NMRCP
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Digital Media Literacy:

Developing a Measurement Framework for Malaysian Secondary School Students

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ABSTRACT

Young people spend a large portion of the awake hours on digital technologies; but being digital natives does not mean that they are digital literates. With increasing urgency, media scholars, regulators and policy-makers have pointed to the need to create national standards of digital media assessment which would provide empirical bases for evaluating digital media literacy and digital participation of young people in Malaysia. This measure is important to facilitate interventions to ensure that we produce generations of young people who have good ideas, skills and values when approaching data-rich and complex digital media environments. A digital media literacy measurement framework with ten components and specific indicators under each component was created for use in a practical manner for research and policy impact. The components are: Operational, Information Navigation, Social, Mobile, Creative, Critical Understanding, Digital Citizenship, Safety, Regulation and Problem-Solving. The digital media literacy measurement framework was then tested and the findings suggest that on a scale of 1 to 5, the majority of participants in this study were on Level 3 – Fairly Competent, indicating the need for more educational endeavours in digital literacies among young people.

Keywords: Digital media, Media Literacy, Media literacy measurement, young people

INTRODUCTION

The integration of digital media technologies in everyday life of young people is a priority across many parts of the world today as governments devote significant resources on media and digital infrastructure, devices, learning materials and trainings. Digital media technologies permeate the realms of personal lives, school, workplace, leisure, communication and social interaction, health and wellbeing as well as participation in local and global communities (Kamaruzaman Jusoff & Nurul Nadiah Sahimi, 2009; Coiro, J., Knobel, M., Lankshear, C., & Leu, D.J., 2008; Livingstone & Helsper, 2010; Erstad, 2015).

Cognisant of the crucial role of media literacy in today's society, the Malaysian Communications and Multimedia Commission has taken leadership in advancing research on media literacy in Malaysia. Specifically, there is an interest in exploring efficient ways of measuring competences among the Malaysian population and in creating national standards of digital media assessment.

A media literacy measurement framework is important in developing a critical mass of tests that is able to measure competence in productive participation in knowledge producing communities today. Such a framework is advantageous towards understanding appropriate educational and research enterprises that can be taken to empower young people to become active and responsible participants who have critical autonomy in making decisions and choices, as well as proper communication capacity when engaging with people with diverse perspectives.

Therefore, it is important to assert here that Malaysian young people's media lifeworld is unclear as an appropriate measurement instrument to assess media literacy in a holistic way is yet to be developed. This distinct gap means we are unable to provide a reliable and a fair picture of young people's operational, strategic, safety and creative capabilities when navigating media environments.

There are three major challenges in Malaysia. The first is the lack of an appropriate measurement framework to assess digital media skills; specifically, among young people who have grown up in technology immersed milieus. Secondly, any assessment framework has to address diverse geographical and social cultural contexts of young people's lives. Thirdly, it has to be pragmatic, cost-effective and address quantitative and qualitative dimensions of involvement in digital media situations. Work on a digital media literacy measurement framework is essential as it will make a positive contribution to knowledge on young people's personal, social and cultural development and their understanding of digital media participatory cultures.

The present study is interested to develop a digital media literacy measurement framework to identify the different levels of young people's skills, online engagement and activities. A more holistic view of digital media literacy was taken to search for instruments that are capable of measuring novel skills required for productive participation in today's communication and digital media settings.

Research objectives:

- To examine definitions, concepts and approaches to digital media literacy measurements appropriate to the Malaysian context;
- To identify key indicators that would measure digital media literacy;
- To design a digital media literacy measurement framework that can be used in a practical way in the Malaysian context;
- To test the digital media literacy framework among the Malaysian young people; and
- To reveal findings of the application of the measurement framework.

LITERATURE REVIEW

Digital media literacy assessment is becoming a major issue at a time when the use of digital media technologies does not necessarily mean that users are media literate and competent. Often, the digital generation is assumed to be a group of young people who are super-users of digital content and highly competent in their use of digital technologies (Shanthi, Ambigapathy, Prasad & Aaron, 2013). A more critical stance is needed to specify the characteristics of this varied group and their digital media practices.

In this vein, the development of a digital media literacy framework within a national context has attracted the attention of media scholars and policy-makers in many countries including United States of America, United Kingdom, Europe, Canada, Australian, India, China and Sri Lanka. Developing such a national or regional framework, however, has been deemed a daunting task by many, given the challenges in the conceptualisation and methodology of digital and media skills measurement (Bulger, 2012; Livingstone and Wang, 2013; Hobbs, 2010). Many existing instruments do not capture the full spectrum of skills propounded by digital media literacy scholars and cannot be transferred unproblematically to local contexts.

