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Beyond Traditional Literacies: A Multimodal-Based Instruction to Fostering Student Digital Literacy Learning

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Abstract: The fourth Industrial Revolution (IR 4.0) marked by artificial intelligence and cyber-physical systems has transformed the landscape of education including English literacy instruction. Some literacy educators claim that the success of students' today as millennial kids (Gen-Zs) and future employees has been linked to digital literacy. This term is defined as the skills associated with using digital technology to enable users to locate, organize, understand, evaluate and create information and using those skills to solve problems in technology-rich environments. This study attempts to investigate the extent to which multimodal pedagogy helps improve students' digital literacy skills in an English for Specific Purposes (ESP) setting in a vocational higher education. A theoretical multimodal semiotic approach along with multiliteracies pedagogy is served as the overarching guideline in the overall instructional procedures grounded specifically from the principles of learner-centeredness, constructivist learning, and social interaction. A qualitative case study approach was adopted to provide an in-depth explication and analysis of students' literacy development. Data collection included classroom observations and students' digital artefacts. In the course of the study, the students were engaged in the creation of two digital projects of different genres: digital information report in the form of text-image creation and digital persuasive talk in the form digital video production. The key findings of this study suggest that multimodal pedagogy is an effective instructional method for digital literacy learning in that several aspects of digital literacy had proven to be significantly improved.
Keywords: digital literacy; English language teaching; industrial revolution; instruction; multimodal pedagogy

Melampaui Literasi Tradisional: Pembelajaran Berbasis Multimodal untuk Membina Pembelajaran Literasi Digital Siswa

Abstrak: Revolusi Industri keempat (IR 4.0) yang ditandai oleh kecerdasan buatan dan sistem fisik-siber telah mengubah lanskap pendidikan termasuk pengajaran literasi bahasa Inggris. Beberapa pengajar literasi mengklaim bahwa keberhasilan siswa saat ini sebagai anak-anak milenial (Gen-Zs) dan karyawan masa depan telah dikaitkan dengan literasi digital. Istilah ini didefinisikan sebagai keterampilan yang terkait dengan penggunaan teknologi digital untuk memungkinkan pengguna menemukan, mengatur, memahami, mengevaluasi, dan membuat informasi dan menggunakan keterampilan itu untuk memecahkan masalah di lingkungan yang kaya teknologi. Studi ini mencoba untuk menyelidiki sejauh mana pedagogi multimodal membantu meningkatkan keterampilan literasi digital siswa dalam perancangan Bahasa Inggris untuk Tujuan Khusus (ESP) dalam pendidikan tinggi kejuruan. Pendekatan studi kasus kualitatif digunakan untuk menjelaskan dan menganalisis secara mendalam tentang pengembangan literasi siswa. Pengumpulan data termasuk observasi kelas dan artefak digital siswa. Dalam proses penelitian, para siswa terlibat dalam penciptaan dua projek digital dari genre yang berbeda: laporan informasi digital dalam bentuk penciptaan gambar teks dan pembicaraan persuasif digital dalam bentuk produksi video digital. Temuan utama dari penelitian ini menunjukkan bahwa pedagogi multimodal adalah metode pengajaran yang efektif untuk pembelajaran literasi digital karena beberapa aspek literasi digital telah terbukti meningkat secara signifikan.
Kata kunci: literasi digital; Pengajaran bahasa Inggris; Revolusi industri; petunjuk; pedagogi multimodal

INTRODUCTION

The fourth Industrial Revolution (IR 4.0) marked by technological advancements like sensors, cyber-physical system, the Internet of Things (IoT), mart network, and automations of machine has dramatically transformed society into a virtually digital space, and accordingly influence the landscape of education including literacy learning. Some literacy educators claim that the success of students' today as millennial kids (Gen-Zs) and future employees has been linked to digital literacy (Pangrazio, 2016) As pointed out by (Eshet-Alkalai, 2004) digital literacy has become a "survival skill" in the technological era—a key that helps users to work intuitively in executing complex digital tasks. He further proffered that digital literacy involves more than the mere ability to use software or operate a digital device; it includes a large variety of complex cognitive, motor, sociological, and emotional skills, which users need in order to function effectively in digital environments. Therefore, learning how to use digital technology has become a crucial step in developing literacy in the twenty-first century (Godwin-Jones, 2000). In addition, developing digital literacy competencies could open opportunities to get better job prospects, increase interaction in society, support more autonomous language learning, and provide wider entertainment options (Corbel & Gruba, 2004; Healey, et al, 2008).

