Padlet: A Technology Tool for the 21st Century Students Skills Assessment

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Abstract. Emergence of Internet connected devices and globalization in education has paved way for the new discoveries in the 21st Century Learning. In current classrooms, the students use various instructional technologies to synthesis new knowledge, collaborate with peers, critically solve problems, and make valid decisions to shine in the current, complex and globalized community. Due to the advancement in the technology, it is not an easy task to meet sustainability in education as identifying and deploying the proper tool as an educational and instructional tool is time-consuming and requires validation before it is widely implemented in the Higher Education Institution (HEI). Furthermore, the students from the 21st Century are technology driven and have new approaches to learning. In response to these changes, this research aims to assess the 4Cs in the 21st Learning Skills using Padlet, an online virtual bulletin board that is gaining wide popularity in many Higher Education Institution. The 4Cs consist of creativity, critical thinking, collaboration and communication. A total of 31 undergraduate students from a Private Higher Education Institution (PHEI) participated in this case study. The results of the study indicated that the assessment via Padlet efficiently assessed the 4C’s for the Computing module offered to the undergraduate students. The findings offer evidence that the virtual bulletin board promotes creativity and collaborative learning in classroom and optimizes the classroom performance.

Keywords: Assessment, Technology, Padlet, 21st Century Learning
INTRODUCTION
Every year, new technology and innovations reinvent the way we teach and learn in the 21st century. The rapid growth of Internet connected devices has paved way for many Higher Education Institutions (HEIs) to deploy these technology inside and outside classrooms to cater to the needs of the young learners from the 21st Century. The usage of devices such as iPads, tablets, and laptops at the education institution provides the knowledge to students to compete in the technology world (Johri & Misra, 2017).

President Clinton (2005) once quoted:
“Literacy is not a luxury; it is a right and a responsibility. If our world is to meet the challenges of the 21st century, we must harness the energy and the creativity of all our citizens.”

Align with this, there has been a significant shift from the manufacturing era to the digital era. Researchers claim that in this new digital era, the progress of digitization and connection of everything and everyone is triggered by the Internet of Things (IoT) and supporting technologies will automate human life (Sanjee et al., 2017). Besides that, the information highway, backbone of the digital era extends a new learning platform that is more centralized and thus promotes globalization in HEIs.

Adding on, these emerging technologies provide unlimited opportunities for many new discoveries to equip the students better to face the challenges in the 21st century. In the 21st century learning classrooms, the students are required to use educational and instructional technologies to synthesis the new acquired knowledge, collaborate with their peers, solve problems, and make decisions to be successful in the current complex, diverse and global community (Chu et al., 2017; Collins & Halverson, 2018). The success of such learning style lies in being able to communicate, share, comprehend and apply the acquired information to solve the complex problems. To add on, students are also required to adapt to the changes in the information age and use the power of technology to create new knowledge.

Today, e-learning tool is one of the emerging needs of information age whereby it replaces the traditional teaching method for the distant students and simultaneously encourages collaborative learning (Keenaghan, 2018; Myers, 2018; Abdul-Kader, 2011). To add on, Rosenberg (2001) affirms that e-learning application is an open system that integrates the access to the information and purposeful communication into a dynamic and intellectual learning community. Therefore, e-learning tools are used widely in the 21st century learning classroom.

Education is the process of acquiring knowledge or information. Over the years, it is noticed that the knowledge is growing exponentially and it has impacted on the diversified career specialization. At the same time, the emerging technologies are also the root cause of this phenomenon and this is due to the rapid growth of the knowledge via the information highway. Therefore, the need arises for the students to keep abreast with this new change in the 21st century. It is important to identify the appropriate learning styles and assessment methods to assess the essential adaptation skills required to address the new changes in the 21st century. The advancement in technology has helped students to acquire more knowledge and provided the facility to learn at their own pace. It has changed the teaching method whereby the educators play the role of an instructor and promote technology integrated teaching modules. However, it is not an easy task to achieve sustainability in education in this digital era as these digitally experienced students learn differently and have new vernaculars. Their needs and pace of learning is much diversified than before. Furthermore, educators must be skilled and trained to assess these young minds using the right assessment tool that can capture the 4Cs such as creativity, communication, collaboration and critical thinking skills which is within the 21st century skills framework.

