy may prefer using technological devices in their interaction and feedback in their asynchronous learning. Students' learning styles differ and to what extent their styles are associated with the usage of online technology learning platforms that can affect learning and teaching outcomes are vital.

RESEARCH BACKGROUND

Learning styles

There is a plethora of definitions for learning styles and instruments for measuring learning styles. A learning style can be defined as an application in a given situation of an individual's typical mode of perceiving, thinking, problem-solving, and remembering (Cassidy, 2004). The Grasha-Reichmann Student Learning Style Scale (GRSLSS) was chosen to measure learning styles among students in this study. The six learning styles based on GRSLSS are independent, dependent, collaboration, competition, avoidant, and participant. Individual student's learning styles differ, and their style interaction pattern by learner's personality can affect the usability of the learning platform. Research on learning styles has shown that addressing learning styles among students on how to manage their learning styles is important to academic achievement (Matthews, 1991; Atkinson, 1998; Magdalena, 2014; Jiraporncharoen, Angkurawaranon, Chockjamsai, Deesomchok, & Euathrongchit, 2015). On the contrary, Allen (1987) posited that other variables are better predictive variables for students' academic attainment as compared to learning style variables to a lesser degree or with no influence. Research has also shown that students who logged more in the learning management system have achieved higher grades in their results compared to those who logged in less (Fllippidi, Tselios, & Komis, 2010).

Online technology learning platform

The online technology learning platforms is also known as the learning management system (Hall, 2003) uses the Internet, and web-based technology with the software application is the key element that provides synchronous and asynchronous communication tools for interaction among and between teachers and students in the teaching and learning process. The learning platform manages the registry's administration, students' enrollment, and comprises course components. Generally, the

four main course components are (i) Resources: course materials, other web links, forums, and chat; (ii) Activities: assignments, tasks, quizzes; (iii) Support, announcements, help desks, and (iv) Evaluation: assessments of students' learning outcomes. RASE (Resources, Activity, Support, and Evaluation) pedagogical model (Churchill, King, Webster, & Fox, 2013) was chosen as an instrument in this study to measure students' learning style usage based on the four-course components in the online technology learning platform.

PROBLEM STATEMENT

Based on Education Blueprint (2015-2025) (Higher Education) Shift 3 emphasizes lifelong learning as well as Industrial Revolution 4.0 and Malaysia Higher Education 4.0 (MyHE 4.0) highlighted in enhancing human capital development and preparedness to meet the challenges of Industrial Revolution 4.0, it is important to identify how and to what extent students' learning styles are associated with the usage of modalities in online technology learning platforms that can affect their learning outcomes. Online technology learning platforms provide students with the advantages to studying at their own pace and with much more flexibility and freedom in self-regulating their learning. Conversely, due to lack of face-to-face interaction among instructors and students, students may lack opportunities to collaborate and receive feedback and lesser extent of engagement in learning activities (Tuckman, 2007) due to their learning styles despite the advance communication tools and social network sites that complement as a support in social interaction communication. Identifying learning styles where certain styles emerge that affect student's usage of online technology learning is beneficial to both instructors and students. Students can better equip themselves in performance attainment. Instructor can plan enhanced tasks to motivate and further strengthen students' engagement in their learning. Hence, there is a need for researchers to conduct a study to identify the level of students' learning styles and the level of usage of online technology learning platforms as well as to determine whether there is a significant relationship between learning styles and the usage of online technology learning platforms that ultimately have affecting their learning process and learning outcomes.

RESEARCH OBJECTIVES

Specifically, this study has the following objectives: (1) To identify the level of learning styles among students. (2) To identify the level of the usage of the online technology learning platform. (3) To identify whether there is any significant relationship between students' learning styles and usage of the online technology learning platform.

