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COMPUTER IN EDUCATION

REPORT ON FINDINGS

TITLE: 21ST CENTURY SKILLS

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1.0 INTRODUCTION

Almost fifteen years into 21st century, the educational systems have promoted numerous of approaches in teaching and learning. According to the Partnership for 21st Century Skills, a non-profit organisation, “The 21st Century Skills are a set of abilities that students need to develop in order to succeed in the information age”. New divination in the education technology has begun to show potential into helping them to engage themselves with the skills from research and observations along the time. Aligned with this, the researchers were intended to evaluate the students’ proficiencies under the 21st Century Skills and the use of technology in and outside of the classroom.

2.0 LITERATURE REVIEW

Definition of 21st Century Skills

The term "21st-century skills" is generally used to refer to certain core competencies such as collaboration, digital literacy, critical thinking, and problem-solving that advocates believe schools need to teach to help students thrive in today's world. (Education Week Teacher pd Sourcebook). Proponents of 21st century skills argue that all students today not only a select few need to master both core subjects and applied skills (W. Riley, 2003). Thus, an overview of the knowledge, skills, work habits, and character traits that commonly associated with 21st century skills have been listed which are 1) critical thinking, problem solving, reasoning, analysis, interpretation, synthesizing information, 2) research skills and practices, interrogative questioning, 3) creativity, artistry, curiosity, imagination, innovation, personal expression, 4) perseverance, self-direction, planning, self-discipline, adaptability, initiative, 5) oral and written communication, public speaking and presenting, listening, 6) leadership, teamwork, collaboration, cooperation, facility in using virtual workspaces, 7) information and communication technology (ICT) literacy, media and internet literacy, data interpretation and analysis, computer programming, 8) civic, ethical, and social-justice literacy, 9) economic and financial literacy, entrepreneurialism, 10) global awareness, multicultural literacy, humanitarianism, 11) scientific literacy and reasoning, the scientific method, 12) environmental and conservation literacy, ecosystems understanding, and 13) health and wellness literacy, including nutrition, diet, exercise, and public health and safety.

Ellis (2005) stated that a commitment to teaching 21st century skills will enable educational leaders to a) improve teaching and course quality, b) move to performance and competence based modes of learning, c) ensure that every student is college or work ready, and d) enable educators to be more flexible and creative in the ways they assist and engage students with learning disabilities and students that are needing a more challenging curriculum.

Integration of technology in and outside of classroom

It is not surprising to know that observers, from educators and policymakers to parents and businesspeople, overwhelmingly agree that technology is an essential component of education. Billion dollars on technology equipment and internet access for schools have been spent from the federal and state government. In many countries the use of educational technology is part of an instructional shift toward constructivist approaches to teaching and learning within a context of school improvement or reform (Pelgrum & Anderson, 1999, as cited in B. Kozma, 2003).

However, there are still numbers of schools that struggle to integrate technology into the classrooms. This statement is supported by Bransford, Brown, & Cocking, 2000; Roschelle, Pea, Hoadley, Gordin, & Means, 2000, as cited in B. Kozma, 2003, which stated that new information and communications technologies (ICT) can bring exciting curricula based on real-world problems into the classroom, and provide scaffolds and tools to enhance learning. The interactivity of the technologies enable students to receive feedback on their performance, test and reflect on their ideas, and revise their understanding.

As an evidence, Wenglinski, 1998, as cited in B. Kozma, 2003, found that certain uses of technology had a positive effect on achievement. As an example, in the eighth grade, the teacher's professional development in the use of ICT and its use to teach higher-order thinking skills were positively related to math achievement which shows a great impact on students' learning. Interestingly, ICT has been rapidly incorporated into more various subjects in the curriculum and across subjects. Other teachers are gradually to see ICT as a way of changing what is taught and how it is assessed. These teachers are using ICT within the context of complex tasks, conducted within a multidisciplinary context and extended blocks of time, and with performance-based assessment (Means & Olsen, 1995, as cited in B. Kozma, 2003). As a result, it is proposed (OECD, 2001) that students will learn the skills needed for the 21st century, such as the ability to handle information, solve problems, communicate, and collaborate.

Implementation of 21st Century Skills in the aspects of communication, leadership, collaboration and higher-order-thinking-skills (HOTS) for educational purposes

Communication is very important for students because the act of transmitting and receiving information occur in daily life and even in the future. Communication also involved a few purposes such as to inform, instruct, motivate, and persuade. The importance of communication is supported by Alexander (1973) and Murstein (1972) which emphasized on effective communication determine the success of interpersonal relationships. Cushman and Cahn (1985) also agreed on communication is requisite for the maintenance of satisfying relationship since interpersonal relationships are a driving force in our lives. To illustrate, interpersonal skills are set of abilities that help you communicate well with others.

Not every student can be a leader but we can engage the student with effective and essential leadership skills in students. According to Davies and Ellison (1997), the reform and restructuring of education has taken place in many countries initially encouraged those in schools and those who responsible for school to substitute a premium on shaping the leadership skills that would enable the students to manage effectively their new responsibilities. The purpose to equipped the student with the leadership skills are also to help students thrive in today's world. Relevant to the issue, Pink (2006) stated that future belongs to the creators, empathizers, pattern recognizers and meaning makers which he referred to those who have leadership skills.

In a study done by Crockett in (2015), he stated that “students must possess the ability to collaborate seamlessly in both physical and virtual spaces, with real and virtual partners globally”. One of the reasons is most modern work environments required more teamwork and collaborative to enhance their corporation or product. Also, the fact that nowadays, students of the digital age are social by nature, connection and collaboration with others is not only essential to their learning, but contribute to their mental and emotional health as well. To support this claim, Morel (2014), attested to the fact that collaboration brings joy. For example, be it online

or face-to-face interaction, it is noted that by collaborating with others, it can enhance creativity, increase respect for others and promote team celebration.

Apart from collaboration, the students should be able to use the higher end of Bloom's Digital Taxonomy or also known as Higher-Order-Thinking-Skills (HOTS). Relevant to that, the study by Crockett (2015) also demonstrates that "students need the ability to think analytically, which includes proficiency with comparing, contrasting, evaluating, synthesizing, and applying without instruction or supervision". He believed that it is crucial to guide students because most jobs in the 21st Century will require employees towards being able to perform analytic thinking. This then achieved the Bloom's aim in which to promote higher forms of thinking in education, such as analyzing and evaluating, instead of rote learning (Collins, 2014).