There are numerous studies on digital media literacy teaching and learning experiences by teachers. However, there is a lack of discussion on instrument design to assess media literacy competences. Despite the challenges, media literacy assessment instruments have been developed in numerous countries to pave a critical direction and to pool data and expertise in enhancing media literacy research efforts at local and global levels.

The quest for a digital media literacy assessment tool in Malaysia is fraught with difficulties. Digital media literacy competences are not assessed because they are not taught in broader contexts in Malaysian schools. As such, there is no awareness of the existing gaps in the area and no measures of monitoring progress of digital media literacy among young people.

The first step taken was a review of literature, definitions and indicators relating to digital competence and media literacy. Among the key works that were instructive in the study include the following: Jenkins et al (2015), Hobbs, (2010), Ala-Mutka (2011); EU's DIGCOMP framework further developed by Ferrari (2013); UNESCO (2013); van Deursen & van Dijk, (2014); Committee on the Rights of the Child Report, (2014) and Hoechsmann & Dewaard (2015). The review showed that there are many contentions on the concept of digital media literacy which delve on questions of skills, attitudes and social and political factors in each country context that impinge on different types of learning.

There are debates on skills for reading, writing and calculating using available tools on paper, images and wiki. Generally, most frameworks comprise of knowledge, skills and competence components. A number of the frameworks were complex while some indicators and measurement of digital competence appeared to be difficult and not well suited in different socio-cultural school settings in Malaysia.

In the literature reviewed on measuring media literacy in the United Kingdom, Livingstone (2011) observed a number of practical problems in such assessment research. She argues that it was difficult to frame a media index that could reveal comparisons among the population given the different research foci, methodologies and samples employed in the studies. She further asserted that most research works are based on small samples and tend to focus on particular aspects of digital media literacy.

This is not helpful in constructing a general picture of media literacy levels among the population in United Kingdom. Most importantly, Livingstone affirmed that much of the media literacy research efforts have rarely attempted estimates of scale when setting out to discover the media literacy levels of young people.

Bulger (2012) deliberates on the digital media literacy assessment design criteria and highlights challenges in measuring criteria to assess media literacy levels in all EU member states. She argues that given the breadth of contexts and behaviours associated with media literacy, a simple 20-minute survey, no matter how well designed, cannot provide the comprehensive measures necessary to inform policy. She recommends that the design include a modular measurement framework, encompassing contexts and competencies like access, critical understanding and communication to be conducted in a rotating survey over a 5-year period. The measurement framework proposed by Bulger, however, has not been utilised by the EU member states, given issues of costing.

The task of developing a media literacy assessment instrument in the United States and Australia is also contentious given the differences in expertise and expectations regarding quality metrics, data collection and potential bias when developing frameworks for measurement. Frameworks for Information Literacy, Media Literacy and Media and Information Literacy, as noted by Renee Hobbs (2010), reveal some of the diverse theoretical lines related to the new literacies that concern different scholarship, practice and intellectual interests. Jenkins

(2006), for example suggested the need for policy and pedagogical interventions which focus on the following:

- *Participation:* access to the opportunities, experiences, skills, and knowledge for full participation in the digital age;
- *Transparency:* learning to see clearly the ways that media shape perceptions of the world; and
- *Ethics:* understanding professional training and socialisation for public roles as media makers and community participants.

In another vein, the American Association of College and Research Libraries (ACRL) proposes an assessment framework (2014) encompassing five elements for understanding Information Literacy as follows:

- Determining the extent of information needed;
- Accessing information in an effective and efficient way;
- Evaluating the information and resources critically and incorporating them into a knowledge base;
- Using information for a specific purpose; and
- Understanding the legal, economic and social context surrounding information in order to be able to use it in an ethical and legal way.

The framework proposed in Australia (National Assessment Programme, 2014) for media literacy development considers skills and competences related to three elements:

- Technological skills;
- Abilities to work with the information; and
- The use of information to communicate.

It is clear that the task of designing a digital media literacy measurement is a difficult one and involves consideration of many factors. Nonetheless, due deliberation must be given to the approach, feasibility, implementation, duration of time and costs so that the needs of addressing media literacy as a positive regulatory measure is available. As the population of young people and their respective digital skills evolve, it is crucial for MCMC to continue initiatives in developing and updating assessments instruments to support critical autonomy in the digital media environments.

METHODOLOGY

The study adopted an exploratory approach where both quantitative and qualitative methods were used. Given the problematic nature of quantifying critical and creative works, this measurement framework also delved into qualitative methods that provided valuable, quality information on young people's media practices. A total of 191 participants from different geographical locations, including Sabah and Sarawak were involved. The research was conducted between June 2015 and December 2017.

Several current digital and media literacy measurement frameworks and initiatives were collected and analysed to arrive at a practical framework that could be used in the Malaysian context. The digital media literacy framework matrix proposed comprises of 10 dimensions based selectively on the structure and works developed by Ala-Mutka (2011), Ferrari (2013) and van Deursen, A.J.A.M., Helsper, E.J. & Eynon, R. (2014). This framework provides a general overview of the needs of young people aged 16 to be competent in a digital society.

