

**COMPUTER MEDIATED CONTACT IN VIRTUAL INTERNSHIP:
MEANINGFUL LEARNING EXPERIENCES**

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ABSTRACT

The global pandemic caused by Coronavirus has forced many universities to transition in research and learning activities, into virtual modes. The virtual research based internship considers dynamic development in Multimedia using remote placement training, by helping students to learn how to recognize and solve problems, comprehend new phenomena, and construct mental models of those phenomena. The paper addresses the concerns from internship supervisor to guide and monitor students in experiential internship activities. The paper also highlights the specific technology integration emphasis to accommodate internship during this time of uncertainty. The multimedia internship design is mainly project-based so interns required to complete their projects under the direction of internship supervisor and monitored by faculty mentor, utilizing email and the Microsoft Team platform for communication. This study is based on a case of virtual research based internship in Multimedia study programme to accommodate serious game development and evaluation of moral education among preschool children. The programme takes place in Second semester of Session 2021-2022. The descriptive presentation of the case serves as initial step to understand the challenges and strategies in software engineering virtual research based internships. Empirical evaluation and investigations of technology integration to support meaningful internship will be required in the next step of the study.

1. INTRODUCTION

The transition of COVID-19 the new phase of endemic open for another changes but virtual modes of teaching and learning activities continue to be the current norm. The

circumstances of physical distancing and remote learning leads to virtual internship programme takes place. The virtual internship involves participation in dynamic problem solution in professional working environment using remote placement training.

The COVID-19 has entered into the new phase of endemic but the modified norms in the learning activities of many students all over the world continue to occur. The current educational activities consider the circumstances of physical distancing and remote learning take place within temporary or moderate time span. Internship programme for students in higher educational institutions get significant effect and disruption from the situation.

The pandemic era has a significant impact on internship implementation. The number of placements offered by industries show reduction trend (Koopman et al. 2021). The unprecedented shift in the structure of internships take place due to high number of employers modify office into a virtual operation environment. Therefore instructors in the higher learning institution see some necessary changes to the internship offer and make use some of the opportunity (Briant & Crowther 2020; Teng et al. 2021).

Recent changes to workplace activities, have offered an opportunity for virtual internships in which students work and engage remotely, via on-line modes, in a workplace (Briant & Crowther 2020). The COVID-19 pandemic brings considerable interest in virtual internships, although in the prior years, this type of internship has gain prominence (Hora et al. 2021). Despite varieties in the virtual internship format due to session duration, activities, structure, and evaluation, this type of placement continue to solve many internship issues problems as many in-person positions were cancelled or shifted online (Hora et al. 2021).

To ensure students gain meaningful learning experiences in the internship tasks during the endemic time, project based supervisor needs to design specific learning experiences throughout the internship period. Meaningful learning occurs when students are wilfully engaged in a meaningful task to engage active, constructive, intentional, authentic, and cooperative activities (Howland et al. 2012).

Meaningful learning experiences emphasise that students identifies the learned concept as being especially relevant to their individual self, due to their cognitive-emotional impact of any life incidents (González-Ceballos et al. 2021). In the context of internship in higher education, students contribute to a certain meaning to the set of recognized training experiences (Mystakidis et al. 2021). Meaningful learning achievement is the aim of technology utilisation in the learning process (Howland et al. 2012). Technology integration also takes place in internship programme to involve a mixture of applications, media, systems, approaches and techniques guided by information and communication technology to increase intern engagement and effectiveness of Multimedia-specific knowledge and transferable skills (Mohamad Subaidi & Azlina 2020a, 2020b, 2020c; Nurul Faeizah et al. 2021).

While literature exists on virtual internships, relatively little exists on software engineering virtual internships (Koopman et al. 2021). The review of literature on virtual internships across disciplines to find effective practices that can be applied to virtual software engineering internships. The review sets the stage by a brief summary of research on traditional software engineering internships and management of virtual teams before investigating into findings on the opportunities and limitations as well as program design recommendations for virtual internships.

2. Meaningful Learning in Multimedia Programm Internship

Multimedia has been expressed as a combination of sound, text, animation, video or art delivered by a computer or other digital platform (Hendric 2008). The scope is under Software engineering field that concerns software development aspects, starting from planning to maintenance phase by adopting systematic, disciplined, quantifiable and an organised approach. Multimedia Systems Development is an undergraduate programme under The Bachelor of Software Engineering to train students in multimedia software production in the enquiry, design, development and employment of the system using the software engineering methodology. The

programme produces software engineers or computing professional alike to contribute creatively and innovatively in the vibrant of Multimedia System Development.

