JTE HCMUTE
ISSN: 2615-9740

JOURNAL OF TECHNICAL EDUCATION SCIENCE
Ho Chi Minh City University of Technology and Education
Website: https://jte.hcmute.edu.vn/
Email: jte@hcmute.edu.vn

Establishing a Tight Link between Students and Society Environment for Education 4.0 – An Online Interaction Case Study

Le Phuong Truong[1*], Tran Thi Thuy[2], Nguyen Huu Chuc[2], Do Thi My Trang[3], Nguyen Thi Lai Giang[3], Lai Jiang[4]

[1]*Lac Hong University, Vietnam*
[2] *Hue Industrial College, Vietnam*
[3] *HCMC University of Technology and Education, Vietnam*
4 Kuleuven University, Belgium

[*] *Corresponding author. Email: lephuongtruong@lhu.edu.vn*

ARTICLE INFO

Received: 30/5/2022
Revised: 17/6/2022
Accepted: 28/6/2022
Published: 30/6/2022

KEYWORDS

Education 4.0;
Online interaction;
Virtual internships;
Virtual career counseling;
Virtual field trip.

ABSTRACT

This paper presents research results on online interaction for higher education toward 4.0 education. In addition to online interaction in universities through learning management systems, this study builds a model of online interaction between universities and enterprises and presents methods for implementing different types of online special terms outside the academic environment such as virtual reality tours, virtual internships, and virtual career counseling.

The analysis has shown that creating a virtual interactive environment outside the university has brought lots of benefits such as saving cost and time, personalizing learners, changing awareness about digital technology, diversifying learners' approach.

Doi: https://doi.org/10.54644/jte.70A.2022.1220

1. Introduction

The EMVITET (Empowering Vietnamese VET teachers for transformation towards Education 4.0) Erasmus+ capacity building project aims at creating a new learning ecosystem for Education 4.0 in Vietnam, based on student-centered learning, competency-based education, collaboration and networking in digital environments, and sharing knowledge through a community of practice [1]. The EMVITET gave timely support and a boost for project teachers to continue quality education with technology. Different tools have been introduced by the project such as learning management applications (Moodle and Google classroom,), online interactive applications (Zoom, Google meet, MS Team), and some tools supporting online teaching (Padlet; Menti; Jamboard)

In the early period of applying digital technology in teaching, it is challenging for lectures and students not only because of some barriers to digital skills of learners, teachers, and technology background. Moreover, when all technical barriers are resolved, "how to appropriately use digital tools?" became a more central question as to deployment of technology moves to a new focus, that is, approaches and deployment of digital tools should be based on pedagogical considerations. One of such considerations is how to ensure meaningful interactions in fully online classes. This is a big challenge.

Woo & Reeves (2007) pointed out that interaction is an essential ingredient of any learning environment (face-to-face learning, synchronous/asynchronous online learning, or blended learning). They emphasized that the interactions must be meaningful as the interaction quality can significantly impact the quality of teaching & learning processes. This is because "interaction in learning is a

JTE HCMUTE
ISSN: 2615-9740

JOURNAL OF TECHNICAL EDUCATION SCIENCE
Ho Chi Minh City University of Technology and Education
Website: https://jte.hcmute.edu.vn/
Email: jte@hcmute.edu.vn

necessary and fundamental process for knowledge acquisition and the development of both cognitive and physical skills" (Barker, 1994) quoted in (Woo & Reeves, 2007). Following (Hirumi, 2002) and (Vrasidas & McIsaac, 1999)'s work, Woo and Reeves defined "Meaningful interaction" as the ones that stimulate the learners' intellectual curiosity, engage them in productive instructional activities, and directly influence their learning.

Some researchers around the world have conceptualized different categories of online interactions (Vlachopoulos, D., & Makri, A, 2019; Mehall, S, 2020; Arbaugh, J. B., & Benbunan-Fich, R, 2007; Julien, C, 2015) Among them the most common ones are: Learners interact with the content; Learners interact with learners; Learners interact with teachers (Moore's, 1989). Different methods have been described to stimulate and organize these different types of interactions in a meaningful way. However, these studies have not shown how to interact outside universities for learning purposes. That is, learners interact with the environment/society. This aspect has been highlighted in the EMVITET project. It has called for special attention of educators to establish learning ecosystems, which includes building connections with external partners (e.g., business & industry) so that learners have more chances to engage in real-life tasks to learn, practice what they have learned and created products. In this study, one of the concrete project outcomes, i.e., interactive methods beyond university campus are presented such as virtual reality tours, virtual internships, and virtual career counseling. We argue that the interaction with the society/environment is essential as it offers authentic context where learners are challenged with real-life tasks/problems, which engages them in information collection, analysis and leads to productive activities. As a result, the interaction with society/environment can have a positive impact on their learning (e.g. stimulate integration of knowledge, application, and creation).

