

Information Literacy Awareness and Practices during School Research Projects: A Qualitative Case Study of MRSM Students

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ABSTRACT

This qualitative case study explores information-literacy (IL) awareness and practices among five Form 4 students undertaking Schoolwide Enrichment Model (SEM) research projects at one selected MARA Junior Science College (MRSM) in Kuantan, Pahang, Malaysia. Data were generated through a focus-group interview, direct observation, and researcher field notes. The findings indicate that four participants were unfamiliar with the formal term “information literacy,” although their accounts and observed behaviours demonstrated some IL practices. Participants were able to identify and access information using familiar digital tools and showed some awareness of information reliability, plagiarism, and citation. However, limitations were evident in systematic task definition, diversification of information sources, advanced search strategies, explicit procedures for evaluating information, and citation practices. Some weaknesses observed in this case resemble deficiencies reported in previous Malaysian school-based IL research; however, the study does not make a direct comparison with mainstream-school students. The findings highlight the potential value of more explicit and systematic IL guidance within SEM research activities. As a bounded qualitative case involving five participants from one MRSM, the findings are context-specific and are intended to provide analytical insight rather than statistical generalisation.

Keywords: Information literacy, Internet literacy, MRSM, SEM, Library science

INTRODUCTION

In today's globally linked information society, the need to be information literate is more pressing than ever before, as only those with access to information will be successful in pursuing their goals. The recognition of information power started many decades ago when the “information literacy” concept emerged with the rapid development of information technology in the 1970s. At its simplest, information literacy is “understanding how to access and use information and is regarded as the core of lifelong learning today” (American Association of School Librarians (AASL), 1998). Thus, these statements suggest the importance of information literacy skills and the crucial responsibility for schools to prepare their students to be information literate in the era of knowledge explosion. Information literacy is a set of abilities that requires individuals to recognize when information is needed and to locate, evaluate, and use it effectively (ALA, 1989). “Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning.” (ACRL Framework for Information Literacy for Higher Education, 2015). Information literacy is a skill used to find specific information. It includes the ability to find and obtain information in any format, either through printed or electronic materials, and actively use the information (Shuhidan et al., 2016). According to Cheng and Tsai (2020) and Califf and Brooks (2020), many researchers in the education setting agree that information literacy is a broad umbrella term covering various other skills such as electronic searching and information retrieval skills, library, media, research, reference, learning, and study skills.

In Malaysia, the concept of Information literacy has not been fully embraced as in developed countries such as America and Australia (Shuhidan et al., 2016; Yu et al., 2018). The early stages of information literacy development start in primary school through an early literacy program, locally known as the 3M program (Ayob and Hussain, 2021). The program reinforces reading, counting, and writing skills. The 3M program is the basis for information literacy skills, where the students primarily need to read and understand information content before attempting to find information and solve learning problems. This study took place in a MARA Junior Science College, one of the prestigious schools in Malaysia, locally known as the MRSM schools. The students are carefully selected through a special examination and interview process. The establishment of the MRSM schools is in line with the nation's aspirations to provide an exclusive secondary school system, specializing in science and technology, to high-achieving students to further develop their potential (Maktab Rendah Sains MARA, 2019). One of the key programs to develop students' potential is through extracurricular enrichment plans, which include the School-Wide Enrichment Model (SEM) Program.

The SEM program is among the added-value initiatives introduced by the MRSM education system. It adopts and adapts the gifted smart education (SEM model) introduced by Joseph Renzulli (1988). The program is restructured to be in line with the needs of the Malaysian education system based on the National Education Philosophy. (MRSM/MARA College Prospectus, 2000 and MARA, 2001). The students of MRSM are introduced to three levels of SEM, namely Type 1 (title assignment and information search), Type 2 (exploration and study of findings), and Type 3 (report and presentation of the final product). Type 1 Enrichment activities are general exploration of experiences to get students interested in a topic. Type 2 (do standardized either roman or numbering) Enrichment is the activities that provide group training where the students practice various learning skills and acquire new knowledge. During the final phase of SEM (Type 3), the students complete their reports and present their work in a special program called 'Pesta Type 3' (Transkerian, 2011). In short, the smart model or SEM program in MRSM has provided more opportunities, resources, and encouragement to students to develop their interests, talents, and potential (Renzulli & Reis, 1997). Therefore, this study aims to (1) explore information-literacy awareness among the participating students in a selected MRSM and (2) examine how these students demonstrate information-literacy practices while undertaking their SEM research projects.