In response to these changes, this research aims to assess the common core state standards of the 21st century skills framework, 4Cs via Padlet, an application used to create avatars. In accordance to the aim of the research study, two objectives were identified. The first objective is to determine the efficacy of the Padlet tool to capture the 4Cs component exhibited by the undergraduate students in the Computing module. The second identified objective is to discover the acceptance level of Padlet among the students and how it impacts their learning curve in an interactive learning classroom.

21st Century Learning Skills (4Cs)
Educators are frequently challenged with the new emerging technologies as they influence the minds of the young learners and the needs of these 21st Century learners keep changing over the years (Bellanca, 2010). Hence, identifying an effective delivery medium in classrooms becomes the most challenging task for the educators. Align with the 21st Century ideology, a new framework was designed. The framework for 21st century learning is a product that describes the skills a student will need to acquire to thrive in the current complex, diverse and global community. It is noted that the common core state standards of the 21st century skills framework 4Cs need to be integrated into the classrooms to produce students who are adequately prepared to face the new challenges of the digital era (Van Roekel, 2008; Varghese, 2018). Adding on, researcher Wilborn (2013) reported that the 21st century 4Cs outcomes were clearly supported by assessments, curriculum and professional development. The mentioned outcomes were designed to promote positive engagement and were align with the Partnership for the 21st century learning and innovation skills (Partnership for 21st Century Skills, 2006). Figure 1 below clearly depicts...
the four essential learning and innovation skills referred to as the 4Cs. They are: the critical thinking, communication, collaboration, and creativity.

Critical thinking is one of the key components highlighted in various discussions to 21st Century classroom teaching and learning. It is said that the critical thinking includes inductive and deductive reasoning techniques, as well as making the right analyses, inferences, and evaluations (Varghese, 2018). The importance of such component is merely to understand the academic content, and to relate it to the real life scenario. Consequently, it will enhance their career performance in the workplace. Past research also suggests that for an organization to compete in the global economy, it needs workers who will think out of the box to continuously improve its products, processes, or services and they are well equipped to give back to the society (Varghese, 2018).

On the other hand, communication comprises of clarity of information, sharing of information and the balance among the participants or communicators (Mohr, Fisher, and Nevin 1996; Schrooten & de Jong, 2017). According to Pellegrino and Hilton (2013), communication is vital to promote teamwork and lies at the core of empathy, trust, conflict resolution, and negotiation. Therefore, effective communication is important to map various ideas together and to facilitate good networking skills with peers or clients. Due to this, there has been an increased focus on this skill in schools. Similarly, collaboration is also given importance in schools as it is known as an additional competencies related to conflict resolution, decision making, problem solving, and negotiation (Lai, 2011). Currently, the information highway allows virtual teams to collaborate and spread their ideas around the world. To keep abreast with the globalization and the advancement of technology, employees are expected to have various skills related to effective communication and collaboration as it will enable them to effectively collaborate from any location. Hence, communication and collaboration are identified as an essential 21st century competencies by almost all of the organizations who are seeking competent employees.

Many educators and employers believe that creativity is the most outstanding competencies in the 21st Century. Many researchers have defined this term as unusualness, appropriateness, and transformation in varying combinations (Epstein & Phan, 2012). Over the years, creativity has gained increasing focus in educational institutions globally. For example, Malaysia has devoted resources to fostering more creativity in their teaching and learning styles. Importance is given to creative projects done and the assessment rubrics do integrate creativity as a core assessment component. According to Epstein and Phan (2012) all the four competencies that are related to creative expression. The competencies are capturing new ideas, challenging ourselves to solve a problem, broadening our student’s interest and finally associating with diversified people. He also affirms that the most important of these competencies is capturing the ideas and therefore suggests that the educators must provide students with the opportunity to capture their ideas on a daily basis in an idea folder or known as the idea box.

**METHOD**

To address the objectives of this 21st Century Learning Skills related research, Padlet was implemented to assess the 4Cs competencies. According to the official Padlet page, Padlet is the easiest way for students to create and collaborate ideas online. To add on, Padlet empowers everyone to design their desired content, whether it’s in the form of bulletin board, a blog, or a portfolio in the quickest manner. Furthermore, Padlet is able to invite collaborators to work on the shared projects, assignments, and activities real time.