In the context of English language teaching, the call for digital literacy integration in language learning has been advocated during the last decade (Hafner, Chik, & Jones, 2015). English-language classrooms are suggested to provide students with the opportunities to develop digital literacy: to work with ICT and develop the skills required for representing through digital media. The imperativeness of improving this digital literacy competence is due to the emergence of new types of texts and new contexts of communication and the profound changes of the patterns and forms of information from paper format to a digital one. Therefore, it is inevitably necessary to expand the scope of English language teaching beyond the traditional literacies on speech and writing to include digital literacy learning. As regard with this issue, Hafner, Chik, and Jones (2013) proffered that

> Learning a language, particularly in the digital age, goes beyond learning grammar and lexis, and even beyond attaining 'pragmatic competence' and mastering the 'communicative functions' of language. It also involves being able to communicate in the target language using modes and media of communication that introduce new sets of affordances and constraints on what can be done with the language (Hafner, Chik, & Jones, 2013).

According to these scholars, communicative competence in English language learning should be expanded beyond merely the ability to speak that language, it also includes a whole host of new 'communicative competencies' including the ability to search for and critically evaluate large quantities of information in online databases, to construct meaningful reading paths through hypertext documents, to comment on the online writing of others in appropriate ways, to construct knowledge collaboratively through online platforms like blogs and wikis, to create multimodal texts that combine visual, aural, and textual information, remix online texts creatively, and interact appropriately with others in a range of online spaces (Hafner, Chik, & Jones, 2013). Thus, English language teaching should be used as a means to facilitate the integration of technology to foster the skills in the use of digital tools and resources. This study aims to explore the enactment of multimodal approach to promote digital literacy as learning in English language teaching.

The conceptualization and enactment of multimodal-based instruction design is primarily based on two theoretical constructs; multiliteracies pedagogy and multimodality combined with the principles of learner-centeredness, constructivist learning, and social interaction.

A. *Multiliteracies Pedagogy*

Multiliteracies pedagogy was introduced in 1996 by a group of literacy researchers and educators, known as the New London Group (NLG). This group proffered that literacy in the twenty-first century should extend beyond reading and writing. Literacy should involve all various ways of communication to make meanings (i.e. through combinations of linguistic, gestural, audio, visual, tactile and spatial semiotic modes) as well as an "appreciation of diversity of textual, contextual, social and cultural conventions that influence the use of these modes for different people in different situation" (New London Group, 1996; Cope & Kalantzis, 2000).

Multiliteracies pedagogy was developed and organized into two sections: the "what" of literacy pedagogy and the "how" of literacy pedagogy. The "what" of multiliteracies pedagogy draws from multiple modes of meaning making to support a design process of literacy learning. The "how" of multiliteracies pedagogy draws from a range of relationships between four components: situated practice, overt instruction, critical framing, and transformed practice. The *situated practice* suggests the "immersion in meaningful practices within a community of learners who are capable of playing multiple and different roles based on their background and experiences (New London Group, 1996). The component of *overt instruction* includes all activities that scaffold students' learning that allow leaners to gain explicit information. *Critical framing* is the stage in which teachers assist leaners to continually frame and examine their learning and literate practices. The final component of multiliteracies pedagogy is *transformed practice.* it is in this stage that learners apply the skills, knowledge, and behaviors in their real-world contexts. Transformed practice allows for students to "make connections to their learning, as well as to incorporate their cultural experiences, resulting in some level of creative change" (Cope & Kalantzis, 2015).