METHODOLOGY

This study employed a qualitative case study design to explore information-literacy awareness and practices among five Form 4 students participating in the SEM program at a selected MRSM in Kuantan, Pahang. The case was bounded by the institution, participant group, SEM programme context, and the students' engagement in research-project activities. Five students were selected purposively because they were active Form 4 students and had completed all phases of SEM implementation, enabling them to reflect on the information-seeking and research activities examined in the study. The manuscript does not treat these participants as statistically representative of all MRSM students.

The researcher identified qualitative interviews as the tool that was suitable for the study, and the type is a focus group interview, which will assist in answering the research questions. Kvale (1996) mentions that most interviews are conversations, but qualitative interviews are appropriately used when studying people's understanding of the phenomenon in their lives from their perspective. Hence, the qualitative interview is an adequate method to provide comprehensive information from the subject. Rubin and Rubin (1995) highlight that in-depth, qualitative interviews will provide a thick description of the subject that was being studied. With these considerations, this study deploys semi-structured and generally open-ended questions. A focus-group interview was used to facilitate interaction among participants and to elicit accounts of their shared and differing experiences of the SEM research process. Before the session, participants were briefed on the purpose and procedures of the study, their right to withdraw, and the measures used to protect confidentiality.

The semi-structured interview question developed allows the researcher to capture and elicit rich data that can be used in the analysis. The question provides the respondents more room to answer and to provide an

actual phenomenon in depth. The open-ended question was used throughout the interview to encourage respondents to talk freely, as suggested by Kvale (1996). The interview questions were developed by adapting and adopting Argyris and Schön's (1974) Theory of Action and Eisenberg and Berkowitz's (1990) The Big Six Information Skills. The questions were designed and sought to dig deeper and elicit data from respondents regarding awareness of information literacy and the practice of information literacy throughout their involvement in conducting the SEM project.

The interview took around 50 minutes. The researcher was aware not to conduct the session beyond one hour, as the respondents, being teenagers, tend to get bored with the slow process of things. The respondents were also informed that they may be called again afterwards for justification and verification of their responses. Field notes serve as supporting data for this study. As suggested by Maxwell (2005), the field notes were typed during the interview and later analyzed and compared with the interview's transcription. This was later used to assist the researcher in translating and comparing the interview's transcription. In ensuring that the researchers had a clear understanding of the interview responses, the researchers took their time to reflect on the answers and repeated the answers to ensure that they achieved the same understanding as the respondents. The researcher also deployed non-directive probes of questions such as, 'Is there anything else you want to add?' to encourage and give freedom for the respondents to communicate.

The observation session was conducted in the school resource center as the researcher was interested in understanding how the students engaged in the information-seeking process. Besides printed collections, there was also access to computers and the Internet in the resource center. The researcher took the opportunity to capture images and take field notes on the respondents' actions while they were seeking information in the school resource center, as well as when they were responding to the researcher's questions. Captured images and field notes serve as important supporting data for this study. The observation session was set up and scheduled according to the time convenience of the respondents. This is important as they had a busy daily routine, being full boarding students. Following data collection, the interview recording was transcribed and analysed thematically. Initial codes were generated through close reading of the transcript and were refined by comparing related excerpts. Conceptually related codes were then grouped into categories and developed into higher-order themes addressing the research objectives. The interview data were considered alongside observational records and field notes to examine convergence and divergence across data sources. The Big Six Information Skills framework informed the interpretation of relevant information-practice dimensions; however, the analysis distinguished formal awareness of the term "information literacy" from demonstrated information practices. Where the available evidence did not permit a firm judgment about a dimension, no competency was inferred.

Ethical Considerations

The manuscript reports that participants were informed about the study procedures, their right to withdraw, and confidentiality. Because the participants were school-age minors and photographs were taken during observation, the final manuscript should additionally report the actual institutional ethical approval, school/authority permission, parental or guardian consent, student assent, confidentiality procedures, and permission for photography, where these were obtained. The ethical consideration was obtained from the College of Computing, Informatics and Mathematics (100-KPPIM(PI.9/10/)(MR/1335).