The study deliberated on the challenges related to time and cost constraints, specifically in taking time to administer research activities in school settings which are very examination oriented. In addition, it is asserted here that the framework was pitched at a level that will enable young people aged 16 from diverse school settings to participate in the project. It is helpful to state that while computer or ICT classes are conducted in schools, these remained largely as technical dimensions and less attention was given to broader contexts that encompass cognitive and ethical dimensions.

Development of the Digital Media Literacy Measurement Framework

The reviewed literature on design of media literacy assessment instruments revealed that the efforts in this area have three major foci:

1. Conceptualisation of media literacy components;
2. Methods employed to measure media competences; and
3. Assessment of scales and scores used.

1. Conceptualisation of media literacy components

While the readings on framework on media literacy indicators listed many components and competences, we have constructed a framework with 10 components. Working from the efforts of Ala-Mutka (2011), Ferrari (2013) it considers digital competence as a combination of Information skills, Communication skills, Content Creation skills, Safety skills, and Problem Solving skills.

In a similar vein, van Deursen et al (2014) acknowledged that internet skills are a more elaborate concept that encompass several domains. They argue that many existing

internet skill measurements focus merely on the technicalities of internet use. They suggest that skills should be measured beyond the basic technical level and in relation to the ability to work with communication technologies for social purposes and proposed Operational, Navigational, Mobile, Informational, Social, and Creative as categories in the measurement framework.

Given that the domains identified by Ferrari (2013) and van Deursen, A.J.A.M., Helsper, E.J. & Eynon, R. (2014) were rather broad and included many items, we broke down the above domains and added additional categories to make ten components. These components were aligned with the ten themes that were identified in the design of interactive comics in a parallel study of productive practices among young people in secondary schools. The smaller components, we assert, enable a more focused way of thinking about the measurements of internet and media skills.

The digital media literacy measurement framework in this study proposes ten components detailed as below:

Table 1: Proposed ten components of the digital media literacy measurement frameworks

Ser.	Component		Sub-component
1	Operational	1	Adjusting privacy settings
		2	Retrieving information for class assignments
		3	Uploading files & photographs
2	Information Navigation	4	Identifying different types of information (news, advertisement, opinion columns, fiction etc.)
		5	Looking for information from different authors and websites
		6	Deciding on keywords for online search
3	Social	7	Ability to interact with people from diverse communities by respecting multiple perspectives
		8	Finding relevant communities and groups that suit personal interests & needs
		9	Knowing which information should and shouldn't be shared online
4	Mobile	10	Keeping control of the costs of mobile app use
		11	Considering other people's privacy when taking any pictures of those around
		12	Installing apps on a mobile device
5	Creative	13	Designing a webpage/blog/digital poster
		14	Using a variety of media to develop self-expression on social media
		15	Making video, music and images creatively with online apps
6	Critical Understanding	16	Knowing the difference between news and sponsored articles for promotion purposes
		17	Assessing the truthfulness of information before sharing them on social media
		18	Checking who created media content, why it was created and whether it was credible

Ser.	Component	Sub-component	
7	Digital Citizenship	19	Knowing what to do when a social media account has been hacked
		20	Taking appropriate action when a friend is being bullied on social media
		21	Contributing to comments on online discussion (online forum, blog or wiki) on social issues encountered in everyday life
8	Safety	22	Tracking how one's digital footprint can be seen by others
		23	Knowing when to avoid activities that are considered as cybercrimes
		24	Blocking unhealthy content published on the internet
9	Regulation	25	Knowing about Malaysian laws that affect users if they spread lies and dangerous comments on websites
		26	Understanding rules and rights related to content creation
		27	Knowing how and when to acknowledge the source of information in essays and creative work
10	Problem Solving	28	Able to evaluate the problem by gathering appropriate information using digital tools
		29	Working in teams to choose the best answer to solve the problem
		30	Creating thoughtful explanation with the support of digital applications

2. Methods employed to measure digital media competences

The proposed digital media literacy measurement framework in the present study comprises of three major sections: self- assessment (10%), digital media literacy test (40%) and digital activities (50%). Self-assessment takes up only 10 percent given limitations in the self-assessment approach where respondents may underestimate or overestimate his/her competences. The digital media literacy test is made up of two sections: Multiple-choice questions and answers (20%) and True/False answers on knowledge statements (20%). Digital activities involve the designing of a digital poster (20%) as well as a two (2) to four (4) minutes video production (30%). A score sheet was prepared to enable the facilitator to observe and evaluate the competences in the ten components. The details of the proposed digital media literacy measurement framework are presented in the Figure 1.