B. *Multimodality*

Multimodality acknowledges the use of multiple modes to make meaning. Here, mode is understood as a "regularized and organized set of resources for making meaning, including image, gaze, gesture, movement, music, speech, and sound-effect (Jewitt, 2006). Thus, the key concept of theories of multimodality is that all communication is multimodal, and that "language is but one of communicative resources through which meaning is (re)made, distributed, and interpreted" (Jewitt, 2008). This indicates that although oral and written language is usually considered as the central media of communication, there are also other modal resources such as visual, gestural, aural through which individuals can represent significant meanings (Kress & Jewitt, 2003; O'Halloran, 2011). Jewitt (2009) proposed four assumptions of multimodality: first, language is acknowledged as the most important mode of communication, however, other representational and communicative modes all have the "potential to contribute equally to meaning" (p. 14). The second assumption describes "each mode in a multimodal ensemble is understood as realizing different communicative work" (p. 15). It is further explained by Jewitt (2009) that "Multimodality assumes that all modes have, like language, been shaped through their cultural, historical and social uses to realize social functions" (p. 15). Jewitt (2009) connects the third assumption of multimodality to the meaning making processes as people's "selection and configuration of modes", which emphasizes multimodal composers' agentive and purposeful choice of modes and the significance of modes' integration and interaction for meaning making. The final assumption of multimodality describes the social meanings of signs and suggests that "meanings of signs fashioned from multimodal semiotic resources are, like speech, social". This means that signs are inherently social in that they communicate to viewers, readers and listeners in different social contexts. Multimodality is not a new

concept. The orchestration modes to make meaning -- represent ideas and communicate meaning -- through verbal, visual, gestural, aural, and spatial has always been used. The 'newness' of multimodality is the way authors distribute through media of communication.

In English language learning context, multimodality is regarded important and plays crucial role in constructing and conveying content. Multimodal environments allow English language learners construct and interact with specific contexts of language use. Learners gain awareness of the linguistic elements they need in order to create appropriate contexts of language use and to complement these with their specialized content (Plastina, 2013). In addition, based on the constructivist view of learning, learners should be offered opportunities to engage in processes of learning by doing. This can be conducted among others by engaging learners to design multimodal artefacts that provide them greater flexibility and creativity in their content-specific learning. Multimodality, thus, engages learners in a "complex process of sense making" (Jewitt, 2006) which is based on the social interactions between language and the other semiotic systems represented.

C. Digital Literacy

The term digital literacy was originally introduced by Paul Gilster in 1997. He defined digital literacy as "the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers" Gilster (1997). In the opinion of Gilster (1997), digital literacy competencies covered both technical and critical thinking skills emphasizing not only the ability to use digital devices but the ability to "master ideas" as well. Gilster (1997) proposed four digital literacy competencies including knowledge assembly, evaluating information content, searching the internet and navigating hypertext. Likewise, Warschauer and Matuchniak (2010) offered the definition of digital literacy as having the ability to deal with information, media and technology, to demonstrate learning and innovation, and to be flexible in life and career. Given that, to be digitally literate, an individual needs to develop that set of the skills. In this study, digital literacy is defined as a set of skills that enable an individual to use technologies to work with information. Following Churchill (2016), digital literacy in this study is examined in terms of the set competencies that a student needs to possess to participate meaningfully and actively through digital multimodal texts. The competencies include the abilities in reading, writing, speaking and listening (traditional literacy), identifying what information is needed and possessing the ability to locate, evaluate and use information (information literacy), questioning, analyzing, interpreting, evaluating and creating media messages (media literacy) and using tools to manage, consume, and create information (technology tools literacy). The 10 aspects of digital literacy adopted from Churchill (2016) were used to identify the evidence of digital literacy learning on students. The aspects include:

1. Determine the nature and information of media needed. This aspect puts forth skim-reading through the content and deciding whether the information and images are useful for the task and identifying what this source offers that other sources of information do not (ISTE, 2008) .
2. Locate information. This aspect deals with the ability to know where and how to locate information and to use multiple sources of information in completing the tasks (ISTE, 2008; UNESCO, 2008).
3. Evaluate the reliability of information. This aspect involves deciding whether information sources and media are reliable by being able to explain the significance of some criteria for evaluation and media reliability (ISTE, 2008; UNESCO, 2008).
4. Analyse, interpret and use a range of information and media to

communicate meanings through multimodal text (e.g., text, image, animation, sound, layout and narration). This aspect involves students' ability to make meaningful use of modes to construct meanings in a cohesive manner, to express themselves in a digital format (UNESCO, 2008).