LITERATURE REVIEW

LEARNING STYLES

Learning styles are defined in several ways by many authors, and numerous learning style models exist in the literature as learning is attained from different dimensions, and different theorists or authors have focused on different aspects. Pashler, McDaniel, Rohrer, and Bojor (2008) referred to learning styles to view that different people learn information in different ways. The Curry Onion Model (Curry, 1983, 1987) is measured to compare learning styles as analogous to the layer-like of an onion. The four layers' view is the makeup of a person's characteristic of learning style, namely (a) instructional preferences, (b) social interaction, (c) information processing, and (d) personality (Cassidy, 2004). The social interaction model of the Curry Onion Model addresses preferences for socialization while learning. This study focused on the social interaction layer based on the GRSLSS. Grasha (2002) addressed this social interaction in his definition of learning style as the 'personal qualities that influence a student's ability to acquire information, interact with peers and teachers, and otherwise to participate in learning experiences. GRSLSS six learning styles, namely, independent, dependent, competitive, collaborative, avoidant, and participant are for used to address the impact of different social dynamics of learning

preferences among the students. Independent students prefer independent studies and prefer to work alone instead of with other students on projects. Dependent students prefer to look to the teacher as well as a peer for guidance. Competitive students learn and perform better than their peers to receive recognition for their academic accomplishments. Collaborative students prefer to acquire information by sharing and cooperating with teachers and peers. Avoidant learners are not enthusiastic about acquiring content and class activities. Participant students are interested in class activities besides discussion and do as many class activities as possible to meet the teacher's expectations (Grasha 1996). All characteristics in the learning styles are present within the learners' personality, but most learners gravitate towards one or two certain learning styles. Learning preferences are likely to change as learners face new educational experiences as they mature in their learning process.

Among the research studies on learning styles, students displayed various preference learning styles in their learning processes or academic performance with significance and no significant results. Diaz and Cartnal (1999) examined a study with local health education students enrolled in an online class and equivalent on-campus students in a community college. The results showed that there is a statistically significant between the online students who were more independent than on-campus students who were more dependent. Online students with independent learning styles displayed their willingness to participate as good class citizens and responded well to collaborative activities provided only if the teacher gave them enough structure and guidance. Online students displayed more intrinsic motivation instead of obtaining rewards in class. On the contrary, on-campus students had tendencies of collaborative styles to their needs to be competitive to meet the expectations of their teachers and as good class citizens to obtain rewards in class. There is a positive correlation between competitive learning styles and participant learning styles. In both groups, the results displayed an average score in the avoidant and competitive learning styles. Steele (2012) made a comparison study between online and face-to-face students. The results showed that there was no predictive relationship between learning styles and student achievement in an online mathematics course. The researcher observed a few themes. In comparison to the participatory style of learners, the collaborative style obtained higher scores in the face-to-face modality when compared to the online students. The dependent style of learners indicated a decrease in scores when compared to the participatory style of learners in the face-to-face modality, while online dependent style of learners obtained higher scores. The overall results showed that the online students outscored face-to-face students. Corbin's (2017) results study at the tertiary level in the Caribbean showed that collaborative learning styles obtained the highest score. Independent and avoidant learning styles showed the significance of positive effects on academic attainment among students. Independent learning styles displayed better grades compared to avoidant learning styles, while millennials scored highest ratings for independent, avoidant, and competitive learning styles respectively.

ONLINE TECHNOLOGY LEARNING PLATFORM

Online technology learning platforms have few types, and they may differ in certain features (Machado & Tao, 2007; Chada Kongchan, 2013). Educational institutions that offer online technology learning platforms have their portals to support online learning and administrative activities. It is supported by a well-equipped information communication technology infrastructure using software applications, the Internet, and is web-based, which has interactive communication tools to facilitate synchronous and asynchronous communication and enable faculty members to share learning materials and provide teaching and learning processes among and between instructors and students. Course components in the learning platform can similarly be grouped based on the RASE pedagogical model. Resources components such as course materials, ebooks, links to relevant websites, digital materials, and digital libraries. Students can download course materials to their computers, laptops, or mobile devices. The activity components such as multimedia-based activities, online quizzes, assignments, and projects. The support

components such as forum discussion, help desk, announcements, notifications, email, and other e-services. The evaluation components provide students' feedback on their tasks from instructors and facilitators or tutors as well as students' learning outcomes and academic performance. With the emergence of Web 2.0 technologies, social networks, Facebook, Twitter, and What's app, together with innovative mobile devices, these communication tools are also used as an extension to the online technology learning platform for easier and faster means of communication to support inquires and received feedback among and between the instructors and students.