Table 2: Digital Media Literacy Measurement Framework

Self-Assessment (10%)	Digital Media Literacy Test (40%)	Digital Activities (50%)
Questionnaire	Multiple Choice Questions (20%) False/True Knowledge Statement (20%)	Digital Poster (20%) Video Production (30%)
• Operational • Information Navigation • Social • Mobile • Creative • Critical Understanding • Digital Citizenship • Safety • Regulation • Problem Solving	• Operational • Information Navigation • Social • Mobile • Creative • Critical Understanding • Digital Citizenship • Safety • Regulation • Problem Solving	• Operational • Information Navigation • Social • Mobile • Creative • Critical Understanding • Digital Citizenship • Safety • Regulation • Problem Solving

3. Assessment of scales and scores used

In the current study, the Likert-type format was used in the self-assessment section. Respondents were asked to indicate their competency in the above ten components using the scale 'Don't know', 'Know a little', 'Fair', 'Competent' and 'Very competent'.

For the digital test section, one mark was given for the right answer, while zero was scored for the wrong answer. Sample questions in the test are as follows:
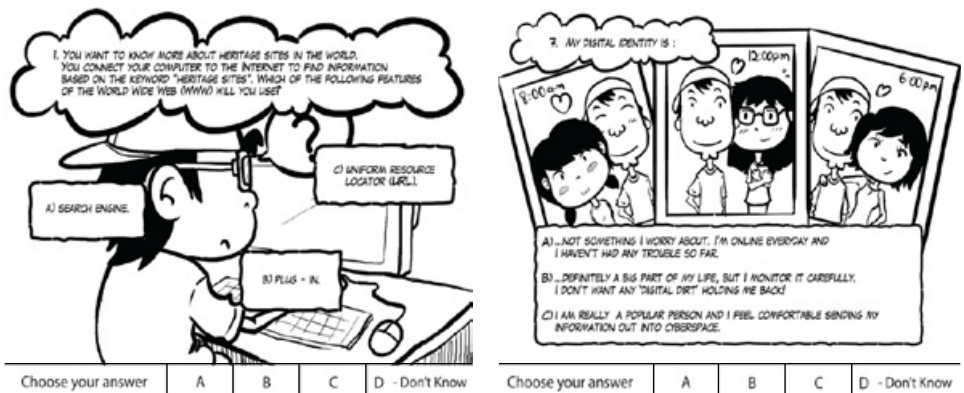

Figure 1: Sample questions in the digital media literacy test

For the digital activities, participants were required to design digital posters and a short video production on media matters confronted by young people. The participants worked in groups over a two-day workshop held in school settings. Workshop facilitators observed participation and production processes in the project activities and rated the work of the participants.

In the activity on poster design and video production, the 191 participants were given topics like cyberbullying, online scam, online safety and privacy, managing online emotions, hurtful words and sexual harassment. These were some of their media and online experiences that they encountered that were raised in their focus group discussion. The participants were shown some of the applications that were available in the tablets that could be used for poster design and video production.

Participants then used tablets and mobile phones to perform numerous tasks like uploading photographs/icons/images, deciding on keywords, gathering appropriate information using digital tools and installing apps on a mobile device. Facilitators were trained and asked to observe the activities of participants to give scores to the different actions. The scores were based on the Media Literacy Measurement Framework components and the specific items listed under each category. The ten components had three items each, totalling to 30 items. The facilitator was asked to indicate competence levels on scale of 1 (Not competent) to 5 (Very competent).

All marks were tabulated according to the levels indicated in the Figure 3 below.

Table 3: Grade of Competence

Grade	Definition	Grade of Competence
Level 1: < 30	Not Competent (NC)	The participant has difficulty orienting him/herself in digital media environments and while he or she may have access to media technologies, the capacity to evaluate and create communications in a variety of contexts is weak. The participant is not competent in digital media literacy.
Level 2: 30 – 49	Less Competent (LC)	The participant is able to access and orient him/herself accordingly to the 10 components within digital media environments with simple capacities to evaluate and create communications in a variety of contexts. The participant is considered as less competent.
Level 3: 50 – 69	Fairly Competent (FC)	The participant is able to orient him/herself accordingly and is fairly able to engage in several interconnected activities in evaluating and creating communication in a fair manner. The participant is fairly competent in media literacy.
Level 4: 70 – 89	Competent (C)	The participant is able to orient him/herself accordingly and is skilful in engaging in several interconnected activities in evaluating and creating communication in a knowledgeable manner. The participant is competent in media literacy.
Level 5: 90 – 100	Very Competent (VC)	The participant is able to orient him/herself accordingly and is highly skilled in engaging in several interconnected activities in evaluating and creating communication in a very efficient manner. The participant is very competent in media literacy.