5. Use digital technologies in a safe and socially responsible manner. This aspect involves displaying socially responsible conduct when coming across inappropriate, harmful and obscene digital information (ISTE, 2008; UNESCO, 2008).
6. Manage digital information in technology space (hardware and software components troubleshooting). This aspect is about how students use digital technology such as computers and online resources (ISTE, 2008, Hobbs, 2005]. It includes abilities such as copying chunks of texts, web addresses or notes for future use from an Internet page and pasting them into a word-processing document
7. Ethically use information and media. This aspect involves a student's ability to use royalty-free information and media created by others (Creative Commons) by providing a source title, the link and date when information was retrieved (Australian Communications and Media Authority, 2009).
8. Apply information to design own representations to effectively communicate knowledge to others. This aspect is about how students apply information they have collected (e.g., text, image, animation, sound, layout and narration) to create their own multimedia presentations using the elements of a given genre (ISTE, 2008; UNESCO, 2008).
9. Develop ability in problem solving and reflecting on own technology skills. This aspect involves a student's ability to critically evaluate the technology skills that he or she needs in order to complete the task (ISTE, 2008; UNESCO, 2008).
10. Use a variety of technology tools to create digital information. This aspect means that a student is able to create an integrated multimedia product with authoring tools, using them to the best advantage (e.g., evaluating and editing their own work). This skill is important, in light of the vast variety of emerging technologies, as it allows a student to make informed decisions when choosing a technology tool (UNESCO, 2008).

METHOD

As the aim of this study was to explore the aspects of digital literacy learning on students, qualitative case study design (Merriam, 2009) were adopted. Case study was selected for it allows the researcher to concentrate on a single group of subjects, investigate a contemporary phenomenon in depth and within its real-world context, and to provide a rich, thick description of the phenomenon under study (Merriam, 2009; Yin, 2003).

The study was undertaken at the Informatics Engineering Program of a State Polytechnic in Banjarmasin. This research site is basically chosen due to two reasons. First, the researcher has been teaching in this institution for more than 13 years that gives her advantage to have easy access and feasibility of the research. Second, vocational students at tertiary level are extensively exposed to digital technology in their academic life, thus facilitating them to gain knowledge of digital literacy would be a great significance. In addition, it is likely essential that vocational students are guided to make meaning, analyze, synthesize and evaluate information, and communicate ideas and messages effectively using a range of available technological inventions in a variety of situations to prepare them to be successfully function in the global world of work that they likely face in the future.

This study utilized multiple techniques

of data collection. These include classroom observations and students' artefacts. As suggested by Creswell (2007) that in-depth analysis of multiple data sources allows the researcher to create rich contextual perspective of the case, preparing the research for validation strategies and transferability. The observations were carried out for twelve sessions in which the researcher acted as 'teacher as researcher' and participant observer. The researcher's involvement in the setting's central activities aims to reveal depth information (Merriam,1998; Creswell, 1994) from the classroom activities.

In understanding students' digital literacy learning, it is essential to look at classroom artefacts that documents the students' works. Cousin (2009) stated that documents are cultural artefacts and would be able to provide relevant data relating to the students' experiences. The collected artefacts were the documents of the students' classroom tasks and multimodal texts.

The observation data were obtained during the teaching and learning process. The researcher took note on everything that was going on in the classroom, and as soon as leaving the class events were reconstructed into field notes. These notes were carefully read to see some common emerging themes.

Students' artefacts (e.g., E-MiniMag; Video project) were analyzed and evaluated using a designed rubric adapted from Churchill (2016) consisting of three level of skills: use, understand, and create and ten aspects of digital literacy. The 'Use' skills and competencies ranged from simply using basic technology to accessing and using knowledge resources such as search engines and online databases (Media Smarts, 2009). 'Understand' evaluated the skills that help us to comprehend, contextualize and critically evaluate digital media, to allow an informed decision about what we do and encounter online. This deepens the information management skills to find, evaluate and effectively use information to communicate, collaborate and solve problems (Media Smarts, 2009). 'Create' was "the ability to produce content and effectively communicate through a variety of digital media tools" (Media Smarts, 2009).