Students' low usage of the various features in the online technology learning platform can have various implications besides decreased learning. Mtebe's (2015) study through a literature review with selected higher education institutions in sub-Saharan Africa, found that the majority of adopted learning management systems are underutilized despite massive investments involved in the adoption of a learning management system and educational technologies to install and maintain them. Further, other variables besides learning styles also affect the low usage of learning platforms, such as socio-economic status of learners or families, to afford devices to access the learning platform, skillfulness in using the learning platform, and internet speed and coverage in the study area (Ahmady, Ahmad Nasir & Mohammad Sophian, 2017).

RASE (Resource, Activity, Support and Evaluation) Pedagogical Model

The RASE pedagogical model supports quality learning and teaching and is a student-centered model within an outcomes-based curriculum. The model consists of four integral course components: Resources, Activity, Support, and Evaluation, relative to the issue of a learning design model as well as student engagement with applications of technology to improve student learning outcomes and satisfaction. The model builds upon several important theoretical works and concepts (Churchill, King, Webster, & Fox, 2013; Churchill, King, & Fox, 2013). Resources relate to learning content, web content, textbooks, digital media, articles, slides, notes, and tools. Activity relates to problem-solving, collaborative tasks, inquiry, and project work. Support relates to forums, FAQs, social networking, email, and chat. Evaluation relates to reports, portfolios, and online presentations. The central idea behind RASE is that quality content resources are not adequate for full achievement of students learning outcomes. Teachers need to, for example, design learning modules to engage students through demonstrations, experiments, or mini-lectures for students that demonstrate learning. Activities for students to engage in using resources such as working on tasks in problem-solving with its role in assisting learning and applying the concept instead of 'information transfer'. Support such as technology-platform, teacher, and peer to help students solve difficulties faced during work on tasks. Evaluation to provide structured information to guide and enable students' self-progress as well as to serve as a tool for teachers to plan what is needed to achieve the learning outcomes. Students' certification of learning is based on these four-course components from a range of summative assessment activities. In contemporary technological and new challenges for science education today (Churchill, King, & Fox, 2013), teachers need a learning design model, RASE, to assist in their instructional planning with the integration of educational technologies. Such as an effective type of digital resource for conceptual model learning objects that scaffold a deeper understanding of scientific concepts to support students to learning disciplinary content and developing new literacies in science education.

Students' learning styles towards user-friendly online technology learning platforms increased students' usage of the learning platform can impact increased learning. Kandappan, Jaykumar, and Leena (2014) conducted a study with an online classroom community in a private university of Selangor district, Malaysia using the RASE model to measure students' learning preference usage of the online social learning platform, Edmodo, on student engagement and responsible learning. The results showed overall all the four components indicated above average scores with resource, highest score in sharing folder option. In support, the highest score in communications (e.g., notification,

etc.). In Activity, the highest score is useful for making inquiries. In Evaluation, the highest score in submit assignments (comments from my lecturer are fast). The study found students' preference learning towards Edmodo as a user-friendly social learning platform and encouraged both student engagement and responsible learning.

Relationship between students' learning styles and online technology learning platform

Regarding the relationship between students' learning styles and online technology learning platforms, a study by Rodgers (2008) found that increased online interaction showed statistically significant of better examination performance. In the level one undergraduate student with Economics, Accounting, and Accounting/Finance module, it showed that these students, module marks increased by approximately 1% with one extra hour of e-learning in an academically traditional lecture and e-learning setting. Students' learning styles data on how they interact with the online technology learning platform can be detected in the logs they made. Studies have shown that students who made more logs and engagement with most of the features in the learning management system found to have a significant positive effect on students' academic performance (Jo, Kim, & Yoon, 2014; Modritscher, Andergassen, & Neumann, 2013). Studies found that track and monitor students' interactions from the logged students' actions and incorporate them into the learning analytics have shown benefits to educational institutions (Tak, 2017).

RESEARCH METHODOLOGY

RESEARCH DESIGN

A quantitative research design was employed in this study and to analyze data collected. The study was a descriptive survey. The questionnaire was employed to collect the data representing a population.

RESEARCH POPULATION AND SAMPLING

The population under study was selected from students enrolled in a private higher educational institution in Sibu, Sarawak, offering an online technology learning platform. A simple random sampling based on Krejcie and Morgan (1970) was applied in the sample selection process for the student sample. A total of 30 students were chosen to be surveyed in this study.