2. Objectives

Some activities outside universities such as field trips; career counseling; internships bring learners many benefits such as practicing skills and gaining experience in real settings. Many universities and colleges have cooperated with businesses in the training field to create beneficial interactions between learners and businesses. In 2020-2021, under the impact of the COVID-19 pandemic, the interaction with businesses cannot be performed physically. To ensure learning progress and be adaptable to the situation, with the inspirations from the EMVITET project institutions have facilitated learners' interactions with business partners virtually.

This article reports how virtual interactions (virtual internships, virtual business tours, and virtual career counseling) were organized and the interview results on learners and teachers' perceptions towards these interactions (i.e., advantages and challenges).

3. Implementation at Universities/Colleges

3.1 Virtual interaction between learners and enterprise

The interaction with the environment/society in this study is focusing on building connections between universities/colleges, learners and resource partners (e.g., business & industry), see Figure 1. Education institutes, such as Universities and colleges play a coordination role in building and maintaining the interactions.

JTE
HCMUTE
ISSN: 2615-9740

JOURNAL OF TECHNICAL EDUCATION SCIENCE
Ho Chi Minh City University of Technology and Education
Website: https://jte.hcmute.edu.vn/
Email: jte@hcmute.edu.vn

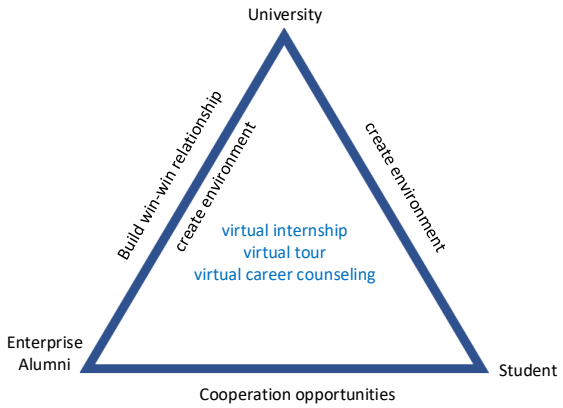


Figure 1. Model of online interaction between learners and enterprises at universities

For businesses or alumni to approach learners, education institutes built a mutually beneficial relationship between them and businesses. In addition, the institutes created a working space as well as a cooperative and sharing environment between learners and businesses. During the pandemic, businesses interacted with learners in virtual environments offered by the education institutions with some virtual interactive software (Zoom, MS Team, or Google Meet). To learners, the coordinating institutes created a communication structure and established procedures for learners to approach businesses in a more convenient way.

Below are brief descriptions of the 3 types of virtual interaction with business: virtual internships, virtual business tours, and virtual career counseling.

A Virtual internship is an internship model through supporting devices and tools so that learners can get knowledge and experience without physically going to enterprises. This type is suitable for distance learners who cannot go directly to enterprises to practice; besides, it also allows learners to have more choices to practice in large enterprises that are interesting for learners.

"Virtual internships emerged long before the current pandemic, though the closing of physical worksites created virtual opportunities in organizations where they had never existed before. This is significant because virtual internships can help interns to obtain work experience with employers of their choice despite their location''(Feldman, E, 2021).

Virtual field trip are that learners can use computers, mobile phones, and tablets to observe the workplace at enterprises thanks to the use of devices such as 3D scanning machines, specialized scanners to collect images, data about certain spaces or places, and then recreate those spaces in a digital style, create the feeling of being there.

Virtual career counseling is a form in which businesses and learners share and exchange information, knowledge, and skills needed to meet practice work requirements. Such information exchange can be done through organizations connecting between universities, learners, and businesses, or through seminars organized by universities, or through emails.

3.2 Implementation at EMVITET Vietnamese partner institutions

With the consultation of the EMVITET experts, three partner institutions: Lac Hong University, HCMC University of Technology and Education and Hue Industrial College are active in searching solutions during the COVID19 period to retain the industry/business inputs to curricula. To maintain the internship and factory tour for our learners, we have applied virtual reality technologies in online meetings. The procedure of virtual interaction with business is shown in Figure 2.