3.0 RESEARCH OBJECTIVES

The study aimed at establishing the following specific objectives:

- I. To find out their understanding about what is 21st Century Skills
- II. To identify the integration of technology in and outside of classroom
- III. To investigate the implementation of 21st Century Skills in the aspects of communication, leadership collaboration, and higher-order-thinking-skills (HOTS) for educational purposes

3.1 Research Questions

This research sought answers to the following questions:

- A. What are the respondents demographic details in terms of institutions, programmes, gender, and age?
 1. Do the respondents agree that 21st Century Skills involve the 4'Cs (Collaboration, Creativity, Communication, Critical Thinking)?
 2. What are the respondents' desirable learning environments?
 3. What are the respondents' preferable methods for curriculum?
 4. What are the mediums that the respondents use to communicate with their peers?
 5. What are the medium of technologies that the respondents use to share information?
 6. How often/frequent are the respondents' daily usage of internet?
 7. Do the lecturers integrate technology in the classroom most of the time?
 8. Do the respondents agree that the usage of electronic gadget and internet in the classroom should be allowed?
 9. Do the respondents agree that it is important to fulfill the need of teacher in equipping themselves with knowledge and technology literacy?
 10. What are the respondents' main reasons to be a leader?
 11. What are the respondents' perspective as leaders regarding etiquette of workers in terms of joking around while working?
 12. What are the respondents' perspective as leaders regarding etiquette of workers in terms of punctuality?
 13. What are the respondents' perspective as leaders regarding etiquette of workers in terms of tolerate the group members' opinions?

14. Why the respondents prefer to work in small groups or in pairs to complete a task together?
15. Do most of the respondents will avoid group discussion if they have to work in groups?
16. Do most of the respondents prefer to work with people that they are familiar with if they have to work in groups?
17. Why do the respondents believe that Higher Order Thinking Skills (HOTS) will sharpen the way they think?
18. Will the respondents get frustrated and give up when they facing certain difficulties in the middle of learning process?
19. Will the respondents seek for help and guidance from other people when they facing certain difficulties in the middle of learning process?
20. Do the respondents eager to learn more deeply by asking questions when they are experiencing something new?
21. Do the respondents prefer to search for information in books when a new topic is being introduced to them?
22. Do the respondents prefer to search for information on the internet when a new topic is being introduced to them?

4.0 METHODOLOGY

4.1 Sample

In this paper, it is asserted that the respondents' educational programmes, different branches, gender, age and finally institutions that they study in as the pivotal elements in completing this research.

The sample of the study consists of 46 respondents, composing of 27 females and 13 males who are still studying in both private and public higher educational institutions. Thirty-two respondents from public institution and eight respondents from private sector had participated in this sample research. Thirty-four of the respondents are in the scope of age 18-20 and another six respondents between the age of 21-24. Branches of five of these respondents were Education: seven of them are TESL students and two of them were Special Education students; three of them were Science and Technology students; two of them were Information, Science and Technology students and four of them were others.

Table 1: Demographic Factors of the Respondents

Variables	Levels	Number	Percentage
Programme	Diploma	13	32.5%
	Degree	24	60%
	Other	3	7.5%
Gender	Male	13	32.5%
	Female	27	67.5%
Age	18 - 20	34	85%
	21 - 24	6	15%
Faculty (For UKM Students)	Education (TESL)	7	38.9%
	Education (Special Education)	2	11.1%
	Science & Technology	3	16.7%
	Information, Science & Technology	2	11.1%
	Others	4	22.2%

4.2 Data Collection Tools

As a data collection tool, we constructed a structured questionnaire that had closed ended questions, which were designed to obtain information and data from the respondents.

Based on twenty-two questions related to the 21st century skills topic that we have constructed, we decided to allocate those questions into two types; fifteen Likert scale type questions which were scaled from 1 (Strongly disagree), 2 (Disagree), 3 (Average), 4 (Agree) and 5 (Strongly agree) and seven checkboxes type of question where the respondents are allowed to select multiple answers based on their opinion about the questions.

We then disseminated the link of our Google Forms survey to the respondents using our messaging system, for example Whatsapp and Wechat. Other than that, we also reached the respondents through email invitation and by posting the link to the Weebly Forum and other online networking such as Facebook and Twitter.

5.0 FINDINGS

Descriptive analysis technique is used in the process of analysing the data.

1. I understand that 21st Century Skills involve the 4'Cs (Collaboration, Creativity, Communication, Critical Thinking)

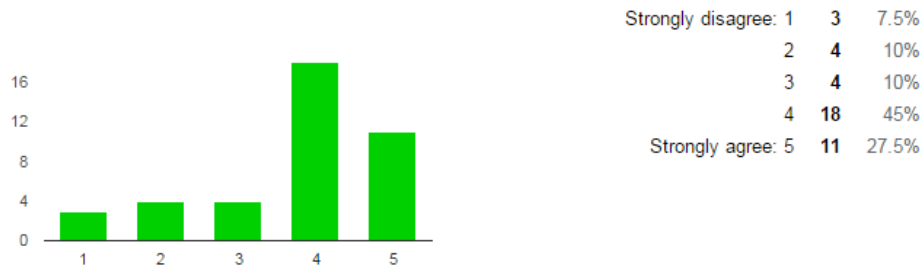
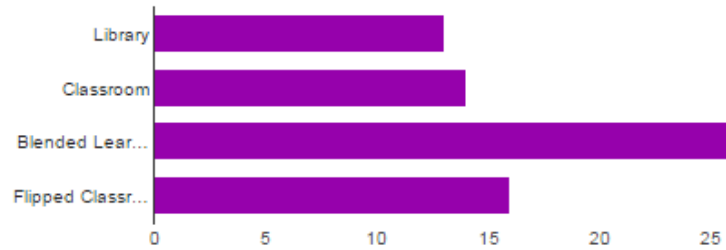


Figure 1: A bar graph of 4'Cs

In the figure 1, most of the respondents were agreed that 21st Century Skills involve the 4'Cs which are Collaboration, Creativity, Communication and Critical Thinking Skills with n=18 (45%) of the students.

