This paper aimed to determine teachers' knowledge level in digital literacy and teacher's perception of the 21st Century Learning in SMK Bako Kuching Sarawak. Many teachers nowadays have difficulty to know their level knowledge in digital literacy, especially in the 21st century learning in school. Besides, some teachers have huge interpretation of job burden in spite of teaching using technology. Since there is no study done on this subject in Sarawak, this is the first research done in study teacher’s level perception in digital literacy in school. The objectives of this study were to determine the level of teacher’s digital literacy in SMK Bako. Second, it was to identify significant relationship between antecedents (information literacy, visual literacy, software literacy, technology literacy and computer literacy) and teacher’s perception for 21st century learning in SMK Bako. Third was to determine the moderating effect of gender relationship between digital literacy and teacher’s perception for 21st century learning in SMK Bako. The data was analysed using Pearson Correlation and Multiple Regression to test the hypotheses. This quantitative study shows that there was a significant relationship with digital literacy and teacher’s perception for 21st century learning in SMK Bako Kuching, Sarawak. It was also found that gender moderated the relationship between digital literacy and teachers’ perception in 21st century learning. This study can be a guideline for other researchers, especially in the education sector to evaluate the teacher’s level in digital literacy perception in the future.

**Keywords:** Digital Literacy; 21st Century Learning; SMK Bako; Computer Literacy; Software Literacy

**INTRODUCTION**

Education plays an important part in term of country development. Education always transforms every time due to the technology use as how to deliver the learning as fast as students are capable to learn it well. Nowadays, the digital system faces a new revolution in learning, especially in 21st learning century. In
parallel term to the Sarawak Digital Economy Plan 2018, the education system also is participating in modification aligned to the global skills workforce as to generate the development of the economy growth of Sarawak.

The development of digital literacy as in the light of the rapid and continual development of digital technology, public are prerequisite to use an emergent variety of technical, cognitive and sociological skills in order to complete tasks and solve problems in a digital environment [1]. This is speedy changes in technology atmosphere due to digital user demand in the real world of digital. Therefore, the digital literacy is also known as one of the skills [2, 3, 4, 5]. Like any various term of digital literacy, it has many words definition based on the literature in term of citation technical aspect [6].

As the world digital economy changes, especially in Sarawak, therefore the education system is upgrading the digital literacy learning as a model of education transformation as stated in Malaysia Education Blueprint Transformation System Ministry of Education 2013–2025. Besides, it also works as a yardstick for Sarawak development in the education side. This is because since Sarawak in one of the states pioneering the digital economy concept and Malaysia is facing the reality of the 4.0 Industrial Revolution. Therefore, the digital literacy is a very crucial part to robust the economy as well. The reason is teachers nowadays are encouraged to use digital knowledge as to deliver the knowledge well in order as to support the 4.0 Industry Revolution especially in Sarawak, which is implementing the digital economy.

**Digital Literacy**

The digital literacy basically could be best defined as the individual ability to find, analyse, programme and install, that also communicate clearly with the information through writing on various of digital platform. Moreover, it is also the capability to use the technology to allow to use it wisely besides in term of increasing the level of knowledge on the digital literacy. According to Bruce [7], the digitalization of many media, increased capacity of computers, Internet connection via high speed broadband have enabled learners to collaborate. Those having the most efficient roles in teaching these literacy skills are doubtless the teachers. Hence, teachers need to acquire digital literacy skills while they are still candidates. The changes in society will affect teacher behaviours correspondingly and the new digital technologies offer an increasing use in their daily lives. Therefore, five literacies will be examined in reflecting the teacher’s perception for 21st century learning in school. Information literacy is the essential for a created society and people must achieve a specific dimension of data proficiency with the end goal to confront the difficulties of the Information Age. The terms data educated and data proficiency are not new to Malaysians. This is because since Malaysia has achieved a lot performance and has become one of the Asian countries which tend to use internet, communication and technology in all fields.
especially in the development of Malaysian education. Visual literacy is another fundamental part in this study. Visual literacy needs capability to interpret the visual information into a new accurate data information. Both Umar and Jalil [8] and Konan [9] have contended that visual literacy is a basic ability for twenty-first-century understudies and should be a focal segment of liberal instruction. Thus, it also debates that visual literacy is really needed in 21st century learning as this is serious matter for students to understand the information accurately. Software literacy is a new concept in digital literacy literature. Therefore, Software literacy can be defined as understanding and resolving of the information formed by machine commands used for developing tasks and their usability by enabling the electronic devices communication and compatibility, and the ability of defining this electronic information, access and usage. According to Hardy [10], the “notion of software literacy is emerging as one way to conceptualise the repertoires of skills and understandings needed for people to be critical and creative users of software packages and systems in a software saturated culture”. Technology literacy is the capacity to viably utilize technology to get to, assess, coordinate, make and convey data to improve the learning procedure through critical thinking and basic reasoning. Technological literacy is a necessary 21st-century skill for today’s world. Computer literacy involves learning how to use a computer in order to do research and gather information [11]. Individuals who can use computer programs, reach the information needed through a computer and the Internet and also can solve the problems encountered on their own [2]. Computer literacy involves file management, use of word processor programs, calculation table programs, presentation programs, database programs, communication programs, algorithmic design, research techniques and skills of accessing information [12].