The course described in this study was a one-semester course (twelve 1,5 hour sessions) in English for Specific Purposes (ESP) of Informatics Engineering discipline at a polytechnic in Banjarmasin. The course was situated in a rich supported-technology environment with an excellent internet access and computer facilities. The teaching practices in this study was strictly adhered to the principles of multiliteracies pedagogy suggested by the New London Group (1996) , learner-centeredness, constructivist learning, and social interaction. Multiliteracies pedagogical framework gives prominence on two instructional components of multiliteracies: learning by design and multimodality. The learning by design in multiliteracies includes three key elements: Available Designs, Designing, and the Redesigned. Available designs refer to the accessible semiotic resources to make meanings. These available designs require teachers and students to develop metalanguage to understand and express explicitly the differences between texts, and relate these to the contexts of culture and situation in which they seem to work. Designing is transforming the meanings with the Available Designs. Cope and Kalantzis (2015) see 'Designing' as "the act of doing something with Available Designs in representing the world". It is a connection between past and new experiences through oral, written, visual, audio, gestural, spatial, and other multimodal patterns that relate to meaning making. The Redesigned is the what has been transformed and reproduced through the Designing Process (New London Group, 1996; Cope & Kalantzis, 2015). Pertaining to multimodality, teachers are required to constantly expose students to multimodal texts in the social world around them and provide them with authentic learning activities.

The multiliteracies projects assigned for the students were e-MiniMagz and digital video presentation. The e-MiniMagz is a project of creating and designing an image-text magazine-like of a particular topic

related to a specific subject in a digital format. This project is a group-based project in which each group should determine a topic and translate it into sub-topics of their particular interest. Students could include various modes in the text construction to make the texts meaningful, understandable, and interesting. In the text creation, online applications such as *canva.com* and *sway.com* were suggested to be used. However, the students were given freedom to select and use other applications available online on their own choices. The rubric scoring was used to assess this project.

The second project was the creation of video presentation which was intended to measure students' ability in writing "expository text". This project required them to design a digital video using verbal and visual aspects of content-specific English language. This is an individual project in which students should select a particular topic and develop the topic into a digital multimodal expository paragraph. The students could use any available free web-based video making tool such as *Screencast-O-matic* or *goAnimate.com*. This project gave chance for the students to make meaning by integrating elements relating to all the five semiotic resources (linguistics, visual, audio, gestural, and spatial). Prior to producing the digital video, the students were required to plan the multimodal content project. To this end, learners were required not only to plan the content of their artefacts, but also to creatively transform and integrate it in multimodal format to present an effective product, demonstrating their learning of content-specific language.

RESULTS AND DISCUSSION

This section presents the findings of digital literacy learning during the implementation of the multimodal teaching program in the English classroom. The data in this study were obtained from the classroom observations and students' projects

A. Project 1: Digital Mini-Magz

Project 1: Digital Mini-Magz

The overview of the data findings can be seen in Figure 4.1 followed by detailed description of the aspects of the digital literacy.