JTE
HCMUTE
ISSN: 2615-9740

JOURNAL OF TECHNICAL EDUCATION SCIENCE
Ho Chi Minh City University of Technology and Education
Website: https://jte.hcmute.edu.vn/
Email: jte@hcmute.edu.vn

At Lac Hong University, tours and career counseling were organized for both high school and university students, with businesses such as Ajinomoto Company. During the Covid-19 period, many enterprises in Vietnam could not receive learners for internship. To overcome this, Hue Industrial College have applied VR technologies for learners to do the Virtual Internship (see Figure 3).

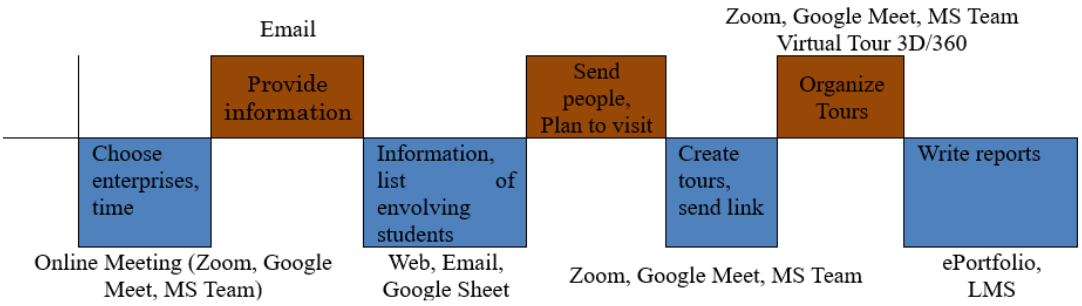


Figure 2. Steps to implement virtual career counseling and tour

Figure 3. Chemical and Environmental Engineering students at Hue Industrial College do the virtual internship at factory using VR technologies

After implementing the Virtual Interaction between industry and learners, we have interviewed our learners and teachers. The summarized results of the interviews on advantages and challenges of the organized virtual interactions is presented in Table 1.

JTE HCMUTE
ISSN: 2615-9740

JOURNAL OF TECHNICAL EDUCATION SCIENCE
Ho Chi Minh City University of Technology and Education
Website: https://jte.hcmute.edu.vn/
Email: jte@hcmute.edu.vn

Table 1. Advantages and Challenges of online interactive activities

Activities	Challenges	Advantages
Virtual enterprise tours	- Technology compatibility - Learners do not clearly understand the benefits - Learners' digital skills are still limited	- Learners learn about the enterprise environment actively - Flexible in terms of time
Virtual internships	- Compatibility with the physical environment - Technological compatibility - Learners' digital skills are still limited.	- Personalize the working method - Flexible in terms of time
Virtual career counseling	- Technology platform - Digital skills of learners are still limited.	- Diversity of information

Table 1 shows that the challenges of technology compatibility between learners and businesses still exist. The reasons for the above challenges are that virtual reality technologies of enterprises require learners to use compatible devices. Each different business uses different technologies, so learners need to adapt to technological requirements. In addition, virtual internship for some technical disciplines was more difficult to organize because of the incompatibility of work in the virtual environment with the physical environment, so some specific specialties need a more appropriate strategy. For example, during Covid-19, students in the Chemical-Engineering Faculty have done their internship using VR technology (see Figure 3). These learners had a chance to operate some machines in a VR environment that is similar to the real environment. However, the VR technologies can only immitate some basic functions of the machine for learners to practice. To be familiar with and deal with complex real problems, directly manipulating and operating electrical equipment in real operating conditions is required. To have a real equivalent effect of virtual internships and internship in reality, there is still some developmental work needed for the VR technology.

Despite the challenges, virtual interactions were perceived to be beneficial. There are a number of things mentioned: online format allows learners to personalize their information search and be more flexible in terms of time as well as the choice suiting their needs, compared to physical interactions.

To successfully organize virtual enterprise tours and virtual internships, it is recommended to give learners very specific and detailed instructions. In this way, when learners interact with digital-based content on their own and have problems, they can handle them independently based on the instructions. Furthermore, the leaners were encouraged to write the reflection and/or report at the end of the virtual enterprise or internships tour. A third key point for successful virtual interactions is feedback. In order to receive feedback from learners as well as businesses, the educational institutes built two feedback channels. For instance, at a University level we have a business relations center that is responsible for receiving feedback from businesses through surveys or individual personal communication. This center also receives student feedback through an internal information system. At the faculty level**,** a person was

signed to be in charge of managing internship- related matters and corporate relations. This person also planned all activities and received feedback from businesses and learners**.**