2. Which one is your preferable learning environment?



Library	13	32.5%
Classroom	14	35%
Blended Learning (e.g: mobile learning, e-Learning, classroom learning)	26	65%
Flipped Classroom (e.g: communicating with lecturers and peers via online discussions)	16	40%

Figure 2: A bar graph of preferable learning environment

Based on the figure above, the majority of the respondents with the total of 26 (65%) preferred blended learning as their means to learn. Meanwhile a small number of them responded otherwise; with 16 (40%) of them chose flipped classroom, 14 (35%) of them chose classroom environment and the minority with 13 (32.5%) of them chose library.

3. Which would you prefer for the curriculum?

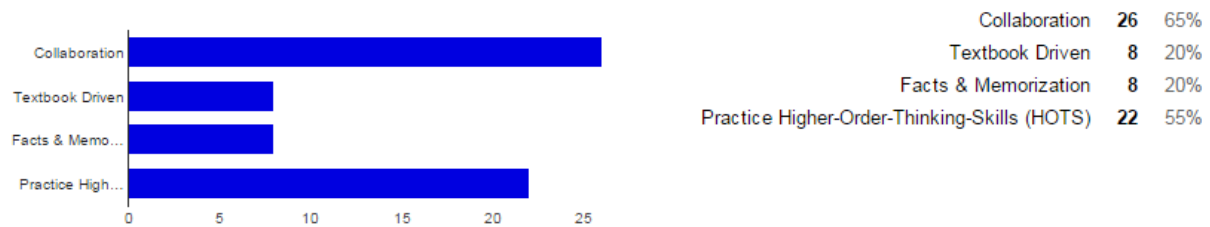


Figure 3: A bar graph of preferable curriculum in learning process

According to Figure 3, the superiority of the respondents chose Collaboration as their preferable aspect for the curriculum with the total of 26(65%), followed by the total of 22(55%) with Practice Higher Order Thinking Skills (HOTS). In the interim, both Textbook Driven and Facts & Memorization share the similar total of 8(20%) as the minority respondents.

4. Which medium you use the most to communicate with your peers?



Figure 4: A bar graph of medium in communication with peers

Referring to Figure 4, a total of 36 (90%) preferred face-to-face interaction medium as to communicate with their peers followed closely by using social media with the 31(77.5%). The respondents were not fond of videos and websites with the total of 5(12.5%) and 7(17.5%) respectively.

5. How do you share information using technology?

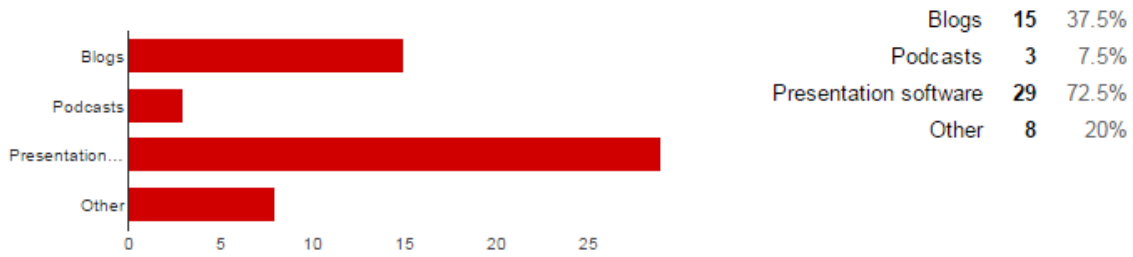


Figure 5: A bar graph of sharing information using technology

Hinge of Figure 5, Presentation software was chosen as the high-rated technology used by the respondents to share information with the total of 29(72.5%), far away followed by Blogs with the total of 15(37.5%). At the same time, with the total of 8(20%), other technology was picked and leave Podcast as the minor choice of the respondents with the total of 3(7.5%).

6. I frequently use internet for educational purposes

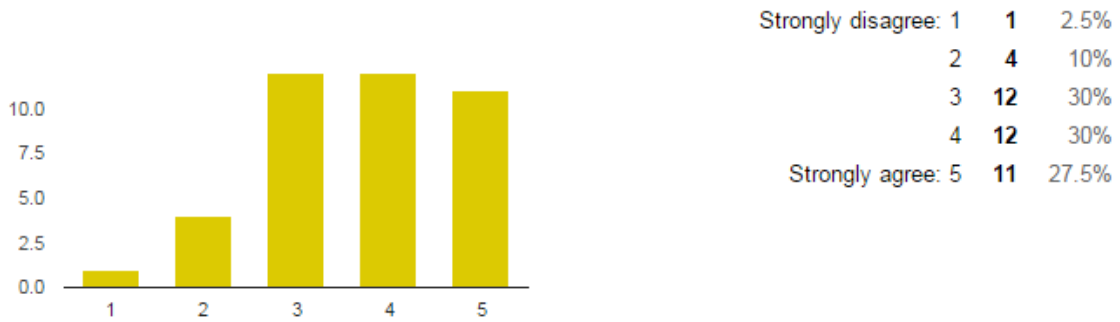


Figure 6: A bar graph of frequency in using internet for educational purpose

Figure 6 illustrates that that most of the respondents were more likely to agree on the frequency of utilizing internet for educational purposes.

7. Most of the time, my lecturers integrate technology into the classrooms

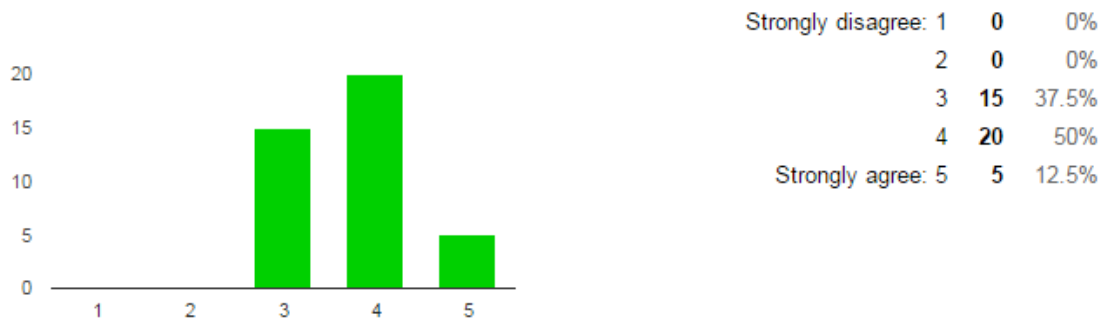


Figure 7: A bar graph of response to question “most of the time, my lecturers integrate technology into the classrooms”

Based on Figure 7, with the supreme total of 20(50%) respondents were agreed that their lecturers integrate technology into the classrooms most of the time while the undermost stated none of the respondents strongly disagree that most of the time the technology was integrated into the classrooms by their lecturers.