The respondents for this research consist of 31 undergraduate students from a private higher education institution. They are from various specialization related to the field of Computing and Technology. This assessment was integrated into a Computing module offered to Year 2 students from the Computing and Technology faculty. The characteristics of the selected respondents are:

- **Gender**: Male (67%); Female (33%)
- **Age group**: between 17-22 years
- **Nationality**: Malaysian (56%); International (44%)

The assessment rubric was adapted from the Washington State Office of Superintendent of Public Instruction (OSPI) website. OSPI is the state education agency for the State of Washington. This organization implements the laws related to education in the United States of America. It is a holistic assessment on the 4Cs and the rubric is entitled 21st Century Skills Standard Rubrics. Since this rubric is being widely used in the US, therefore it is reliable and has been validated by the experts from this domain of research. Table 1 below summarizes the assessment rubric that has been adapted to the current education system in the
Private Higher Education Institution (PHEI) in Malaysia.

Table 1. 4C’s Assessment Rubric

<table>
<thead>
<tr>
<th>Learning &amp; Innovation: PADLET</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Exceeds Standard</td>
</tr>
</tbody>
</table>

A. CREATIVITY: Idea Generation

- Creates new and worthwhile ideas
- Consistently develops new and valuable ideas using both existing and new knowledge, as well as existing and new resource
- Develops new and valuable ideas using both existing and new knowledge, as well as existing and new resource
- Does not apply the ideas and make connections between information and arguments in order to support a perspective

B. CRITICAL THINKING: Synthesize Idea

- Effectively synthesizes and makes connections between information and arguments
- Is able to understand and there is a connection between information and argument
- Is able to understand and there is a connection between information and argument
- Does not understand and there is no connection between information and argument

C. COMMUNICATION: Multiple Media

- Utilizes multiple media and technologies, and knows how to judge their media and technologies
- Worked creatively to craft a comprehensive product using multiple media and technologies
- Created a product using multiple media and technologies
- Attended a project meeting but did not produce an idea

The assessment rubric in Table 1 clearly defines the 4 standards of respondents. A respondent is rated 4 if they exceed standard, 3 if they meet the standard, 2 for approaching standard and 1 is the lowest rating for not being at standard. The 4Cs are clearly defined to ease the assessment process. The rubric was given to the undergraduate students from the PHEI from various specializations from semester two onwards. The research was conducted in the Collaborative Learning Classroom and precise briefing were given highlighting the objectives of the assignment and the accuracy in the assessment using the given rubric. This research was conducted in a form of a project assessment for the Computing module. The 31 respondents brought their own devices and used the assessment rubric as a guideline to achieve the required standards. The respondents were then divided into 6 groups to promote positive interactions and to increase the visibility of the 4C competencies. The duration given to complete the task was 4 hours (2 tutorial
sessions) of classroom contact hours. Each respondent was asked to interact with their peers and to post their outcome of discussion using the online virtual bulletin board, Padlet which is real-time as shown in Figure 2.

The various walls of the Instructors are depicted in Figure 2. The educators then selects the suitable wall and share the link to the undergraduate students. Each group will post 1 real-time post with all the 4 components features. The 4Cs are highlighted to the teams so that they are aware of the 4Cs assessment. Upon completing the posts, the opponent teams are instructed to post a comment on the identified group’s final outcome and rate the quality of the post by their peers as depicted in Figure 3.

The Data analysis is the second phase of this research. This is a process whereby all the collected data from the survey is analyzed using the Statistical Analysis tool to derive the outcome of this research. Analyses involved calculation of the mean values of the 4C competencies and the overall performance. As to meet the second objective, the grades were compared with the control group that does not use Padlet as an instructional and assessment tool.

**ANALYSIS AND RESULTS**

The undergraduate student’s active participation in completing the Padlet task indicated there is a positive trend of interaction among the 31 respondents. A total of 3 groups comprising of 18 students (48%) of PHEI students scored outstanding ratings (greater than 3.5 rating, exceeds standard) in the Padlet assessment. Almost all students obtained more than 75% score for the 4Cs Assessment. The majority of the respondents enjoyed the 4 hours of continuous assessment as it is an enjoyable learning experience for them. Table 2 below depicts the mean scores obtained for the 4 competencies assessed using Padlet assignment.