A strong literacy measurement framework must not only be able to reveal grades but also to offer feedback so that intervention strategies can be planned. As young people complete self-assessment surveys and tests as well as perform production tasks, the scores obtained will offer insights into the strengths and weaknesses of young people's digital media literacy competences in specific areas as outlined in the ten components. The digital risks that confront young people as well as positive experiences that can build resilience can then be addressed in educational and research enterprises.

FINDINGS

The digital media literacy measurement framework was tested in 12 urban and rural secondary schools in Malaysia.

The proposed digital media literacy measurement framework and the findings of scores attained by the 191 young people are presented in Figure 4.

Table 4: Scores of Digital Media Literacy Levels according to the ten components

| Component | Percentage | | | | | | |
	Self-Assessment (10%)	False/True Knowledge Statement (20%)	Multiple Choice Question test (20%)	Digital Poster (20%)	Video Production (30%)	TOTAL (100%)	Grade
Operational	7.09	14.55	14.14	15.68	16.13	67.60	L3
Information	7.02	5.86	8.80	10.76	13.12	45.55	L2
Social	7.82	14.14	7.12	10.13	14.23	53.43	L3
Mobile	7.97	18.01	14.14	14.16	15.77	70.05	L4
Creative	5.64	17.07	12.04	11.54	15.55	61.84	L3
Critical Understanding	7.10	15.81	15.71	9.55	10.18	58.35	L3
Digital Citizenship	6.75	18.12	15.08	9.37	13.45	62.76	L3
Safety	6.68	15.18	11.73	9.76	11.81	55.16	L3
Regulation	6.82	9.21	15.29	9.06	9.27	49.65	L3
Problem Solving	7.72	11.10	14.03	14.08	17.70	64.64	L3

Table 5: The findings of the measurement framework revealed interesting insights as below:

Assessment	Findings
Self-assessment	• The participants were quite confident with their digital media competences.
	• The participants gave themselves quite high scores for Mobile, Social, Problem Solving, Critical Understanding, Operational and Information.
	• They were moderately confident of their competences in Regulation, Digital Citizenship and Safety. The participants appeared to be less confident in the creative component.
Digital Media Literacy Test	• The participants appeared to have difficulty with competences in Information, Social and Regulation as they scored less marks in these domains.
	• The Information component had the lowest score with many participants not sure about looking for information from different authors and websites and in deciding on keywords for online search.
Digital Media Activities (Poster Design and Video Production)	• The participants had lower scores in Critical Understanding, Digital Citizenship, Safety and Regulation aspects.

The results of the Digital Media Activities assessment show that participants had problems in critical understanding, specifically in knowing the difference between news and sponsored articles for promotion purposes; assessing the truthfulness of information before sharing them on social media and in checking who created the media content, why it was created and whether it was credible. In the case of Digital Citizenship, it was found that participants were not competent in contributing to comments on online discussion on social issues encountered in everyday life. In the Safety component, participants were found to be unconcerned with privacy settings. They left their digital footprint, personal details, photographs and their notes in the tablets. There was also a lot of uncertainty in their understanding of rules and rights related to content creation. Several respondents felt that the 'cut and paste' approach was acceptable and did not know much about acknowledging sources of information in assignments and in creative work.

On the whole, many of the participants attained Level 3 – Fairly Competent in many of the components. Information navigation requires serios attention given that the participants achieved low scores in the domain, especially at a time where fake information dominates public discourses on communication. On a brighter note, participants appeared to do well in the Social domain, indicating their capability to interact with diverse people by respecting multiple perspectives and easily finding relevant communities and groups that suit their interests.

The overall final scores of digital media literacy among the participants were put together and the results are as follows:

Table 6: Digital Media Literacy Levels

Grade	Frequency	Percent
L1- NC	0	0.0
L2- LC	12	6.3
L3- FC	171	89.5
L4- C	8	4.2
L5- VC	0	0.0
Total	191	100

The digital media literacy measurement framework found that most participants (89.5%) achieved only Level 3. About 6.3 percent of the participants attained Level 2 while only 4.2 percent of the participants realised Level 4. The findings indicate that more research and educational action plans are needed as any incompetence will become a barrier to their social integration and personal development.

The task of developing a digital media literacy measurement framework was a challenging one given that this was the first attempt to carry out such an exercise in Malaysia. While the conceptualisation of the measurement framework was thought-provoking and note-worthy, executing it in a conventional form in restricted school settings was a major limitation. The complexities of Malaysian school settings (time, resources, access to internet, crowded curriculum, institutional support, etc.) were real, and these emerged as critical issues that need to be deliberated carefully when continuing this important work of digital media literacy assessment in Malaysia.