Meaningful learning in multimedia program concerns assimilation of imperative component in the program. Using the best available definition, meaningful learning is accomplished by achievement of the learning outcomes and realisation of its elements in particular learning (Hakkarainen et al. 2007). The achievement of learning outcomes is acknowledged through Multimedia-specific knowledge and transferable skills such as identifying and managing research information, experimenting with research ideas, reasoning and problem-solving of multimedia issues. The element of meaningful learning are described as active, constructive, intentional, cooperative and authentic (David H Jonassen & Strobel 2006; Short & Graham 2020).

Active encompasses attentive processing of internship task manipulation and evaluation of the results of manipulation (David H Jonassen & Ronrer-Murphy 1999). Constructive involves articulation of project development by reflecting the new learned concept into existing cognitive structures (D. H. Jonassen 1995; Moleko & Mosimege 2021). Authentic Learning considers real-world multimedia problem solution (Hakkarainen et al. 2007). Cooperative takes place in group work to socially negotiate and achieve common understanding of the task (Özarlan & Çetin 2018). Intentional materialise when interns actively and wilfully trying to achieve a project goal (D. H. Jonassen 1995).

In software engineering related field, the training fosters students in writing so the habits help to develop meaningful learning (Fadhel et al. 2020). By writing about the learning material and task, students are trained in decision making before and after every step in design and as discussion material during teamwork (Feldgen & Clua 2014). The exercise promotes reflection about how these students handle the problems and accomplish the task. Writing activities consist of a unique mode of learning which forces students to think, stimulate strident views on recent topics in the research and contribute to an effective teamwork. The active and collaborative learning supports the intended meaningful learning environment. The exercise urges every student

in a team to write research reports as material for discussion for research review assignments. The interns learn to organise material and clarify concepts, to ask questions, to process the information as a group in the classroom and then met outside of the class to finish up the project tasks.

Active reflection session on the gained experiences during teamwork promotes the acquisition of more meaningful and persistent learning (Nicolaidou 2013). Furthermore, writing gives us the opportunity to provide students with feedback, as a result, it becomes a highly effective tool in helping them uncover and then wrestle with their misconceptions while the learning is taking place (Duijnhouwer et al. 2012).

3. Virtual and Research Track Internship in Software Engineering

Internships and any work-based learning programme are considered as among essential experiences for university students (Hora et al. 2021). Benefits of internship include its role to help students develop transferable skills, apply academic knowledge to authentic situations, develop professional networks, and facilitate students' socialization and entry into the professions. Due to Covid-19, internship programmes are being held online and the interns are expected to be working from home. Work-from-home or also known as WFH is defined by working in the home environment (Mei & Wong 2021). Virtual internships represent unique transitional and temporary learning experiences including the use of technology integration (Jeskea & Axtell 2018). Supervisory engagement and commitment to the interns play a critical role to create meaningful learning. Likewise, the customized use of technology to interact, monitor, and engage with interns determine effectiveness in the program.

The traditional internship model does not serve well during a pandemic and should be adapted so that undergraduate students can complete their internship by working only remotely with faculty supervisor organization participation (Dent 2020). The virtual internship emphasises efficient communication platform for both students and supervisors. By leveraging innovative uses of contemporary technologies for communication, students are able to immerse themselves in experiential learning situations, and reflecting on online internship processes (Bay 2017).

Studies have shown that there are several advantages of working remotely which is interns are able to work at their own pace making their work schedule more flexible. Second, it helps interns to save more on transportation costs since their compensation are not as much as permanent worker (Wortham, 2013; Mei & Wong, 2021). Third, remote internships offer interns higher risk tasks without the need to commute or working to strict time constraints.

However, there are a few downsides too. Interns might not offered networking opportunities as much as working in the office since they rarely meet their coworkers or supervisors. Second, they might find it hard to develop their management skills (Marte, 2009; Mei & Wong, 2021). It also makes it harder for interns to perform better and do their task effectively through working-from-home mode.

Generally, an internship allow the students to experience working environment in a short period of time. It is to enhance their practical knowledge and encourage them to apply their knowledge in a real-life environment. Besides industrial internships, students are also allowed to do their internship in research field. In this way, it encourage students to actively participate in this field.

The research based internship considers dynamic development of the domain knowledge, by helping students to learn how to recognize and solve problems, comprehend new phenomena, construct mental models of those phenomena, and, given a new situation, set goals and regulate their own learning (Howland et al. 2012). For example, meaningful internship activities in multimedia research project aim to help students to achieve dynamic development of knowledge in software engineering.