RESEARCH INSTRUMENT AND PILOT STUDY

The research study was based on two instruments adapted from previous researchers and was employed in this study. The RASE pedagogical model was employed to measure the level of usage of online technology learning platforms based on the four integral components of the RASE model: resource, activity, support, and evaluation. Next, GRSLSS was employed to measure the level of students' learning styles. According to James and Gardner (1995) emphasized the importance of selecting an instrument that matches its intended use and use of the data to be collected.   GRSLSS has adequate reliability and validity (Curry, 1983). A questionnaire was used to collect the data and one pilot study has been carried out to test the two instruments to a sample of 20 foundation students in the same private higher educational institution in Sibu, Sarawak on 26 July 2018. The test results showed the value of Cronbach alpha of .955. The questionnaire consisted of three parts, A, B, and C. Part A consisted of 3 items to obtain demographic data of the sample, which consisted of gender, area of study, and level of study. Part B consists of 20 items and is the instrument RASE pedagogical model to measure the level of usage of online technology learning platforms based on the RASE model's four integral components, namely, Resources, Activity, Support, and Evaluation. There are 5 subscales for each of the four components. Each item was measured using a 6-point Likert scale, namely: (1) Completely Disagree, (2) Mostly Disagree, (3) Slightly Disagree, (4) Slightly Agree, (5)

Mostly Agree, and (6) Completely Agree. Part C consists of 60 items: instrument GRSLSS to measure the level of learning styles among the students. There are 10 subscales for each of the six learning styles, namely, independent, avoidant, collaboration, dependent, competition, and participation. Each item was measured using a 6-point Likert scale, namely (1) Completely Disagree, (2) Mostly Disagree, (3) Slightly Disagree, (4) Slightly Agree, (5) Mostly Agree, and (6) Completely Agree.

RESEARCH PROCEDURE

The study was carried out in August 2018 in a private higher educational institution in Sibu, Sarawak involves an online technology learning platforms to enhance students' learning in an online environment. A total of 30 questionnaires were distributed to a sample of 30 respondents all in the foundation level and all in the non-technical area. The sample included 18 male and 12 female respondents. The students were briefed and informed consent was obtained with the help of the research supervisor of this study and a course coordinator in the said private higher educational institution. The questionnaires were self-administered by the students, and all 30 responded and returned the questionnaires.

RESEARCH ANALYSIS

Statistical Package for the Social Sciences (SPSS) was used to analyze the quantitative data collected. The data were checked for entry accuracy to ensure freedom from data entry errors. Descriptive analysis was carried out on the distribution of the sample and variables. Frequencies and percentages were used to describe the respondents' profiles. Descriptive statistics were used to summarize data on the level of the two variables. The mean and the standard deviation were calculated, to sum up, the findings of the data. A Pearson correlation analysis method was employed to find out the relationship between students' learning styles and the usage of the online technology learning platforms.

RESEARCH FINDINGS AND DISCUSSION

RESULTS

In interpreting the findings, mean scores between 1.00 – 3.42 were categorized as low-level; mean scores between 3.43 – 4.08 were categorized as medium-low level; mean scores between 4.09 – 4.85 were categorized as medium-high level, and the mean scores between 4.86 – 6.00 categorized as high-level. The respondents' profile with male 18 (60%) and female 12 (40%) (N=30). The results for objective (1) to identify the level of learning styles among the students indicated mean scores with Dependent (4.72), Collaborative (4.55), Independent (4.32), and Avoidant (4.13) learning styles are all medium-high respectively. Participant (3.75) medium-low and Competition (3.12) is the lowest. Dependent learning styles emerged with the highest score, while competitive learning styles is the lowest score. Most of the respondents with Dependent and Collaborative styles supersede respondents with independent styles in this study. Avoidant and participant respondents did not actively take part in the learning process, while respondents with competition styles being the lowest perceived tendency in less motivation in the learning process. Table 1 shows a descriptive analysis of the level of students' learning styles.