8. Students should be allowed to use their electronic gadgets and internet in the classrooms

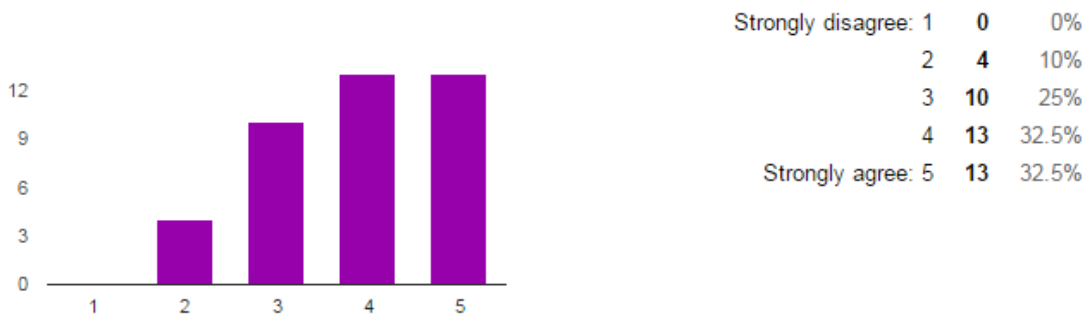


Figure 8: A bar graph of response to “students should be allowed to use their electronic gadgets and internet in the classrooms”

As referred to Figure 8, the highest percentage which is 32.5%(13) are recorded for the respondents who are strongly agree and agree with the idea that students should be allowed to use their electronic gadgets and internet in the classrooms while 10%(4) of respondents disagree with the usage of electronic gadgets and internet in the classrooms.

9. Educators should improve themselves not just in terms of knowledge but also in technology literacy

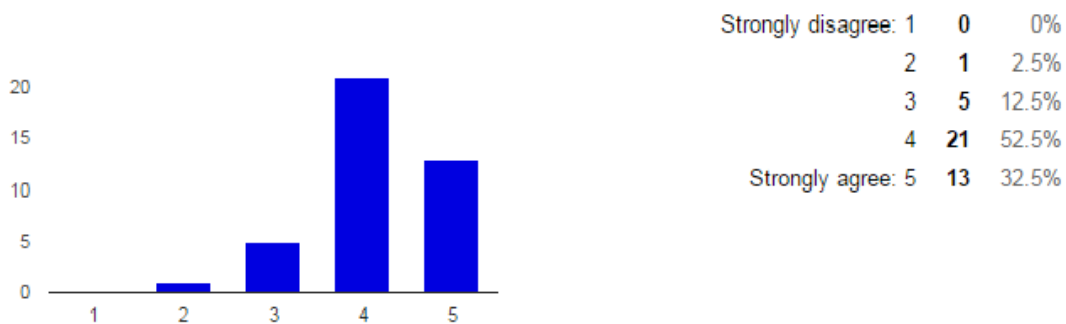


Figure 9: A bar graph of response to “ educators should improve themselves not just in term of knowledge but also in technology literacy”

On to Figure 9, the majority of the respondents have agreed with the total of 21 (52.55). However, only 13 (32.5%) of the respondents were strongly agreed that educators should improve themselves not just in terms of knowledge but also in the technology literacy.

10. I always volunteer myself to be a leader because

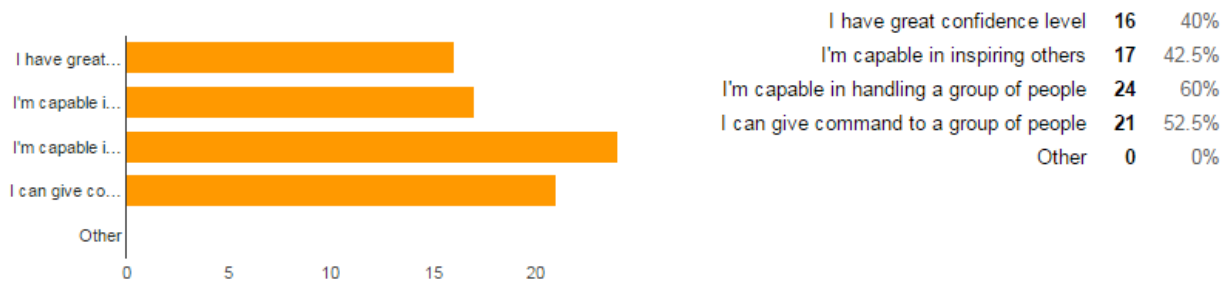


Figure 10: A bar graph of response to “ I always volunteer myself to be a leader because”

Based on the figure 10, 60%(24) of respondents responded that they would volunteer to be a leader because they are capable of handling a group of people, followed by 52.5%(21) of them agreed that they are very good in giving command as a leader. 42.5%(17) of respondents claimed that they are capable of inspiring others while 40%(16) stated that they have a great confidence level.

11. If I were a leader, I will not allow my team members to joke around while working

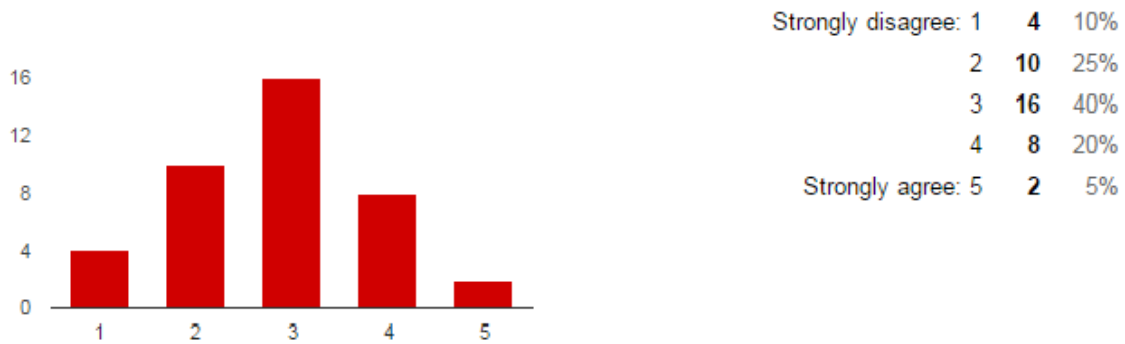


Figure 11: A bar graph of response “ if I were a leader, I will not allow my team members to joke around while working”

Figure 11 clearly showed the highest total of 16 respondents with 40% of them were in the middle of strongly agree and strongly disagree that they will not allow their team members to joke around while working if they were a leader. Simultaneously, only 2 respondents with 5% strongly agree that they will not allow their team members to joke around while working if they were a leader which stated as the least number.