21st Century Learning

The term “21st Century” has become an integral part of educational thinking and planning for the future. Educators and administrators are actively searching for ways to prepare students for the future, and the educational system has been evolving faster than ever before. The 21st century learning is basically a kind of new methods of teaching which it is relevant to the students nowadays. 21st century skills comprise skills, abilities, and learning dispositions that have been identified as being required for success in 21st century society and workplaces by educators, business leaders, academics, and governmental agencies. This is part of a growing international movement focusing on the skills required for students to master in preparation for success in a rapidly changing, digital society. Many of these skills are also associated with deeper learning, which is based on mastering skills such as analytic reasoning, complex problem solving, and teamwork. These skills differ from traditional academic skills in that they are not primarily content knowledge-based.
Conceptual Framework

Figure 1 shows the conceptual framework in this study. The independent variables are information literacy, visual literacy, software literacy, technology literacy and computer literacy while the dependent variable (DV) is the teacher's perception of 21st century learning. Digital literacy plays fundamental part in boosting learning and teaching for students in the classroom. Digital literacy influences and correlates teacher’s perception of 21st century learning. This study intends to test the following hypotheses:

H1: There is a significant relationship between digital literacy and teachers’ perception of 21st century learning.
H2: There is a significant relationship between information literacy with teachers’ perception of 21st century learning.
H3: There is a significant relationship between visual literacy with teachers’ perception of 21st century learning.
H4: There is a significant relationship between software literacy and teachers’ perception of 21st century learning.
H5: There is a significant relationship between technology literacy and teachers’ perception of 21st century learning.
H6: There is a significant relationship between computer literacy and teachers’ perception of 21st century learning.
H7: Gender moderates the relationship between digital literacy and teachers’ perception of 21st century learning.

Figure 1. Conceptual framework of relationship of digital literacy and teachers perception of 21st century learning: A study of SMK Bako Kuching, Sarawak
METHODOLOGY

The most appropriate design for the purpose of this study is cross-sectional design. In this study, quantitative data were collected using a structured questionnaire. The questionnaire initially was prepared in English and translated to Malay. The unit of analysis was defined as the major entity that was being analysing in the study Nunnally [13]. For the purpose of this study, the unit of analysis referred to individuals at all levels in SMK Bako including management section, group teachers' expertise, a group of teachers’ panel and teachers’ subject.

Sample size

This study involved employees at SMK Bako to explore level of teachers of digital literacy and teachers perception of 21st century learning. The population of employees in SMK Bako, Kuching was around 120; hence, the sample size for this study was same as the population of respondents.

Sampling Technique

These studies applied stratified sampling and distributed to all of the staff at SMK Bako, Kuching. There were five sections in SMK Bako, which were Math and Science Unit, Vocational and Technique Unit, Language Unit, Humanity Unit and Form Six Unit. A Simple Random Stratified Sampling was conducted to ensure all units in a sampling frame had an equal chance of being selected [14]. Therefore, 125 questionnaires had been distributed and about 120 were collected.