Table 1. Level of students' learning styles

Learning Styles	Mean Score	Standard Deviation	Level
Independent	4.32	.995	Medium high
Avoidance	4.13	.809	Medium high
Collaboration	4.55	.864	Medium high
Dependent	4.72	.848	Medium high
Competition	3.12	.997	Low
Participation	3.75	.612	Medium low

The results for objective (2), to identify the level of usage towards online technology learning platform in the mean scores indicated Resources (4.55) medium-high as the highest score followed by Support (3.85) and Activity (3.45) both medium-low while Evaluation (3.35) is the lowest. The majority of the respondents made the most usage of resources among the four-course components. It is then followed by support and activity, which is medium-low, which showed the respondents are less active to a certain degree in these two categories. The usage of evaluation was the lowest, which showed that awareness of respondents' feedback on progress was low. Table 2 shows a descriptive analysis of the level of usage of the online technology learning platform.

Table 2. Level of usage of online technology learning platforms

Usage towards Online Technology Learning Platform	Mean Score	Standard Deviation	Level
Resources	4.55	.723	Medium high
Activity	3.45	.977	Medium low
Support	3.85	.559	Medium low
Evaluation	3.35	1.018	Low

Pearson correlation analysis results for objective (3) indicated that there is a significant relationship between students' learning styles as independent variables and usage towards online technology learning platform as dependent variables with dependent learning styles and resources ($r=.642$, $p<.05$); Dependent learning styles and support ($r=.434$, $p<.05$), and between correlation coefficient independent learning styles and support ($r=.367$, $p<.05$). The findings showed only dependent learning styles associated with Resources. Also, both dependent learning styles and independent learning styles are associated with support in the learning process with dependent learners having higher scores as compared to independent learners. Table 3 shows the correlation coefficient between students' learning styles and the usage of online technology learning platforms.

Table 3. Correlation coefficient between students' learning styles and usage on online technology learning platform

Usage on Online Technology Learning Platform	Learning Styles					
	ID	AV	CB	DP	CP	PP
Resources	.253	-.071	-.032	.642*	-.283	.107
Activity	.150	-.199	-.242	.263	-.082	.007
Support	.367*	-.011	-.002	.434*	-.230	.264
Evaluation	.329	-.195	-.353	.199	-.279	.173

*Note. *Significance at the level of 0.05*
ID - Independent, AV - Avoidant, CB - Collaboration, DP - Dependent, CP – Competition, and PP - Participation

DISCUSSION

Level of learning styles

The majority of the respondents' level of learning style as the independent variable is dependent learning style. Dependent students prefer structure and guidance with most of the materials provided. The second level is collaborative learning styles with a medium-high level. Collaborative students prefer to learn through work on sharing with teachers or peers in group discussions or group projects. The third level is independent learning styles with a medium-high level. Students with this style prefer to work independently and self-paced instruction. The social preference of the majority of the respondents in this study showed the need for affiliation with other students and lecturers and structure compared to independence. The fourth level is the avoidant learning styles with a medium-high level. Avoidant students are uninterested in learning content and activities. The fifth level is participation with a medium-low level. An important characteristic of participation learning styles is that students are eager to learn and take responsibility for their learning. However, in this study, the participation learning style was used to a lesser degree, as this style scored second lowest. The lowest score is competition. Competitive students are motivated to learn to perform better than their peers to receive accomplishments and recognition. The respondents in this study were not competitive.

The findings showed dependent learning styles as the highest score, Collaboration learning styles as second highest, independent as third highest, and competition learning styles, as the lowest score was different from previous research by Diaz and Cartnal (1999) with online students who were more independent and average scores in competitive (in both groups) learning styles. However, this study's findings on the dependent learning style support the on-campus students' style of learners and average scores in avoidance learning styles (in both groups). The findings were also contrary to another previous research by Corbin (2017), which indicated collaborative learning as the most preferred learning style, and the Millennial scored highest for independent followed by avoidant and competitive learning styles. The findings are also not similar to the findings of Ahmad and Suaini (2010), who showed that collaborative and competitive were the dominant learning styles. The low participation learning styles in this study is partially similar to Sushma, Aarthi, Swati, Samiksha, and Caroline's (2015) study, which has the lowest participation learning styles but not similar to other dimensions' styles with the majority in Avoidant, followed by independent, competitive, dependent, and collaborative learning styles, respectively. According to Dillon and Greene (n.d.), independent learners exercise greater autonomy in their learning decisions compare to dependent learners. The researchers referred to Moore's theory of transactional distance (Moore & Kearsley, 1996), who might hypothesize that learners who have not learned to make effective decisions related to their approaches to learning will benefit from more structure and dialogue. In comparison to autonomous learners will require less structure and dialogue.