12. If I were a leader, I expect my team members to always be punctual

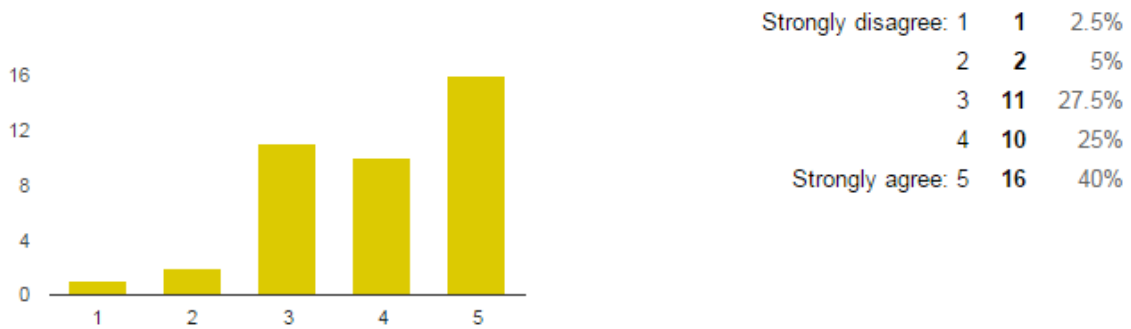


Figure 12: A bar graph of response to “ if I were a leader. I expect my team members to always be punctual”

A large majority of respondents were strongly agreed if they were a leader, they expect their team members to always be punctual except only one voted for strongly disagree.

13. If I were a leader, I will tolerate my team members' opinions

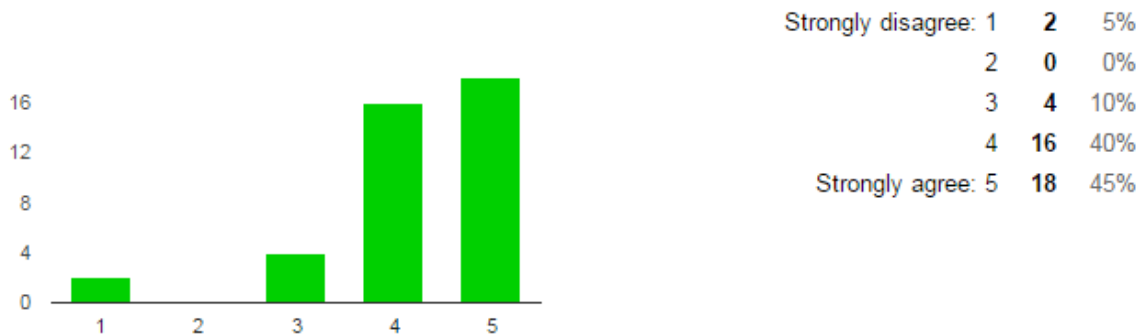


Figure 13: A bar graph of response to “ if I were a leader , I will tolerate my team member’s opinion”

On tolerating the team members’ opinion, a total number of 18(45%) respondents were strongly agreed if they were a leader.

14. I prefer to work in pairs or small groups to complete a task together because

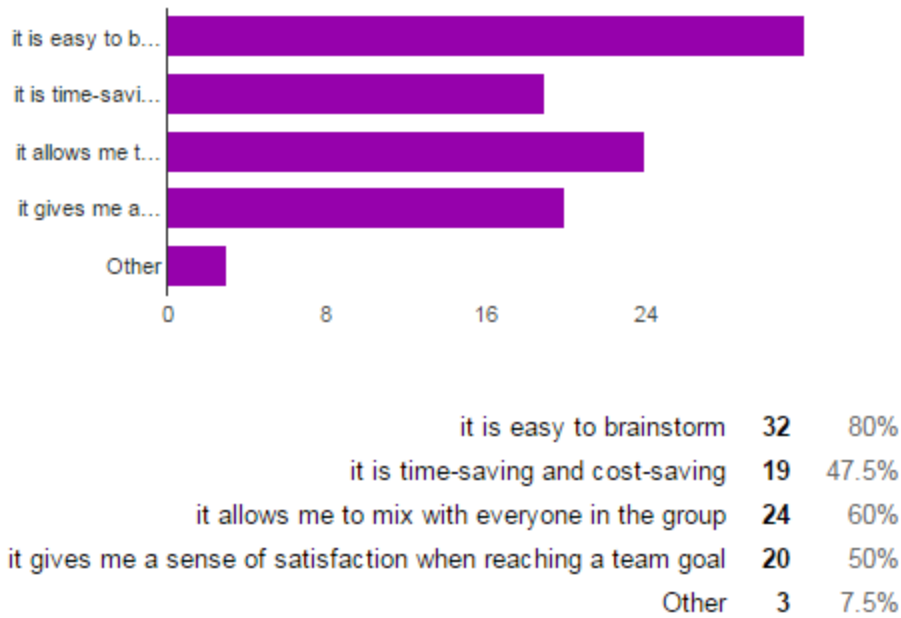


Figure 14: A bar graph of response to “ I prefer to work in pairs or small groups to complete a task together because”

According to Figure 14, the data recorded the maximal number in total of 24(60%) stated work in pairs or in small groups to complete a task together will allow them to mix with everyone in the group. In the meanwhile, other reason was chosen to be the reason why the respondents preferred to work in pairs or in small groups to complete a task together which automatically recorded as the minimal number in total 3(7.5%).