Rather than undertaking a paper and pen test as done in the present study, it is suggested that a digital media literacy test be constructed on a digital platform to enhance digital media literacy assessment activities in Malaysia. Good internet connection and access to mobile phones/tablets/computers are essential for this to take place. Perhaps the measurement framework can be integrated into school settings to present a more cohesive and cost–effective instrument.

It must be asserted that careful consideration must be given over the physical space, learning environment and ecosystem if the assessment is to take place in school settings. Specific resources and physical hardware that continue to evolve are major challenges that need to be confronted. Our experience in this demanding task raises a few issues that need attention:

- The measurement instrument should address mobility, so that respondents can work on handheld digital devices to complete the media literacy test.

- Digital activities have to be a core element of the assessment instrument.

- Learning terrains such as schools need to be open to encourage infrastructures with high speed Internet and openness in teaching, learning and assessment methods.

- Measurement frameworks and assessment instruments can be become challenges if not structured within clearly established policies and guidelines from the Ministry of Education and MCMC.

At this critical juncture, it is hoped that the comprehensive findings of this study will lay out some of the gaps in digital media competences and provoke policy makers and educationists to engage in an informed debate on the implementation of a national digital media literacy agenda for young people.

Focus group discussions on digital media competences

Apart from developing and testing the digital media literacy measurement framework, focus group discussions were also held with participants to gain understandings of their digital media practices and experiences in relation to the ten competences.

Operational

In retrieving the information to design the posters and developing short video clip as a group, the students relied on inspiration from Google and YouTube. The information obtained not only gave them new ideas but also enhanced existing ideas. YouTube was particularly popular with these participants as it presented various examples on how sound and effects could be integrated in their video clips.

Information Navigation

In addition to using Google or YouTube to search for information, participants also used Google Image search. It enabled participants to search the web for image content. However, there were participants who reported experiencing difficulty in finding the required information for the posters and short video clips. When not able to gather much information on a particular issue such as 'stalking' they concluded that the limited information found online was because it was a trivial issue. As described by one participant,

Well, we did not have much information about stalking so we cannot create many things..... Nobody really cares about stalking so there is nothing on the internet. It is not a very big issue; it is just like... Yes, they care, but it is quite minor overall... and it is very minor. Very less has happened. (R3G1)

The views of respondents depict the obstacles participants confronted in information navigation. Given that the bulk of information was found in the English language, some of them had to grapple with identifying different types of information and resorted to searching for images. There were some issues with deciding on keywords for online search and some of them did not obtain the information that they were looking for. The views of the participants on the complexities of searching for information illuminated the low levels of scores received in information navigation.

Social

The participants of the workshop were also asked whether they would share the posters and video clips they designed and developed to raise awareness of the themes discussed. Several participants had problems in knowing which information can or cannot

be shared with their friends. They believed that sometimes sharing may be construed as intrusive by their friends.

The conversations revealed that the participants generally were able to interact with people from diverse communities and respected the multiple views. Most of them noted they were capable of finding relevant communities that suited their interests, but sometimes were not so sure about sharing information.

Privacy

During the group interview, the participants were asked about their views on privacy with regard to using pictures of themselves and/or their friends when designing the posters and developing short video clips as a group. Some participants were of the opinion that permission was needed not only for uploading a person's photograph online but also in taking a person's photograph. However, there were participants who believed that permission was not necessary if the photos uploaded online involved their close friends. The quality of a photo was also a factor in relation to privacy. According to the participants, permission was not required for photos of themselves and/or their friends that turned out well. These photos could be uploaded publicly online as it did not embarrass anyone. If a photo did not turn out well, they felt that permission was required from those involved before it was posted.

The views of participants revealed that there were mixed awareness and understanding about privacy, especially when it came to sharing pictures of friends online. Some of them could easily install apps that were able to edit photographs and thus share acceptable

pictures. Privacy and asking permission were not seen as serious issues. Some others, however, have had negative experiences and asserted that it was important to seek permission.

Creative

The participants used various devices and applications to complete the given digital activities. While some of them did not have enough knowledge, they used devices such as the tablet, mobile phone, laptop, and screen recorder to complete tasks related to preparing digital posters and short videos. Some participants made efforts to use other apps to be creative in their work.

During the group interview, the participants explained that they used a variety of media to create their posters and videos. The use of various media helped the students to develop digital competence and self-performance. The students were appreciative for the opportunity to learn and utilise digital skills such as downloading photo and using editing software to add text and edit video.

Bagi saya, best buat video ini kerana membuat video ini kadangkala hobi saya juga. Saya suka membuat video dan lihat orang membuat video itu menarik yang kita juga berasa ingin ikut. Jadi, saya juga berniat hendak menjadi seperti dia yang pandai membuat video. Apabila saya membuat video dengan sendiri, baharu saya tahu susah juga membuat video ini. (PMTR1)

> *And also I've learned much things about video editing. My friend taught me. So I'm happy through that. Maybe I could bring up this thing further. (SDMS1)*

Working in groups enhanced their self-performance. The students mentioned development of self-discipline through listening to and respecting every members' views. This enabled them to complete the tasks easily. They also added that these creative skills were useful for their current studies and the future.