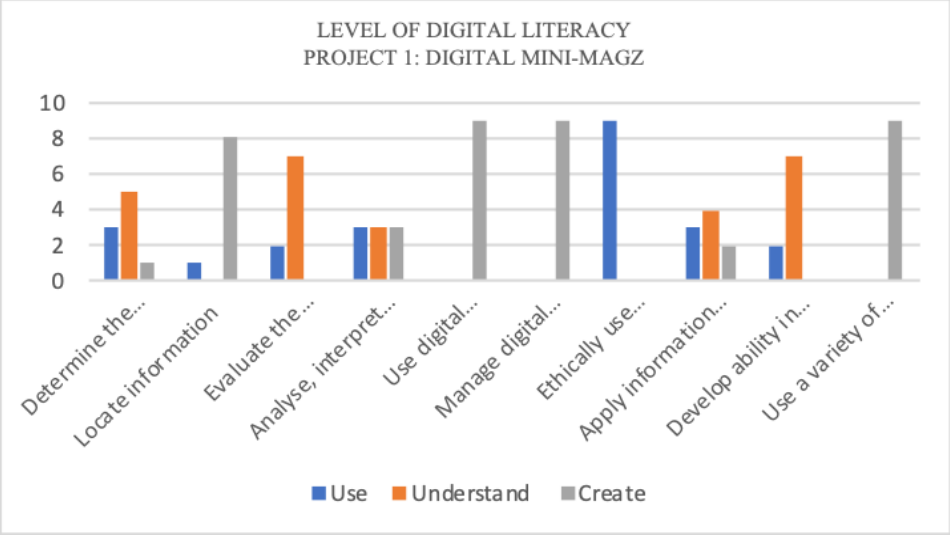

Figure 1. Aspects of Digital Literacy Observed in Project 1

Figure 1. shows the various aspects of digital literacy observed in the creation of digital Mini-Magz Project. The accomplishment of this project was conducted in a group of four in which each group was given freedom to select topic of their own choices and to use any free online application in creating the digital text. Various topics were selected by the students to accomplish this task including: *Games, Computer Viruses, Online Games, Fake News (Hoax),*

Virtual Reality Technology, Mobile Phone, Gadgets, and Online Transport Service. Most group used Microsoft Sway application in their multimodal text creation and the rest used Microsoft PowerPoint application.

In terms of the aspects of digital literacy, the data revealed that most students demonstrated the ability to locate information, could use digital technology in a safe and socially responsible manner, could skillfully manage digital information in a technology space, could use a variety of technology tools to create digital information, all of which reaching the level of "Create". In relation to the ability to determine the nature of information and media needed, evaluate the reliability of information and media content, apply information to design own representations to effectively communicate knowledge to other, develop ability in problem solving and reflecting on own technology skills, several students reached the level of "Understand" meaning that these aspects were not fully achieved by them. The data also revealed that several other students were in the level of "use" in the aspects of determining the nature of information and media needed, evaluating the reliability of information and media content, applying information to design own representations to effectively communicate to knowledge to other, and develop ability in problem solving and reflecting on own technology skills. Evidence for one of the aspects of digital literacy, in this case the aspect of determining the information of the media needed, most students were able to skim through online content and find images and texts useful for the tasks. The students could successfully provide appropriate images to help to convey meaning, to attract reader's attention, and to construct unified meaning making representation. These data indicated that the students seem to have an awareness of the functions of images in the text construction that the use of images could clarify the meaning of text (Barratt-Pugh, 2000). An image does not replace text, but rather complements it, which results in a blending of modes in multimodal text creation. As regard with this, Martinec and Salway (2005) emphasized three possibilities for the text-image relationship: text supporting image, image supporting text and the two being equal (that is, the whole image is related to the whole text). Another evidence for the observed aspect of digital literacy learning in multimodal-based instruction was the ability to locate information. A great number of students had the ability to locate information in the digital texts. The students accessed various sources from the websites to construct a concise, sensible and interesting information in the texts. The students also provided the name of the website and provided the links (e.g., https://i2.wp.com/www.thehealthygamer.com/wp-content/uploads/2015/02/onling-gaming-addiction.jpg?w=480). This link was used to access image to the topic related to online game. This suggests that the students had awareness to use many sources to find facts and images that were useful for their works. Despite the various sources that the students used in the completion of the tasks, the data also revealed that most students were not fully aware of the credibility of the sources that they used. They had lack of ability in distinguishing the reliable and non-reliable websites that lead to the use of misinformation data. The use of Wikipedia (Wikipedia Virtual Reality) and personal blog (https://channel9.msdn.com/blogs/misslivirose/introduction-to-the-vr-web) indicated students' lack of understanding of the importance of the reliability of sources.

B. Project 2: Digital Video Presentation

Figure 2 presented below is a visual summary of the observed digital literacy learning for students in Project 2: Digital Video Presentation.