15. If I have to work in groups, I would avoid to participate in the discussions

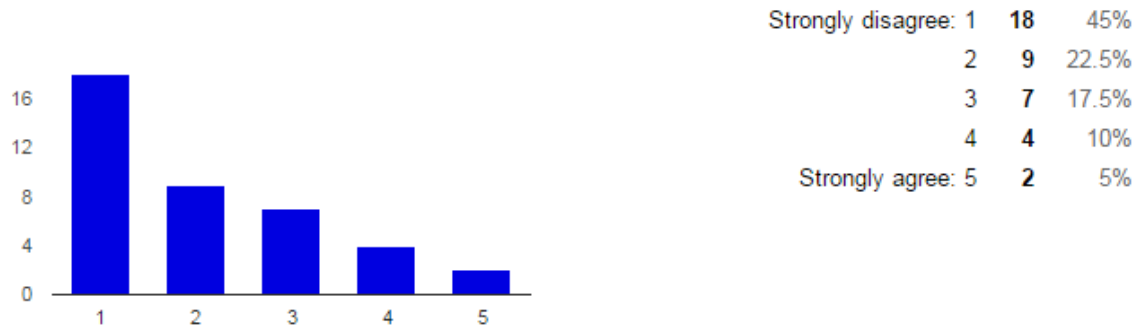


Figure 15: A bar graph of response to “ if I have to work in groups, I would avoid participate in the discussion”

In Figure 15, on working in groups, 18(45%) of the respondents strongly disagreed that they would avoid to participate in the discussions.

16. If I have to work in groups, I prefer working with the people that I familiar with

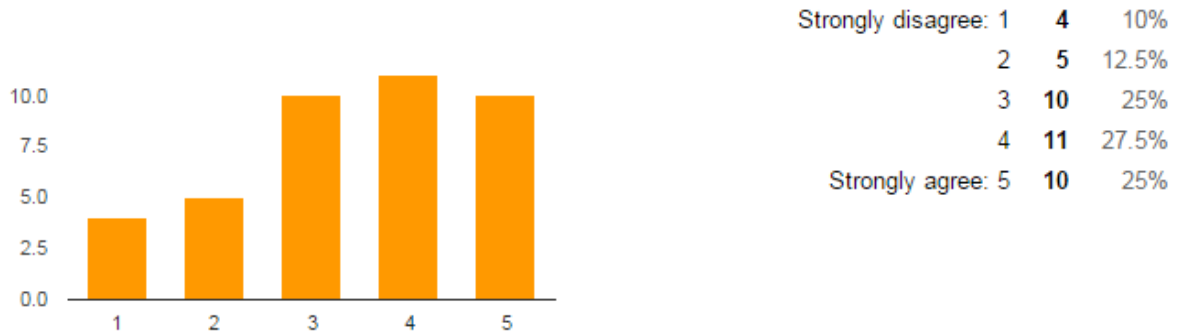


Figure 16: A bar graph of response to “ if I have to work in groups, I prefer working with the people that I familiar with”

Figure 16 recorded the highest percentage which is 27.5%(11) on respondents who agree to work in group with the people that they are familiar with. In the contrary, only 10%(4) claimed that they are strongly disagree to work in group with people they familiar to.

17. I believe that Higher-Order-Thinking-Skills (HOTS) will sharpen the way I think because

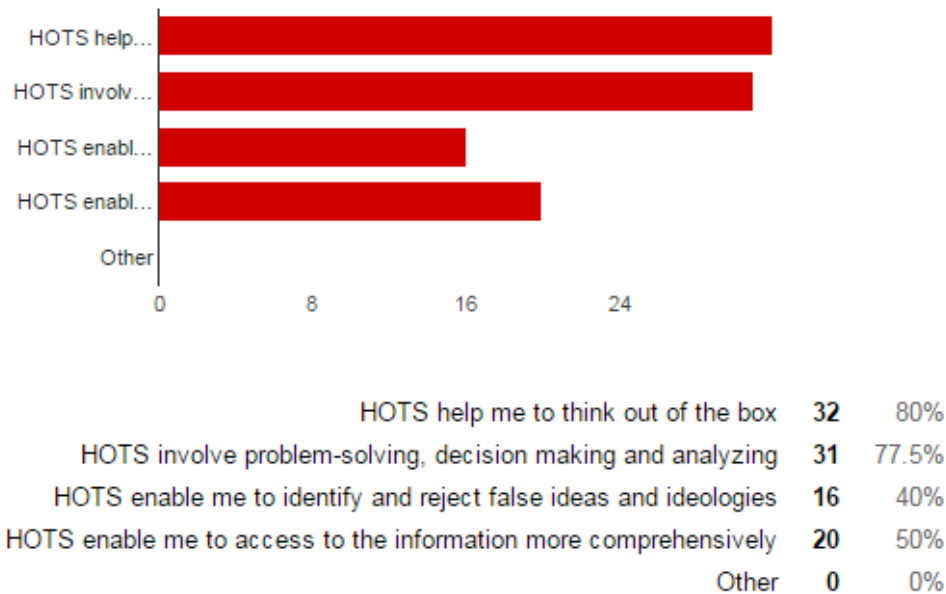


Figure 17: A bar graph of response to “ I believe that Higher-Order-Thinking-Skills (HOTS) will sharpen the way I think because”

Figure 17 illustrated that the preeminent number of 32 respondents with 80% of them stated that Higher Order Thinking Skills (HOTS) will sharpen the way they think because it helps them to think out of the box, closely followed by the total of 31 respondents with 77.5% chose HOTS involve problem-solving, decision making and analysing as their reason why. Simultaneously, 20 respondents with 50% chose the answer HOTS enable them to access to the information more comprehensively, closely followed by 16 respondents with 40% chose the answer HOTS enable them to identify and reject false ideas and ideologies as the reason why. Lastly, none of the respondents picked up other as the reason to why they think HOTS will sharpen the way they think which recorded as the least number.