Advantages that can be gained by doing research track internship is that it encourages an individual for a research career. Next, it helps increases writing skill among students. Interns are required to represent their work through research papers and reading various articles and journals. This is one of the key skills of doing research internship. Interns are trained to write papers, thus enhancing their paper-studying skills. Third, research field helps increases team building skills. Research work require ones to communicate and exchanging knowledge with coworkers.

4. Meaningful Learning using Technology Integration

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In order to help students accomplish Multimedia-specific knowledge and transferable skills, internship activities may include meaningful learning activities (Howland et al. 2012). Meaningful learning takes place in the Multimedia internship programme when they involves intentional, active, constructive, cooperative, and authentic learning. Such activities train students to inquire and manage research information, experimenting with research ideas, designing and developing multimedia products, disseminating research ideas and findings verbally and written, collaborate in meaningful research discourse (Mia et al. 2020).

Meaningful Learning is supported by technology not only as delivery vehicles. Technologies play an important role to foster meaningful learning, mainly as engagers and facilitators of thinking. The conception of meaningful learning suggest various roles for technologies in supporting meaningful learning (Howland et al. 2012). First, technology as information vehicle to support knowledge construction. This appears to be among the main focus in research based internship. Knowledge construction tools aim to demonstrate internship task such as research techniques during virtual meeting and interns use them as simulations for practice (Hwee 2017). The roles of this type are for representing interns' ideas, understandings, and beliefs and for producing organized, multimedia knowledge bases by interns.

Second, technology as information vehicle for exploring knowledge to support learning by constructing. Knowledge exploration performs an obligatory task in intership to offer freedom to interns in conducting research as novice and gain significant experience from the surrounding.

The tools encourage interns to apply solution to be modified in different contexts (Blau et al. 2020). The role serves for accessing required information, for comparing perspectives, beliefs, and worldviews. Tremendous knowledge sources could be managed efficiently using this tool. Third, technology as authentic context to support learning by doing. The tools inspire interns to engage and facilitate thinking in interpreting the real world problems (D. Jonassen 2003). Active learning ensures engagement of interns in the research: for demonstrating and simulating meaningful real-world problems, situations, and contexts; for expressing beliefs, perspectives, arguments, and cases; for defining a safe, controllable problem space for cognitive process.

Fourth, Technology as social medium to support learning by conversing in daily interaction. Efficient communication channel enables rapid interaction between intern, supervisors and related parties (Zhao et al. 2020). Thus, communication tools support the research: for cooperating with others; for discoursing, arguing, and building consensus among members of a community; for supporting discourse among knowledge-building communities. Fifth, Technology as intellectual partner to support learning for task reflection (David H. Jonassen et al. 1999). Intellectual partner considers supervisory engagement and commitment especially in virtual internship and utilisation of customized technology to interact, monitor, and engage with interns (Jeskea & Axtell 2018). Intellectual partnership tools work for: helping interns to describe and represent their conceptual understanding; reflecting on prior knowledge and giving meaning to from experience; supporting interns' internal negotiations and meaning making; constructing personal representations of meaning; supporting meta-cognitive.

The virtual research based internship of Multimedia study programme to accommodate serious game development and evaluation is the selected cases in this study. The programme takes place in Second semester in Session 2021-2022. Table 1 summarise technological support in the internship programme.

Table 1. Technology integration tools

Type	Category	Tools
Technology as intellectual partner	collaboration and communications tools	Microsoft Teams, Google Meet
	delivery and target	Google Calendar
Technology as information vehicle for exploring knowledge	information search	Google Scholar, Publication database
	resource management	Mandeley, Atlas
	agile methodology]ProjectOpen[
	analytics	Excel, PSPP, Tableau
	mapping and structure	MindMeister, advance organizer
Technology as information vehicle to support knowledge construction	knowledge representation	Google Docs, Google Drive
	comparison and assurance	Grammarly, Google Translate
	visual and illustration	freepik, Evanto
Technology as social medium to support learning by conversing	communication	Whatsapp, Telegram
	research planning	iTils
Technology as authentic context to support learning by doing	game development	Unity, Adobe Illustrator
	content creation	Canva, Prezi and Flipsnack