RESULT AND DISCUSSION

The analysis of the focus-group data identified several patterns relating to how the participating MRSRM students approached and carried out information-related tasks within their school project assignments. To provide a systematic framework for interpreting these findings, the identified themes were organised and discussed in relation to the six elements of the Big6 Information Problem-Solving Model: (1) Task Definition, (2) Information Seeking Strategies, (3) Location and Access, (4) Use of Information, (5) Synthesis, and (6) Evaluation. The Big6 framework was therefore used as an interpretive lens to examine the students' information literacy practices across different stages of the information problem-solving process. The alignment between the themes and the Big6 elements should not be interpreted as evidence that the

participating students had fully mastered each component of the model. Rather, the framework provides a structured means of examining the practices, strengths, difficulties, and gaps reflected in the participants' accounts. The findings suggest that the students demonstrated some information literacy practices corresponding to particular Big6 elements, while other aspects were less clearly demonstrated or remained underdeveloped. Each theme is discussed below in relation to the corresponding Big6 element and relevant evidence from the focus-group data.

The Awareness of Information Literacy

Four of the five participants were unfamiliar with the formal term "information literacy." This finding is best interpreted as limited terminological awareness rather than, by itself, evidence of low information-literacy competency. Subsequent interview and observational evidence were therefore examined to determine what information practices participants actually demonstrated while completing their SEM projects.

From the interview process, all the respondents showed that they have an absolute understanding of the SEM program. This finding is in line with Transkerian's study (2011), in which they discuss the journey that MRSM students go through to complete the two-year SEM project implementation. These are also comparable and quite similar to Yu et al, 2010, in which the study investigated the integration of Information Literacy through resource-based school projects. Both studies, in general, aim to understand the information literacy practices among students in working on their school projects.

The interview shows that most of the respondents have poor definitions of information literacy. This indicates that they have never come across the information literacy term. This is consistent with findings by Chan (2002), Yu et al. (2016), and Reis and Peters (2021), as they state that the term information literacy is not presented in the school syllabus in Malaysia and in general studies covering international studies. When the respondents were asked about their motivation or what triggered them to do their SEM project, the findings showed that mostly the motivation came from their interests in the specific subject. This is supported by the Theory of Action, coined by Argyris and Schön (1974), when they discovered that people value valid information, free and informed choice, and internal commitment to make choices. Yu et al. (2018) also reported the similarity in their findings, where the respondents clarified that the topic that was chosen by the respondents was something that they could relate to. Nasri et. al (2010) added that students' interest in science subjects contributed to the high percentage of involvement in SEM. This indicates that personal interests trigger the students to choose a familiar topic.

The Information Literacy Practices

Participant 3 described assuming a leadership role in organising the project and determining how the group would approach the task. She stated,

"I am the one to decide how we were going to approach the project since everybody else did not know how to start."

This account suggests greater confidence in project coordination than was evident in some other participants' accounts; however, confidence itself was not treated as evidence of information-literacy competency. Across the group, discussion at the task-definition stage focused mainly on identifying information sources and locating them, with little evidence of more systematic formulation of problem statements or research objectives.

Findings from the study show that the respondents had little knowledge about the stages in the research process, including the initial task definition stage. The respondents admitted that they did not know what to do or how to start their project. However, all of the respondents collaborated and decided how to work on the project. This includes choosing the topic and delegating information search tasks. This is in line with the Big 6 task definition, where they need to identify their problem, information needs, and a clear understanding to solve their problem. This finding can be related to the earlier statement where the students mentioned their topic preferences. They preferred a topic that is familiar to them, as this would ease their

research (Renzulli, 2016; Renzulli & Reis, 2014; Sumardi & Naim, 2018). The discussion in the findings did not go beyond topic selection. Important research elements, such as developing problem statements and creating research objectives, were not mentioned. This shows that the respondents had limited information literacy exposure. When the respondents were asked about how they would explain information-seeking in the SEM project, the findings indicated that most of the respondents had a mild understanding of information-seeking strategies. The responses reveal that most of them will divide the task between the team members and locate the information, mainly by using the Internet. According to Sumardi and Naim (2019) and Kelly and Sharot (2021), it was justified that the respondents who were students showed difficulty in describing the work they undertook when starting the project. These two studies show similarities in that these students were not able to accurately identify or apply an understanding of information-seeking effectively. The responses also indicate that none of the respondents have any understanding or experience with the term 'Boolean operator'. This finding also relates to the researcher's observation when the respondents were conducting the Internet search. During the observation, the researcher noted the missing 'Boolean operator' as a search strategy in Internet searching. Yu et al. (2018) also reported the similarity in their findings where the respondents were employing the basic "one keyword" Internet searching strategy.