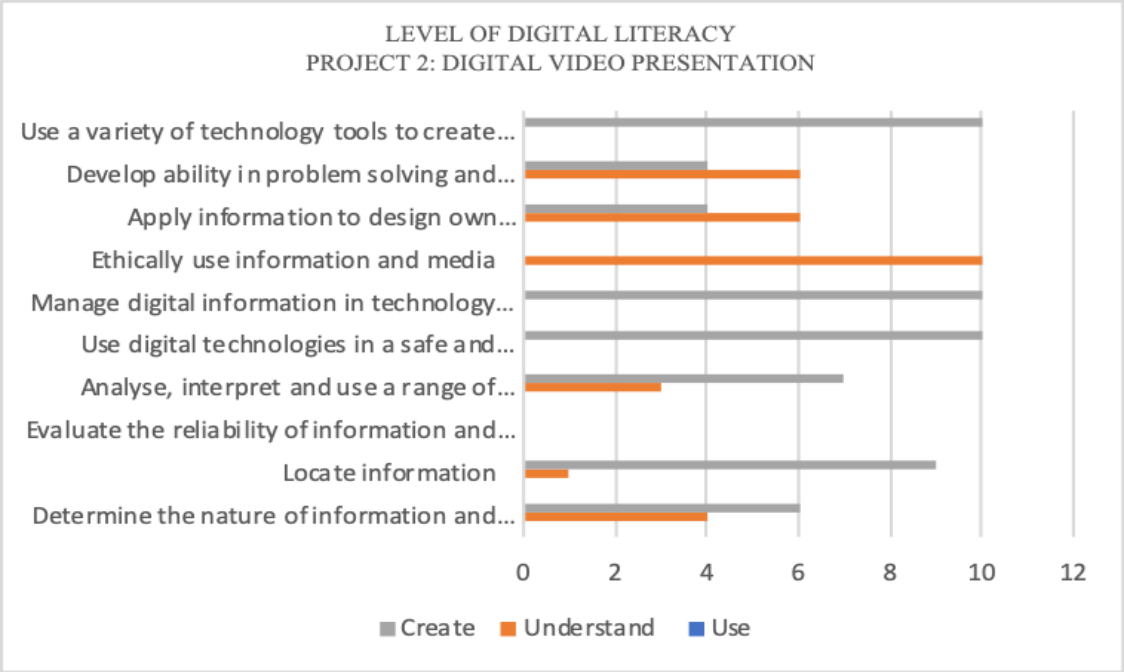

Figure 2. Aspects of Digital Literacy Observed in Project 2

The researcher examined and evaluated 10 student video digital presentation projects to identify students' level of digital literacy. The videos were purposively selected to comply with the objective of the study. Overall, the students' works were excellent in which interesting and creative topics were presented throughout the projects. The topics included among others: *The advantages of using internet in learning English*, *Positive impacts of online games for students*, *The dangers of memes, The earth is not flat*. One of the students' works can be accessed at https://www.youtube.com/watch?v=wFwHRPaiDPw.

As can be seen in Figure 2, many aspects of digital literacy for this project reached the level of "Understand" and "Create". This suggests that the students demonstrated the development of several aspects of digital literacy compared to Project 1. The improvement can be seen among others in the aspects of students' skill in locating information and using information and media. However, no evidence was observed in the aspect of evaluating the reliability of information and media content due to the nature of the project. The most obvious observed aspect of digital literacy in Project 2 was the ability of the students to analyze, interpret and use a range of information and media to communicate meanings through multimodal text (e.g., text, image, animation, sound, layout and narration). The majority of students were successfully performed this aspect. Evidence showed that the students were able to use various modes in their video production meaningfully and in a cohesive manner. In terms of the linguistic mode, several students could produce English language in a comprehensible and logical manner with a few grammatical errors. The students also had the ability to make use the default animated components and special effects dynamically, to make use of the default sound and music effects which clarify and complemented the

content, ta make use of recording to create narration in which the voice was projected clearly, even though the volume was sometimes inconsistent from slide to slide.

CONCLUSION

This paper discusses digital literacy learning in a multimodal-based instruction conducted in an English language classroom in a vocational higher education context. Teaching digital literacy in schools has become increasingly important in this digital technology era. In light of this, students need to be taught to represent themselves using appropriate multimodal and multimedia technology effectively in a responsible manner as the traditional language skills of reading, writing, listening and speaking has been extended to include representing. The results of this study showed that multimodal approach in teaching English could help students reach a significant level of improvement in digital literacy aspects.

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