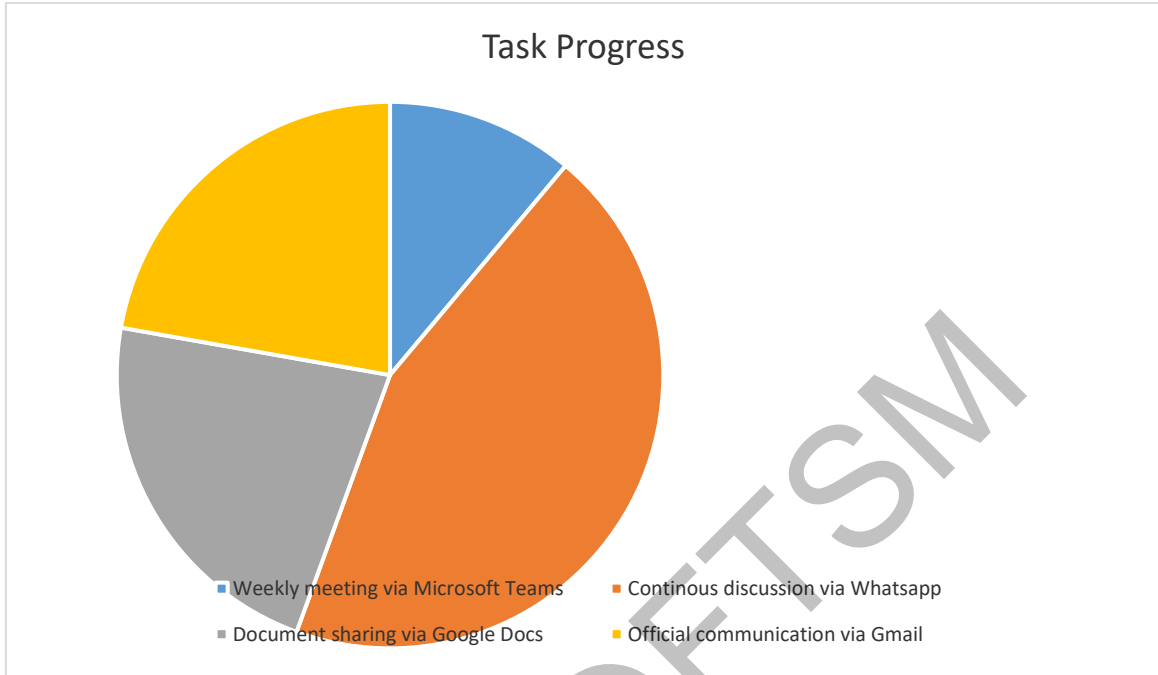


Fig. 1 Internship task progress using technology

Using the case in the study, data on the application of technology in internship task for the period of two months i.e. September and November is analysed. Figure 1 shows how we communicate with team members during virtual internship. In order to track each other's progress, we are required to communicate with each other online. Pie chart above stated that we use Microsoft Teams for our weekly meeting, WhatsApp for continuous discussion, sharing documents and research materials through Google Docs and we also utilise Gmail for official communication. Discussion are often made through WhatsApp because its convenience. Online weekly meeting are required to track interns given tasks progress and to distribute tasks.

5. Discussion and Conclusion

This study emerges from the COVID-19 pandemic which brings about a reliant shift to virtual internship and learning. The global pandemic caused by Coronavirus has forced many universities to transition in research and learning activities, into virtual modes. This paper details

a new dimension to a virtual internship program developed in response to the effects of pandemic in a computer science faculty at a public Malaysian university.

The internship experience sharing emphasise the use of technology and show various roles it plays to support meaningful learning. The use of technology is mainly served as vehicle for exploring knowledge and construct knowledge. This pattern suits the learning outcomes of the Multimedia internship programme. The internship tasks and technology integration selection to support the responsibilities to train student in managing research information, reasoning and problem-solving of multimedia issues, also experimenting with research ideas.

The application of technology integration to support meaningful in the internship context is demonstrated. The descriptive presentation of the case serves as initial step to understand the challenges to fill in the gaps in the selected scope. In order to gain further insight of the goals, further evaluations and investigations will be required. The next step is for the internship outcomes of this program to be assessed through standard measurement and effectiveness of technology integration to confirm the proposed benefits. Ahead of those results, we can still, with some confidence, offer the above case as useful guides for good practice in a range of other contexts and environments.

The demonstration confirms the concept of virtual research based internships as appropriate strategies that can not only support improved student retention in the short term, but offer new opportunities for enriched, broadened and more equitable internship experiences. Various difficulties in workplace-based internships appear to give burden to many students who are unable to give commitment to fulfil the required hours because of a range of life factors. The new virtual research based internship, seeks to overcome these barriers.

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