18. When I face certain difficulties in learning process, I will be frustrated and give up

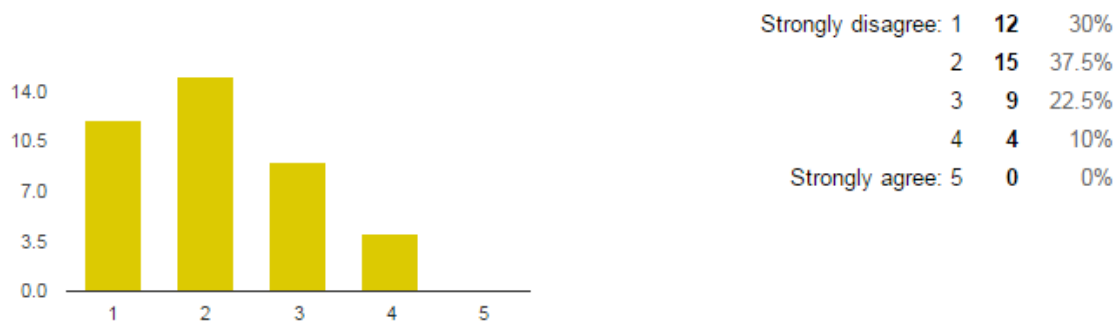


Figure 18: A bar graph of response to “when I face certain difficulties in learning process, I will be frustrated and give up”

Based on the figure above, in facing with certain difficulties in learning process, the majority of them with the total number of 15(37.5%) were disagreed that they will be frustrated and give up.

19. When I face certain difficulties in learning process, I will ask help and guidance from others.

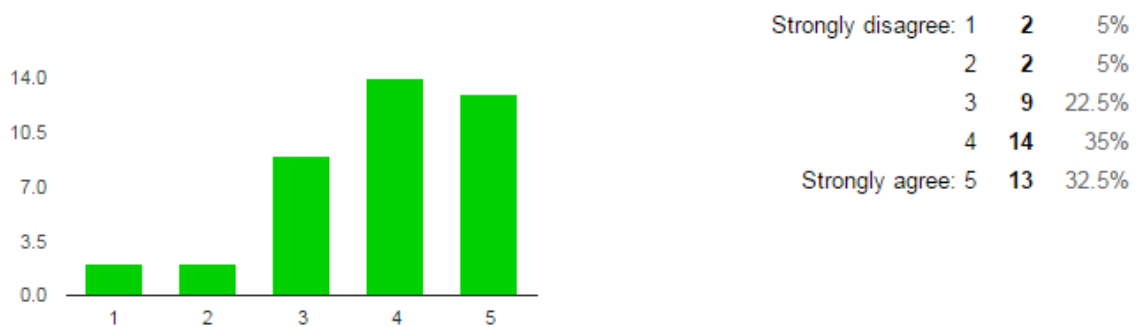


Figure 19: A bar graph of response to “when I face certain difficulties in learning process, I will ask help and guidance from others”

In Figure 19, the highest rating are with agree with the total number of 14(35%) of respondents. Both disagree and strongly disagree have the same total number of respondents with 2(5%) respectively.

20. When I experience something new, I like to question why it happens.

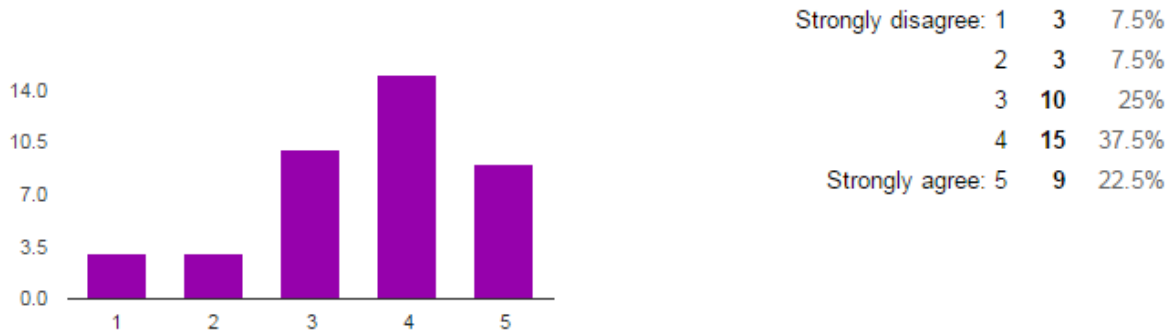


Figure 20: A bar graph of response to “When I experience something new, I like to question why it happens”

From Figure 20, it can be concluded that 37.5%(15) of respondents agree to question why something happened when they experience something new. Meanwhile, the same percentage of 7.5%(3) are recorded from the respondents which are strongly disagree and disagree that they would question the new experience.

21. When a new topic is introduced to me, I prefer to search for information from books

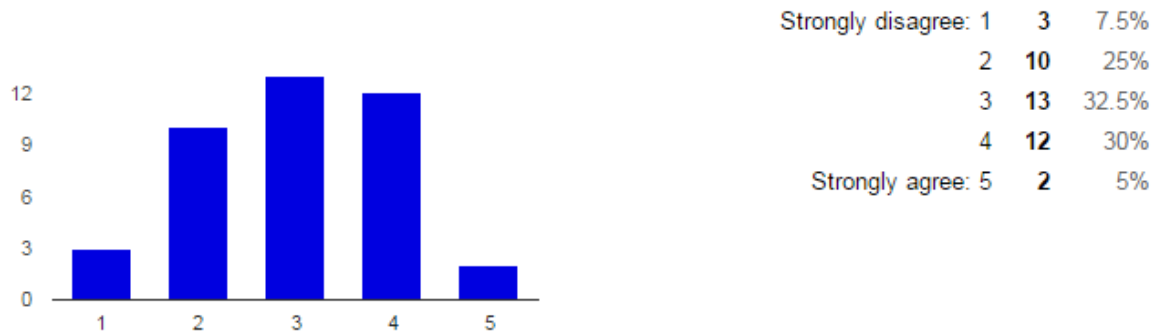


Figure 21: A bar graph of response to “when a new topic is introduced to me, I prefer to search for information from books”

Hinge of the Figure 21, it was clearly showed that the uppermost total number with 13(32.5%) of the respondents were in the middle of strongly disagree and strongly agree to say that they preferred to search for information from books when a new topic is introduced to them while the undermost total of number with only 2(5%) of the respondents were strongly agree that when a new topic is introduced, it was more preferable for them to search for information from books.