In terms of whether the respondents ever knew or have used the library tools, the findings show that every respondent has never used the library tools or ever come across the word. This can be related to previous findings where the respondents noted that their main source of information searching is the Internet. This finding also indicates that the respondents have never used library tools to assist in their information-seeking process. This finding can be related to Komissarov & Murray (2016), who reported that the respondents did not put much effort into identifying a range of sources, as they had already decided to use the Internet to begin their research. From the interview session, it was found that most of the respondents are keen on using Google as their search engine preference. This finding indicates that the respondents are well exposed to this search engine. However, one respondent noted that she uses Safari as the search engine as it is integrated with her mobile phone. Similar findings were reported by Komissarov and Murray (2016) and Jia et. al (2021), where the respondents proudly announced the use of Google as the search engine and did not hesitate to use more sophisticated search engines. This proves that the samples within the same age group are well exposed to this kind of preference.

When the respondents were asked about their information-seeking preferences between books and the Internet, most of them unanimously voted for the Internet. This finding also indicates that the Internet gives the respondents the freedom to retrieve the latest information and ease of access to the specific information that they seek. This finding also finds similarity to Yu et al. (2018) findings, where the respondents insisted that the Internet was their preferred information source as it was a more convenient source of information.

Information Seeking Strategies

The findings from the interview indicate that the respondents only employed a basic information-seeking strategy, using the "one keyword" search term technique to locate information from the Internet. This is evident as all the respondents unanimously claimed that they had never heard of the Boolean operator search strategy. This indicates that they have not tried a more advanced information-seeking strategy. Similarly, they were not sure of what a library tool is; somehow, they can relate that it is a tool used to assist information seeking. These are some of their answers when they were asked about library tools:

"I don't know about library tools, but I think it is a tool to help us to find information"

"Library tools...I think it's a system to ask the librarian to search for some information"

The findings also show that the students work collaboratively as a team. They discuss how to approach the project and divide the tasks among them. This helps them to embark on information-seeking activities. The responses also show that the respondents mostly find information from the Internet. Only one respondent chose books and individuals as her additional reference sources. Not surprisingly, the Internet emerged as the respondents' preferred information source. When the respondents were asked about their Internet search engine preference, most of them chose Google, and only one respondent preferred Safari.

Internet Searching

An observation in the school resource center was conducted to see how the respondents conducted their Internet searching. The respondents were given a task to find information for their SEM project from the internet. They were permitted to use the Internet facilities in the resource center for the project. Researchers had earlier explained to the respondents to ignore his presence in the background. The researcher waited until the respondents had completed their task to ask for clarifications regarding their information-seeking activities. From the observation session, the researcher can see how the Internet searching was conducted. It was noticed that after identifying the search term for Internet searching, the respondents used Google as their preferred Internet search engine. Student 4, for example, used the term 'fast fashion' in the search box. The respondent then accepted all the information derived from the search hit as bundles of information that can be used in the SEM project. The researcher noticed that there was no trace of the 'Boolean operator' used in the searching process, which backs the respondent's answer to not knowing about the term. The observation process has confirmed the information derived from the interview session about students' lack of awareness of advanced searching techniques, such as the Boolean operator search technique. The observation session demonstrated that the students only used simple searching techniques.

Information Evaluations

The interview questions in this set were constructed to reveal the respondent's information evaluation understanding. Initially, the respondents were requested to describe the information they gathered from the information-seeking process. Most of the respondents indicated that they were satisfied with the information gathered. Concerning the quality and reliability of the information, most respondents showed little understanding of how to evaluate the quality and reliability of the information.

Most participants demonstrated that they were aware of the importance of evaluating the information they get, rather than simply accepting it. The students' answers ranged from

..... "some information can be reliable, and some is not. So, we need to choose the best information."

"For me, it fulfills my need, but if we are talking in terms of originality, I can't confirm that. Some information can be reliable, and some maybe not. So, we need to choose the best information."

Another student remarked:

".....I can't rely on it because there is still a lot of unconfirmed information on the Internet that we can't trust."