Usage of online technology learning platform

In the dependent variable, the usage level of resources by the respondents scored highest in the online technology learning platform at the medium-high level. Resources are course materials, learning contents, links to other websites, and digital libraries. The usage level of support scored second at the medium-low level. Support is FAQs, forums, discussions, social networking, emails, and synchronous and asynchronous communications among and between teachers and students, and collaboration with peers to assist in emerging difficulties in tasks faced by students aimed at leading students to become more independent learners. The usage level of activity scored second-lowest at the medium-low level. Activities are quizzes, tasks, assignments, problem solving, inquiry, and project work. Evaluation usage scored the lowest level. Evaluation is an assessment and report to guide students' self-progress and for instructors to plan what is needed during the learning

process to evaluate the learning outcomes. The usage level of activity and evaluation among the students' learning styles was low.

The usage level of resources and support in this study is to a certain degree similar to the previous study of Kandappan, Jaykumar, and Leena's (2014) but not similar in the usage level for activity and evaluation which is lower in this study. The findings on the level of usage towards online technology learning platform is contradictory to RASE pedagogical model that emphasizes quality of resources is not sufficient for full achievement but central to the four components is activity (Churchill, King, Webster, & Fox, 2013) when compared to this study the usage level of activity scored second lowest though the highest score is resources. This study showed the respondents majority usage of the two features, resources followed by support while the other two features, activity and evaluation to a lesser degree in the learning platforms.

Relationship between students' learning styles and online learning platforms

The majority of the respondents with dependent learning styles were positively associated mostly with the use of resources followed by support towards the online technology learning platform. Independent learning styles also have a positive correlation with the use of support. Dependent learning styles tend to feel discouraged in facing challenges and lack of self-efficacy skills in the learning process (Grasha, 1996) besides lack of taking initiative to explore further related course materials in addition to the resources in the learning platform, and they need clearer guidance and structure as well as regard lecturers, peers, resources, and support in helping them cope in their learning process. In comparison to independent learning styles, they are more independent in their abilities in the learning process (Grasha, 1996). In this study, both dependent and independent learning styles are associated with usage of Support in the learning platform with dependent learners having higher scores compared to independent learners. Support in pedagogical to provide students with tools to scaffold and to ensure students develop learning skills and independence. Support can assist students when they face challenges in task work, and educators can anticipate or assess the needs of students. Support includes online forum discussion, students-lecturers, and student interaction besides administrative and technical (Churchill, King, & Fox, 2013).

RESEARCH IMPLICATIONS, RECOMMENDATIONS, AND CONCLUSION

RESEARCH IMPLICATIONS

The implications of the study results suggest that the GRSLSS, social interaction learning styles are associated with usage in the RASE pedagogical model in the online technology learning platform, and may be beneficial for students and educators. By implications, students can be made aware of their learning styles to achieve success in their learning process in an online learning environment. Alternatively, students may need to consider their learning styles in their decision-making in the learning process in an online environment versus on-campus environment. The respondents were all foundation year students. They may be underprepared in an online environment that lacks face-to-face social interaction and much freedom in self-regulation. From the findings of the study, dependent learning styles not only score highest in the independent variable but also dependent styles are also associated with resources. Hence, the suggestions that dependent learners are strengthening to become more independent learners or versatile learners. Independent learning styles portray characteristics that support long-life learners. A quality sample assignment or project may be shown to the students. Students may be encouraged to search and read more journals and other related course materials besides the resources in the learning platform. Support also in displaying themes and features on learners' initiative, discipline and self-efficacy or other motivating, and inspiring topics in the learning platform may remind the students of the needed qualities in an online environment. The medium and low level in avoidant, participant, and competitive learning