Critical Understanding

Critical understanding, as a component of media literacy, is reflected in the way the research participants assessed the truthfulness of information obtained from media before using it in the assignment, their understanding of the assignment, and their reflection on the experience of completing the assignment.

Based on the focus group discussions, it was found that the participants often associated the truthfulness of information with its sources; with Wikipedia perceived as a reliable source.

Apart from Wikipedia, the participants appear to believe that what they see on television is verified information. For instance, a participant explained that Lazada is a trustworthy website, unlike Instagram, because it has appeared on television (SMSR1), while another participant claimed that "news basically shows the reality" (MPR5).

Others reported that they would confirm what they read with parents, teachers, and friends. Their responses seem to suggest that they perceived other people as more knowledgeable and depended on them to assess the reliability of the information in question. In their opinion, other people's feedback could be taken as an indicator since many "likes" means that it was a piece of information that was reliable. Another participant said that his parents would know and verify what is believable.

There was evidence that the participants lacked competence in judging the reliability of information. Many of them admitted to not knowing how to do so, and thus they would accept everything they read as true:

> *Actually, I think, there are ways to confirm if it is fake or if it is true and real. There are ways but we just do not know. We need to learn. (MPR3)*
>
> *Q1: Macam mana kita mahu tahu informasi yang kita dapat dari internet itu betul atau tidak? Informasi yang benar ke tidak ke?*
> *R8: Main agak.*

In general, there was a lack of critical reflection among participants on the purpose of the assignment and the process of completing the tasks. They noted that they were seldom involved in reflective thinking and did not question many things in their daily lives. Questioning the media was deemed a non-issue and they were not trained on thinking about such matters.

Digital Citizenship

Many of the participants had not thought much about their roles in digital citizenship. While many of them had experienced cyberbullying or had friends who encountered these problems, they felt that they had inadequate knowledge to address it. The participants shared their digital posters and video to contribute to online discussion. Apart from getting 'likes' and some comments, they felt that there was not much online discussion on the issues.

The participants observed that they needed more knowledge and practice to improve their competences in this area. The analysis emphasizes the need to expand the competence discussion on digital citizenship such as knowledge of where to seek assistance and supporting others using digital technologies. The importance and potential influence of support mechanisms has not been adequately discussed in many studies in Malaysia. It is clear that there is a need for more attention, reflection and integration of support mechanisms to enhance understanding of digital citizenship.

Safety

Safety is a crucial aspect in using digital devices. During the project, the participants logged into various sites to search for and download information and materials. However, while the majority of the students' responses indicated that they were aware of the need to logout from the devices they had used, some were of the opinion that if they login as guests, it was not necessary for them to logout.

> *For the Chrome Book, I didn't logout because it is in guest mode. (SDMS6)*

Clearing the digital footprint such as history gathered mixed feedback from the participants. Some students lacked knowledge of what was footprint history and the need to take cautionary measures. They asserted that they did not know about footprint, thought that the computer would clear the footprint itself and their use of the sites would not be recorded and could not be tracked.

> *Mungkin komputer ini clear sendiri. Nak block benda tak baik itu...tak pasti (GRSR4)*

> *Hmm, tak clear sebab tak tahu. Ada history yang boleh tengok jugak ah?Pasal nak block bahan-bahan...not clear (SDM, S5)*

Overall, the data indicated there was a major lack of knowledge related to safety, specifically in addressing one's digital footprint, knowing when to avoid activities that are considered cybercrimes and blocking unhealthy content on the Internet.

Regulation

Similar to safety matters, participants generally lacked knowledge about regulations. Many of them were not sure of laws in Malaysia that affect them. While a few students mentioned that they did know about rules and regulations related to plagiarism, they said that they did not have the time to acknowledge the sources. Others were of the view that the persons in charge, like teachers, did not have the time and energy to track the use of copied materials in school assignments. On the other hand, some participants believed that if they did not make money from using the original creation, it was not necessary to request for permission to copy the materials. Also, they believed if the creators shared something on the internet, this meant that they are allowing the public to use their creations. In relation to knowledge of rules and rights related to content creation, the participants did not know how to acknowledge the sources.

The digital activities which enabled participants to work on digital posters and short video triggered their thoughts on media law, rights and rules when working with materials taken from the Internet.

Problem Solving

The participants' competence in problem solving was analysed in terms of their ability to use appropriate technologies and programs to complete the assignment, how they worked in teams to choose the best solution to accomplish the tasks, and the extent to which they created thoughtful explanations with the support of digital applications.