"The gathered information is quite good, and I'm quite satisfied as it fulfills my needs, but in terms of quality, it is not that good because I rely a lot on the Internet, so it may give me fake information for my project."

Of all the respondents, only one student believes that she can rely on the quality of information that she gets. The respondents, nevertheless, did not explain how they evaluate information. When the respondents were asked about plagiarism, most of the responses showed that they were aware of the term. In terms of understanding the term 'citation', most of the responses indicate that they have a basic idea of it. However, only one respondent admitted to not knowing about the term.

From the interview session, it was found that the respondents were satisfied with the results they gathered from the information-seeking process. Moreover, the respondents also noted that they possess the ability to determine the quality and reliability of the information gathered. Both findings indicate that all respondents have little understanding of information evaluation, though they might not notice the actual term or realize what they have been conducting. When the respondents were asked about their understanding of plagiarism, most of them showed that they were well exposed and aware of the issue. This is perhaps contributed to by their previous knowledge and experience in doing school projects. This is contrary to findings in Yu et al.

(2018), where the students admitted to plagiarizing because they were aware that the teachers would not check for plagiarism. There could be several factors responsible for the differences in the findings from the two studies. First, the respondents in this study come from a prestigious school that accepts only high-achieving students, while the respondents in Yu et al. (2018)'s study come from an average mainstream school. Secondly, the study was conducted earlier when the 'ethical use of information' issue was still not very popular. The result also indicates that most of the respondents have little understanding of the word 'citation'. However, one respondent indicated a contradictory response when she noted that not have any knowledge about the term. Similar studies reported in Prashar et al. (2024) and Yu et al. (2018) reported that the students indicate lower awareness of citing work used in their project. In comparing these studies, responses show a difference between the two groups of respondents. One group of the respondents was exposed to this matter, while the other group of the respondents was not exposed to the citation process.

Demonstrated Information Literacy Practices

Student accounts and direct observations revealed varying competencies across key stages of the research process, as illustrated in Table 1.

Table 1: Student information literacy practices

IL Skill Stage (Big Six Framework)	Observed & Reported Student Practices	Identified Limitations & Gaps
1. Task Definition	Participants collaborated on topic selection and delegated initial task responsibilities within their teams.	Discussion remained limited to topic choice; students failed to formulate clear research questions, problem statements, or objectives.
2. Information Seeking Strategies	Students identified digital platforms as their primary medium for gathering background context.	Participants were completely unfamiliar with search tools such as Boolean operators or library databases, relying solely on basic single-keyword queries (Yu et al., 2018).
3. Location & Access	Google was the primary search tool across participants, with one student utilizing Safari via a mobile device.	None of the participants utilized formal library catalog tools (OPAC) or structured academic repositories (Komissarov & Murray, 2016).
4. Information Evaluation	Students demonstrated general conceptual awareness that online information can be unverified or inaccurate.	Participants lacked structured criteria (e.g., author credentials, publication date, objectivity) to evaluate source authority and reliability.
5. Ethical Information Use	Participants recognized plagiarism as unethical and demonstrated basic awareness of academic attribution concepts.	

CONCLUSION

This qualitative case study provides context-specific insights into information-literacy awareness and practices among five Form 4 students undertaking SEM research projects at one selected MRSM. The findings indicate that familiarity with the formal term "information literacy" was limited, but participants nevertheless demonstrated some relevant practices. They used familiar digital tools to locate information and showed some awareness of information reliability, plagiarism, and citation. At the same time, the evidence revealed limitations in systematic task definition, diversification of information sources, advanced search strategies, explicit source-evaluation procedures, and citation practices. These findings should not be generalised to MRSM students or Malaysian high-achieving students as a whole. Rather, they identify issues within this bounded case that warrant further investigation across a broader range of MRSM and mainstream-school contexts. The findings also suggest that SEM research activities may benefit from more explicit and systematic information-literacy guidance, particularly in problem definition, search strategy development, source evaluation, and ethical use of information. The study limitations include involving only

five participants from one MRSMS and representing a single bounded educational context. The evidence was generated from one focus-group interview, direct observation, and field notes, and therefore does not support statistical generalisation or direct comparison with mainstream-school students—interpretation of observational behaviors also necessarily involved researcher judgment. Future studies could include multiple MRSMS sites, larger and more diverse participant groups, and additional sources of evidence to examine whether the patterns identified in this case occur in other settings.

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