Data Collection

According to Trochim [15], primary data are the data derived originally by the researcher first-hand from direct observed and collected data. Hence, the data used for this study were classified into primary and secondary data. While the primary data was acquired by questionnaires distributed to the staffs of SMK Bako, Kuching. Meanwhile, the secondary data were collected from resources such as articles, journals, previous paperwork and thesis. The questionnaires were randomly distributed among Principal, Penolong Kanan Pentadbiran, Peolong Kanan HEM, Penolong Kanan Kokurikulum, Penolong Kanan Tingkatan 6, Group of Expertise Teacher, Group of Panel Teachers, Subject Teachers and Form Six Teachers where the questionnaires distributed to them were kept confidentially and would not result any bad effect toward their career in relying that this research was only meant for academic purpose.
Measurement

First part of the research measurement consisting of demographic information such as gender, age, race, level of monthly income, length of service and grades of job were based on nominal scale, whereas for the age, level of education and income were based on ratio scale. The respondents were required to mark on their preferred answer. Next was to measure the digital literacy, which was measured using scale developed, which consisted of 30 items comprising five digital literacy constructs [14].

Questionnaires made were in the form of dual languages in English and Bahasa Malaysia language. Point scale was used from 1-strongly disagree, 2-disagree, 3-neither disagree or agree, 4-agree, 5-strongly agree known as Likert scales in Section B and Section C questionnaires.

Thirdly was Teachers’ Perception on Digital literacy for 21st century learning which formed Part C of the questionnaires with Likert scale measurement which consisted of 11 items developed [14]. Eleven questions measured teachers perception by using Likert scale with possible scores ranging from 1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree. The questionnaires collected were analysed by using SPSS 21.0 software in order to get reliability and validity as well as the result of the findings. Both descriptive analyses and inferential statistics were used to analyse the data.

RESULTS AND DISCUSSIONS

Profile of Respondents

The percentage of female and male was the same (50%). In terms of marital status of teachers for this study, majority of them were married teachers (74.2%). For ethnicity, the majority of the respondents were Malay (81.7%). For respondents’ monthly salary, majority ranged from RM4,001–RM6,000 (62.5%). As for working experience, majority of respondents had worked for three to 15 years (62.5%). The highest level of education for the respondents was Degree (80%). Lastly, the grade of the majority of DG’s position of teachers is DG41/DG. This is summarized in Table I.
TABLE I. DEMOGRAPHIC PROFILE

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Below 25 years</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>26 – 30 years</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>31 – 36 years</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>37 – 45 years</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>46 – 50 years</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>51 – 55 years</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Over 55 years</td>
<td>12</td>
</tr>
<tr>
<td>Length of working in the present organization</td>
<td>0 – 3 years</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>3 – 6 years</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>6 – 10 years</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>10 – 15 years</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>15 – 20 years</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>21 – 25 years</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>More than 25 years</td>
<td>8</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Single</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>Divorced/Separated</td>
<td>3</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Malay</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>Iban</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Bidayuh</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Melanau</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Chinese</td>
<td>11</td>
</tr>
<tr>
<td>Monthly Income</td>
<td>Less than RM2,000.00</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>RM2,001 – RM3,000</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>RM3,001 – RM4,000</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>RM4,001 – RM5,000</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>RM5,001 – RM6,000</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>RM6,001 – RM7,000</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>More than RM7,001</td>
<td>3</td>
</tr>
<tr>
<td>Highest Education</td>
<td>Diploma</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Degree</td>
<td>96</td>
</tr>
<tr>
<td>Grade of DG’s Position</td>
<td>DG41/DG42</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>DG44</td>
<td>30</td>
</tr>
</tbody>
</table>

Level of teacher’s knowledge in digital literacy

The first objective in this study is to determine the level of teacher’s knowledge in digital literacy in SMK Bako. The result for this study was reflected in the Table II.

TABLE II. MEAN OF DIGITAL LITERACY

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFORMATION LITERACY (IL)</td>
<td>120</td>
<td>4.05</td>
<td>4.00</td>
<td>0.485</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>VISUAL LITERACY (VL)</td>
<td>120</td>
<td>4.00</td>
<td>4.00</td>
<td>0.422</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>SOFTWARE LITERACY (SL)</td>
<td>120</td>
<td>3.96</td>
<td>4.00</td>
<td>0.438</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>TECHNOLOGY LITERACY (TL)</td>
<td>120</td>
<td>3.77</td>
<td>4.00</td>
<td>0.405</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>COMPUTER LITERACY (CL)</td>
<td>120</td>
<td>4.01</td>
<td>4.00</td>
<td>0.516</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>OVERALL DIGITAL LITERACY</td>
<td>120</td>
<td>3.98</td>
<td>4.00</td>
<td>0.410</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

373
From the finding, the level of teachers knowledge in digital literacy was M=3.96; SD=0.41. Therefore, in term of the level in digital literacy, the teachers in SMK Bako was high.