Most of the participants explained that they used specific digital tools and programs to source for materials and information. For example, one group looked for suitable music on Facebook (SSR5), and another group downloaded images to a mobile phone before transferring them to the tablet.

They did not have clear reasons for choosing the software and applications they used in their creative works. This revealed that they had not critically thought through their decisions. Ease of use and familiarity were two common reasons given by the participants:

For some, the experience of using technologies helped them to reflect on their own digital competence. Many of them realised that handling of digital tools and applications was more difficult than they thought.

To manage the assignment, some participants took the initiative to set up chat groups to discuss their tasks after school.

> *Kami buat group di WhatsApp… saya invite mereka semua then kami bincang sudah buat dia punya lakar-lakar, gambar suruh mereka baca faham dulu supaya esok tidak lagi kelam kabut.(TSR2)*

The participants were asked whether there was thoughtful reflection about their work. A participant said he took into consideration other people's views and privacy while taking photographs for the assignment. Another participant explained that the group screened the images that its members had found online and if the members were not sure whether an image was offensive, they would consult the facilitator.

On the other hand, offensive remarks or images were sometimes deemed inevitable or even necessary for the completion of the assignment. A participant asserted that "sometimes if you don't offend others, they don't know their mistake".

In general, with guidance from the facilitators, the participants attempted to make thoughtful posters and short videos. In doing so, many of them were able to gather appropriate information using digital tools and present different perspectives about the topics that were given to them. In some instances, they encountered problems in their projects, but the conversations in focus group discussions opened pathways for reflective thinking and practice about digital media literacy in a broader sense, making this project a huge success.

CONCLUSION

Research findings as seen in this study revealed that quite often, young people grapple with difficulties in areas like information navigation, content creation, safety, regulation and critical understanding. They are likely to see their engagement with digital technologies as simple and straightforward, to be taken at face value rather than being mindful of their consumption and taking responsibility for their participation in digital cultures.

Today, digital media literacy is a core area of knowledge that is essential to empower students to critically evaluate the information they access, to better understand the materials they need and the meanings they convey as well as to respect diverse views and to take responsibility for their online actions. A national digital media literacy programme that advances a measurement framework is an essential step in enhancing young people's capacities in confronting challenges, seizing opportunities as well as exercising rights as active and responsible digital citizens.

The digital media literacy measurement framework proposed here entails ten components composed of three items each to gauge the capacities of young people to deal with the demands of digital environments. It has a strong empirical base and includes both quantitative and qualitative dimensions of digital media engagement. It is essential that the framework includes digital activities that are practical-oriented to offer a more comprehensive knowledge of how young people deal with contemporary social challenges resulting from technological advances.

The digital media literacy measurement framework presented here is a first attempt in delivering a reference framework that can readily be used in secondary schools in Malaysia. The framework can be updated based on new knowledge and advances in technologies and work must continue in this area so that education, research, training and assessment activities can contribute towards the empowerment and critical autonomy of young people.

RECOMMENDATION

In accordance with the findings of this study, it is recommended that:

- MCMC takes the lead in a large scale action to address the media literacy agenda by pressing forward a policy that gives this Digital Media Literacy Measurement Framework a more structured place in the Malaysian education landscape. MCMC will fuel the policy debate and bring stakeholders together to improve the framework conditions for literacy through the Commission's Recommendation on Digital Media Literacy.

- The Ministry of Education has an important role. It is important for MCMC to apprise decision makers to the strengths of the measurement framework and its currency in the present digital environments.

- MCMC adopts the conceptual framework proposed in the digital media literacy measurement framework in this study to conduct assessments in different population groups in Malaysia. While the 10 components offer a sound base to the structure, it is essential that specific target groups are identified and the measurement instrument be tailored to suit the local setting and context. The instrument should include digital and practical oriented activities.

- MCMC sets up a high-level experts Group to provide expertise and guidance on media literacy policies that focus on learning, assessments and research. The experts representing academia, government ministries, industry and civil society will deliberate on media literacy objectives, assessment rankings among different groups, new digital and media trends and promote the best practices at the national level and propose actions to follow in advancing media literacy standards.

- A lead institute of higher learning will become responsible for testing and refining digital media literacy components and the development of items according to different groups. Available forms of assessment and diagnosis of the impact and consequences of certain cultural settings, knowledge, skills and values aligned to the national education philosophy need to be investigated. It is important that emergent paradigms of research on media literacy assessments are shared with different stakeholders and advocates of media literacy.

- Opportunities to establish media literacy and assessment efforts with international collaboration be created. This is helpful to gain a global focus for the assessment frameworks that have been developed as well as to understand common ecological and social challenges among the world's media literacy practices.

- MCMC continues to fund and support the updating of the measurement framework based on new knowledge and new development with technologies so that education, research, training and assessment activities can contribute towards the empowerment and critical autonomy of young people.

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