<table>
<thead>
<tr>
<th>Team ID</th>
<th>Theme Colour</th>
<th>Mean 4Cs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yellow</td>
<td>3.25</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>3.40</td>
</tr>
<tr>
<td>3</td>
<td>Purple</td>
<td>3.80</td>
</tr>
<tr>
<td>4</td>
<td>Pink</td>
<td>3.00</td>
</tr>
<tr>
<td>5</td>
<td>Orange</td>
<td>3.50</td>
</tr>
<tr>
<td>6</td>
<td>Blue</td>
<td>3.80</td>
</tr>
</tbody>
</table>

Table 2 depicts the mean value obtained by each respondent for the 4 vital competencies measured in this study. The 4 competencies are creativity, critical thinking, communication and collaboration. To elaborate further, the total score obtained by the respondents for each competency is presented in the following Table 3.

<table>
<thead>
<tr>
<th>ID</th>
<th>Creativity</th>
<th>Critical Thinking</th>
<th>Communication</th>
<th>Collaboration</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>12</td>
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<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 3 illustrates the 4 different competencies captured in this assessment. It is noted that the majority of the respondents had high ratings for creativity and communication. Collaboration has the lowest ratings among the respondents. It is proven that 4 competencies are well captured in a single assessment via Padlet.

To address the second objective, the overall performance for the class was compared with the control group that comprise of 28 students for the same module. It is noted that the respondents who
have participated in Padlet scored better grades in comparison to the control group. The findings shows that the undergraduates understood what they have practiced during the Padlet assessment and it cultivates the learning interest within them. Figure 4 captures the comparison of grades between the experimented group and the control group. The experimented group comprises of the 31 respondents and the control group comprises of 28 students who are not assessed via the 21st Century Skills Assessment. The maximum and the minimum score are high for the experimental group compared to the control group. Besides that, the mean value depicts the overall student’s performance. The experimental groups mean score is 80.4% and the control group’s mean is 73.5%. Therefore, it is proven that the students perform better in the collaborative learning classroom that deploys Padlet.

![Figure 4. Comparative Analysis of Student’s Performance](image)

**DISCUSSION AND CONCLUSION**

It is clear that the aim of this study was to identify the efficacy of 4Cs assessment method and to explore the acceptance level of Padlet among the students in an interactive learning classroom. All the 4 competencies are mapped into a single assignment and it is assessed accurately. The 3 teams displayed outstanding performance for the assessment and have the highest score for the 4 vital competencies that comprises of creativity, critical thinking skills, communication and collaboration. The findings supports the findings by Wilborn (2013) and Varghese (2018) who asserted that 21st century 4Cs outcomes are clearly supported by effective assessments or classroom activities. Besides that, creativity seems to be the most prominent competencies depicted by the students who are very IT savvy. The findings supports the claim by Epstein and Phan (2012) creativity is the core competency in education. Besides that, the research also supports the affirmation by Epstein and Phan (2012) that these competencies are capable of capturing new ideas, challenging ourselves to solve a problem, broadening our learning interest and finally associating with diversified people. Hence, there is an increase in the student’s performance due to their interest in learning. A respondent also quoted that he enjoyed the lesson as it was a new learning experience for him and he has improved his social skills and made many new friends. The overall class performance showed a positive increase in the mean value of 80.4%.

It is proven that e-learning application integrates the access to the information and purposeful communication into a dynamic and intellectual learning community, it is important for educators to ensure the efficiency of a teaching learning tool for assessment (Rosenberg, 2001). However, the policy makers in the Private Higher Education Institution (PHEI) must ensure the infrastructure supports the activity as most of the assessments are technology driven. In this study, Padlet successfully captured the learning objectives as well as managed to assess the 4C competencies of the 21st Learning Skills. The research findings also explored the new advancement in assessment in an optimum and conducive learning environment such as Collaborative Learning classroom for PHEI students. Though there are many researches being conducted in the area of teaching and learning space, there is a demand to design an assessment that caters to 21st century students who are very technology driven. Other dimensions in assessment should be highlighted to improvise the effectiveness of the delivery medium in the 21st Century Learning classroom. The findings may also vary from one module to another as different modules have different learning outcomes. Therefore, the role of an informative educator is crucial to identify the most efficient assessment method and this can only be attained through experimental learning, a process of learning through experience and reflection.

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**REFERENCES**


ICEAP 2018