styles may be motivated to take a more active approach in the learning process. Instructors may take the lead or initiate discussions providing structure and rules such as ideas firstly generated among students before guidance from the instructors in forum discussion to promote participative, competitive and collaborative qualities. As both the Dependent and independent learning styles are associated with support and support is also at a medium-low level, students may need more structure, guidance, and dialogue from the instructors where they may need further clarification on the related topic and may yet to capture and conceptualize the subject to achieve the learning outcomes. As activity is medium-low, the suggestion for more learning design in activity as a practical and experiential learning process impacts comprehension of the concept as in online quizzes, problem solving, and projects. Periodic assessments and students' results on their evaluation can help students reassess and take appropriate measures on what and how to improve or strengthen their learning process. The implication for practice in the future that with the awareness of students' process in learning, educators may take intervention measures to address the students' learning styles. Also, educators may take cognizance on learning design with more emphasis in activities including evaluation and support in the RASE pedagogical model. Hence, identifying learning styles associated with the usage of course components in an online learning environment is vital for overall quality teaching and learning processes, and students' learning outcomes.

FUTURE RECOMMENDATIONS

The findings are not conclusive in academic achievement as the study did not measure the actual academic performance. Hence, it is suggested for future research should include actual academic performance and also teaching styles and would be more beneficial if students' data logs in the learning platform are included. Other suggested variables to be included are respondents' socio-economic background, internet services in the location of the study area to provide a more complete framework between learning styles association and usage towards online technology learning platform. Besides, future studies adaptations to the sample regarding size, include more levels of academic education and locations as the small size in this current study is not generalizable for all learning style towards online technology learning platforms.

CONCLUSION

In conclusion, both variables in this study extend knowledge of the associations between social interaction learning styles and usage towards course components, the RASE pedagogical model in the online technology learning platforms. The results showed a significant relationship between dependent learning styles and resources besides support and independent learning styles and Support. Therefore, according to the findings of this study, students are made aware of their own learning styles to improve their quality in the learning process to become versatile learners, while educators can address students' learning styles and enhance their learning design in activity, support, and evaluation. Hence, ultimately the findings may contribute to developing and enhancing long life learners aligning with quality computerization and digitalization teaching and learning processes in the learning outcomes. Lastly, if actual academic performance is measured, it adds to a more conclusive result.

REFERENCES

Ahmad, J. S., & Suaini, Z. M. (2010). Learning styles of Bachelor of Education (Science and Mathematics, Life Skills and Islamic Studies) part time UTM students based on Grasha-Riechmann learning style scale. (Unpublished master project). Universiti Teknologi Malaysia.

Ahmady Solong, Ahmad Nasir Mohamed Noor, & Mohammad Sophian Borhan. (2017). The frequency of CIDOS among mechanical engineering students. Studies in law, education, business and corporate social responsibilities Int'l Conference (LEBCSR-17) Jan. 31-Feb 1, 2017, Bali, Indonesia. doi.org/10.17758/EIRAI.F0117515

Allen, J. I. (1987). The effects of communication avoidance, learning styles, and gender upon classroom achievement. Paper presented at the annual convention of the Speech Communication Association, Boston.

Atkinson, S. (1998). Cognitive style in the context of design and technology work. *Educational Psychology, 18*(2), 183-194.

Cassidy, S. (2004). Learning styles: An overview of theories, models, and measures, *Educational Psychology, 24*(4), 419-444. doi :10.1080/0144341042000228834

Chada Kongchan. (2013). How Edmodo and google does can change traditional classrooms. The European Conference on Language Learning 2013. Paper presented at the European Conference on Language Learning.

Churchill, D., King, M., & Fox, B. (2013). Learning design for science education in the 21st century. doi:10.2298/ZIP11302404C

Churchill, D., King, M., Webster, B., & Fox, B. (2013). Integrating learning design, interactivity, and technology. 30thascilite Conference 2013 Proceedings*, 139-143.

Corbin, A. (2017). Assessing differences in learning styles: age, gender and academic performance at the tertiary level in the Caribbean. *Caribbean Teaching Scholar. 7*, 67-91.

Curry, L. (1983). An organization of learning styles theory and constructs. *Annual Meeting of the American Educational Research Association,* Montreal, Quebec.

Diaz, D. P., & Cartnal, R. B. (1999). Students' learning styles in two classes: online distance learning and equivalent on-campus. *College Teaching, Vol. 47*(4) (Fall, 1999), 130-135.

Dillion, C., & Greene, B. (n.d.). Learner differences in distance learning: finding differences that matter. Chapter 16, 235-244. Handbook of distance education. (Moore, M. G., & Anderson, W.G, Ed.). (2003). London: Lawrence Erlbaum Associates, Publishers.