22. When a new topic is introduced to me, I prefer to search for information from online sources

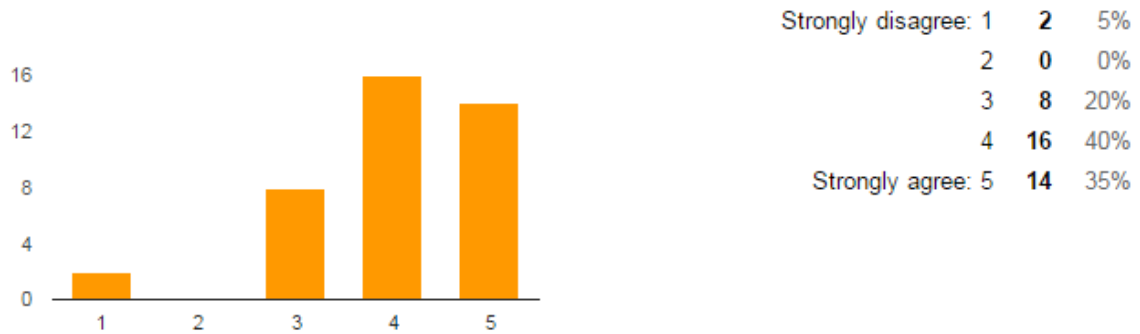


Figure 22: A bar graph of response to “when a new topic is introduced to me, I prefer to search for information from online sources”

Based on the bar graph on the Figure 22, the majority of the respondents with the total number of 16(40%) agreed that they prefer to search information from the online courses except the least with 2(5%) strongly disagreed about it.

6.0 DISCUSSION AND CONCLUSION

From the findings, the respondents' demographic data reveals that most of them are females, single, aged from 18 to early 20s, and are still studying. This is due to the fact that even though the respondents are chosen randomly, the method of distributing the survey are through email invitation, social medias and others. This causes the respondents to be leaning to a certain mindset, and possibly making the results turned biased without intent. The findings have supported that most respondent are at least master the very basic knowledge of 21st Century Skills.

Communication Skills

Learning is fundamentally involving social skills such as communication as the medium to interact with other people. Communication in 21st century skills bring another wide different from what the students have in 20th century skills. Previously, students in 20th century skills have a teacher-centred classroom which is not effective in equipping the students with the communication skills. In contrast, 21st century skills are more to student-centred learning which require the students to involve in the communication and can help them to improve themselves. Communication is useful for a variety of purposes for instance to inform, instruct, motivate and persuade. Despite of face-to-face communication, there are another medium to interact with the peers by using the social media such as skype, Youtube, Blogspot, Wordpress, Weebly, Twitter, Facebook and Instagram. The existence of sophisticated technology and variety of interaction medium make communication easily to be implied in daily life. But, from the findings that have been collected it shows that student in 21st century skills still choose face-to-face communication as their first choice to communicate with their peers. This is supported by McGuire (1985) that face-to-face communication provides an opportunity for students to seek for feedback or clarification upon the conveyed message.

Leadership Skills

Next, according to data collected, most of the respondents stated that they would volunteer to be a leader because they are capable of handling a group of people. This particular data collection is complimenting with Ulrich and Smallwood (2012), citing in Fang Chuang, said in which it is crucial that leaders understand the significance of leadership and leadership expectations, and to develop and sustain effective leadership strategies for long-term change. Other than that, a large majority of respondents were strongly agreed that if they were a leader, they expect their team members to always be punctual and will consider the team members' opinion. As a leader, making sure the other members' punctuality are very pivotal as if a leader is not concerned enough to take account the other members' punctuality, then how in the world he would manage to be a good leader. Heller (1982), citing in Fang Chuang, argues that a critique or judgment has the ability to affect individuals' behaviour and values when the environment is shaped by the same group pattern. Thus, a critique by a leader towards any of the members who is not punctual has the power to gradually change his or her behaviour into becoming more punctual in the future. Coming to a leader should consider the team member's' opinion, it is actually one of the essential leadership skills. This is supported by Fang Chuang (2013) who stated that appreciate individual's differences in terms of cultural background, life experiences and values is an important leadership skills. Hence, accepting each other's' opinion is a character that a leader should possess when he or she is in charge of conducting a group of people. Overall, the confidence to handle a group of people, take account the members' punctuality and accept each other's opinion are some of the important skills to be a good leader.

Collaboration Skills

Collaboration demonstrate the ability of the students to work effectively with their team members which they should cooperate in order to achieve the common goal. As a student, they will involve in many groupwork activities that will need them to give their contribution to the other team members. Kirschne et al. (2009) came up with the statement that if the cognitive skills are required for the tough task, there will be some advantages in sharing the task because students can distribute the information among their team members. Based on the findings collected, the students mostly chose to work in pairs or small groups because it is easy to

brainstorm and allows them to mix with other students. Plus, many of the students agreed to participate the discussion held in the group which shows that they have a good collaboration skills. Apart from that, many students decided to work with the people that they familiar with because it easier for them to collaborate with the team members and give full cooperation to complete the task together. According to O'Neil and Chuang (2008), they asserted that proficiency in collaborative problem solving is the requisite for both field whether in work or school. In short, the collaboration skills should be taught to students since their first entrance to the school so that they can implied the skills when they work in other place soon.

Higher-Order-Thinking-Skills (HOTS)

Apart from that, through the survey, when asked about the respondents' view about Higher-Order-Thinking-Skills (HOTS), most of them agreed that it helps them to think outside the box. From the study, it is also revealed that most respondents agreed that they would like to question why it happens when encounters something new rather than be frustrated and gave up. This actually reflects they know that they can approach difficulties in different ways and not only stick to the lame saying "There's only an answer for every question." In fact, implementing this skills is very crucial as it also helps in developing the divergent thinking where they will learn that sometimes a wrong answer is a right answer to a different question. Next, majority of the respondents also preferred to look for multiple sources when searching for information. The fact that these days, everything can be found at just our fingertips, there is no need to go to library every time only for the sake of borrowing the books. Lots of sources such as journals, website, eBooks and others are available at various search engines.

To recapitulate, students should master 21st century skills with the help and encouragement from educators who are well-trained and supported in this type of instruction. 21st century develop opportunities to prepare educators to integrate 21st century skills into learning standards and classroom instruction. 21st century skills are also important to equipped the students with all the skills to make them competent enough in their future from the aspects of leadership, collaboration, communication, technology and high order thinking skills.

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