**Digital Literacy and Teacher’s Perception for 21st Century Learning**

The study found moderate positive relationship between digital literacy and teachers’ perception of 21st century learning ($r=0.493$, $p<0.001$). Thus higher digital literary was associated with higher perception of 21st century learning. There was a weak positive correlation between information literacy and teachers’ perception of 21st century learning ($r=0.299$, $p<0.001$). Thus, higher information literacy was associated with higher teachers’ perception of 21st century learning; therefore, the hypothesis (H2) was accepted. The result of this study was similar with the outcomes are upheld stated that considers educator conceptions of information literacy and emphasizes the importance of information literacy for knowledge building [6]. In this study, information literacy was needed in building the information as to help students to increase their knowledge through information literacy from teachers. This finding also supported information literacy needed for teachers in their teaching students [16].

There was also a weak positive correlation between visual literacy and teachers’ perception of 21st century learning ($r=0.304$, $p<0.001$). Thus, higher visual literacy was associated with higher teachers’ perception. Therefore, the hypothesis (H3) was accepted. This thesis was supported by the finding made by Petterson [17] which showed moderate correlation between visual literacy and teachers perception in the school. Teachers used similar visual literacy strategies in the classroom, which they required further information for the integration of visual literacy practices into the curriculum, and that they believed that all students could benefit from these practices immensely [18].

There was a moderate positive correlation between software literacy and teachers’ perception of 21st century learning ($r=0.520$, $p<0.000$). Thus, higher software literacy was associated with higher teachers’ perception of 21st century learning. Therefore, the hypothesis (H4) was accepted. This thesis was supported by the finding made by Bellow [19] which showed moderate correlation between visual literacy and teachers perception in school. There was a moderate positive correlation between technology literacy and teachers’ perception of 21st century learning ($r=0.480$, $p<0.000$). Thus, higher technology literacy was associated with higher teachers’ perception of 21st century learning. Therefore, the hypothesis (H5) was accepted. This study was supported by Wavell [20] which showed moderate correlation between technology literacy and teachers perception in the school.

There was a moderate positive correlation between computer literacy and teachers’ perception of 21st century learning ($r=0.545$, $p<0.000$). Thus, higher computer literacy was associated with higher teachers’ perception of 21st century learning.
learning. Therefore, the hypothesis (H6) was accepted. This study was supported by Duke [21] showing moderate correlation between computer literacy and teachers perception in the school.

**Gender Moderates the Relationship between Digital Literacy and Teachers Perception on 21st Century Learning**

As can be seen in Table III, gender explained additional value 1.02 of the variance of independent variable for this study. Thus, gender moderates the relationship between digital literacy and teachers’ perception in 21st century learning. This study also was supported by Petterson [17] who declared that male students demonstrate a significantly superior computer skill than female. Similar in this study the differences between male and female teachers were also quoted by Arch and Cummins [22], Gilster [23], Lawrence [24]. Computers are historically considered the subject of study for males and males are considered to be more digitally literate than female.

**TABLE III. RESULT OF REGRESSION ANALYSIS**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.943&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.890</td>
<td>.888</td>
<td>.280</td>
<td>.890</td>
<td>472.815</td>
<td>2</td>
<td>117</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>.996&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.992</td>
<td>.991</td>
<td>.077</td>
<td>.102</td>
<td>1425.232</td>
<td>1</td>
<td>116</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Respondents Sex, Digital literacy and Teachers Perception
b. Predictors: (Constant), Respondents Sex, Digital literacy and Teachers Perception, Overall Digital literacy

**CONCLUSIONS**

This study confirmed that digital literacy level affected the teacher’s perception in 21st century learning. Findings of this study show that there was a significant relation between digital literacy and its dimensions with teacher’s perception. The results of this study provided some implications for pedagogy and practitioners. One of the impacts is the teacher able to increase their methods of teaching in the classroom especially the 21st century learning classroom. Teacher is able to search other resource and create new applications of teaching source for students. Apart from that, the practitioners can increase their knowledge in digital literacy instead of teaching. The practitioners are able to have partnership and consult school and teacher’s in boosting teaching in the 21st century since this is a new study in Sarawak.
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