Fillippidi, A., Tselios, N., & Komis, V., (2010). Impact of Moodle usage practices on students' performance in the context of a blended learning environment. *In Social Applications for Lifelong Learning*. Patra, Greece, 1-6.

Grasha, A. F. (1996). Teaching with style. A guide to enhancing learning by understanding teaching and learning styles. Pittsburg: Alliance Publishers.

Grasha, A. F. (2002). Teaching with style: A practical guide to enhancing learning by understanding teaching and learning styles. San Bernadino: Alliance Publishers.

Hall, B. (2003). New technology definitions. http://.brandonhall.com/public/glossary/index.htm

James, W. B., & Gardner, D. L. (1995). Learning styles: Implications for distance learning. ERIC Document Reproduction Service (No. EJ 514 356).

Jiraporncharoen, W., Angkurawaranon, C., Chockjamsai, M., Deesomchok A., & Euathrongchit, J. (2015). Learning styles and academic achievement among undergraduate medical students in Thailand. *Journal of Educational Evaluation for Health Professions 2015, 12*(38). doi.org/10.3352/jeehp.2015.12.38

Jo, I. H., Kim, D., & Yong, M. (2014). Analyzing the log patterns of adult learners in LMS using learning analytics. Learning Analytics and Knowledge. *Proceedings of the 4th International Conference LAK '14.* New York, NY, USA: ACM Press, 183-187.

Kandappan Balasubramanian, Jaykumar V., & Leena Nitin Fukey. (2014). A study on "student preference towards the use of Edmodo as a learning platform to create responsible learning environment". doi:10.1016/j.sbspro.2014 .07.311

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607-610.

Machado, M., & Tao, E. (2007). Blackboard vs. Moodle: comparing user experience of learning management systems. *Proceedings of the 37th ASEE/IEEE Frontiers in Education Conference. School of Information Technology and Communication Design,* California State University, Milwaukee, WI.

Magdalena, S. M. (2014). The relationship of learning styles, learning behavior and learning outcomes at the Romanian students. "Education facing contemporary world issues", 6th International Conference Edu World 2014, 7th – 9th November 2014. *Procedia – Social and Behavioral Sciences 180 (2015)*, 1667-1672. doi:10.1016/ j.sbspro.2015.05.062

Matthews, D. B. (1991). The effects of learning styles on grades of first-year college students. *Research in Higher Education, 32*(3), 253-268.

Modritscher, F., Andergassen, M., & Neumann, G. (2013). Dependencies between e-learning usage patterns and learning results. *Proceedings of the 13th International Conference on Knowledge Management and Knowledge Technologies.* Graz, Austria: ACM Press, 1-8.

Moore, M., & Kearsley, G. (1996). Distance education: a systems view. Wodsworth Pub Co., Belmont, WA.

Mtebe, J. S. (2015). Learning management system success: increasing learning management system usage in higher education in sub-Saharan Africa. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 11*(2), 51-64.

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles concepts and evidence. *Psychological Science in the Public Interest*, *9*(3).

Rodgers, T. (2008). Student engagement in the e-learning process and the impact on their grades. *International Journal of Cyber Society and Education, 1*(2), 143-156.

Schwab, K. (2016). The fourth industrial revolution. What it means and how to respond. World economic forum annual meeting 2016, Davos, Klosters, Switzerland. Theme "mastering the fourth industrial revolution" 20-23 January 2016.

Steele, B. J. (2012). Examination of an online college mathematics course: correlation between learning styles and student achievement. Retrieved from http://starts.library.ucf.edu/etd/2245

Sushma, B., Aarthi Rajendran, Swati Agarwal, Samiksha Das, & Caroline, A. (2015). Learning styles and self-regulation: an exploratory study among university students in India. *The International Journal of Humanities & Social Studies, 3*(3), 134-138.

Tak, B. M. W. (2017). Learning analytics in higher education: an analysis of case studies. *Asian Association of Open Universities Journal*, *12*(1), 21-40. doi.org/10.1108/AAOUJ-01-1027-0009

Tuckman, B. W. (2007). The effect of motivational scaffolding on procrastinators' distance learning outcomes. *Computers & Education*, *49*(2), 414-422.