4. Discussion

Under emergency situations, such as the COVID-19 pandemic, the transition from a face-to-face business interaction to an online mode opens up alternatives to solve some existing issues, such as geographical distance and capacity issues. One example is that a number of learners who want to do internships in particular companies that are relevant to their majors but they eventually cannot make it due to a long traveling distance. The limited number of places that learners can register in particular companies is another bottleneck. For these issues, Eric Feldman (Feldman, E, 2021).) has stated that Virtual Internships can solve the problem of geographical distance barrier and an imbalance between a high demand and limited internship offer from certain business areas. Rayed A. AlGhamdi (AlGhamdi, R.A, 2022) argued that government organizations need to develop virtual internship platforms for some majors. These platforms in normal conditions can act as a place where additional training resources and in emergencies, the platforms can act as a virtual space where virtual interaction with the environment outside of class can be hosted.

The interview results indicated that learners' experience in virtual interaction with business changed their perceptions about ways to use digital technology for learning and personal career development.

5. Conclusion

This article presents a particular category of online interaction focusing on establishing a tight link between learners and society/external environment. This study focuses on the interaction between learners, educational institutions and industry/business. Under the support of EMVITET? three types of virtual interactions have been deployed at two universities and one college in Vietnam. The results have shown that implementing online integration with businesses brings many benefits cost and time-saving; support learners' personalization; digital awareness change; diversification of learners' approaches.

Acknowledgments

This article was created as part of the EMVITET project. The project has been funded with support from the Erasmus+ Programme of the European Union. This publication reflects the views only of the author, and the European Commission cannot be held responsible for any use which may be made of the information contained therein.

REFERENCES

AlGhamdi, R.A. (2022), "Virtual internship during the COVID-19 pandemic: exploring IT students satisfaction", Education + Training, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/ET-12-2020-0363

Arbaugh, J. B., & Benbunan-Fich, R. (2007). The importance of participant interaction in online environments. Decision support systems, 43(3), 853-865.

Feldman, E. (2021). Virtual Internships During the COVID-19 Pandemic and Beyond. New Horizons in Adult Education and Human Resource Development, 33(2), 46.

Julien, C. (2015). Bourdieu, social capital and online interaction. Sociology, 49(2), 356-373.

Mehall, S. (2020). Purposeful Interpersonal Interaction in Online Learning: What Is It and How Is It Measured?. Online Learning, 24(1), 182-204.

Moore, M. G. (1989). Three types of interaction. The American Journal of Distance Education, 3(2), 1−6.

Vlachopoulos, D., & Makri, A. (2019). Online communication and interaction in distance higher education: A framework study of good practice. International Review of Education, 65(4), 605-632.

Woo, Y., & Reeves, T. C. (2007). Meaningful interaction in web-based learning: A social constructivist interpretation. The Internet and higher education, 10(1), 15-25.

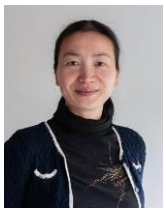
Le Phuong Truong (M'82) is presently as Head of quality assurance and a main lecturer in mechatronics and Electronics at lac Hong University. He graduated master's degree in field electrical engineering in 2010 at southern Taiwan university science and technology and PhD degree in 2016 at Dayeh University, Taiwan. His research based on renewable energy including solar energy, wind energy and education science.
In the year 2016 to present, he join the BUILT -IT projects, it public-private ecosystem is designed to produce graduates who can solve problem and engineer solution and value for Vietnam's social and economic development (https://builditvietnam.org/). Furthermore, in the year 2018, I have joined the EMVITET Project (Empowering Vietnamese VET teacher for transformation Toward Education 4.0) as a core team. I hope I and my team can transfer our knowledge of education 4.0 to LHU's teacher. Email: lephuongtruong@lhu.edu.vn and letruonglhu@gmail.com

Tran Thi Thuy as a Head of Department of Business Administration And Tourism and also Soft Skills Department at Hue Industrial College. She graduated with a master's degree in Business Administration in 2012. She is interested in entrepreneurship, education and especially soft skills. She have participated in the EMVITET – Empowering Vietnamese VET Teachers for Transformation Towards Education 4.0 project.

Nguyen Huu Chuc received the B.Sc degree in automatic control engineering from the Ho Chi Minh City University of Technology, Ho Chi Minh, Vietnam, in 2003 and the Ph.D. degree in engineering from the School of Mechanical Engineering, Sungkyunkwan University, Seoul, Korea, in 2009. From 2010 to 2013, He was an Associate Research Fellow at the ARC Centre of Excellence for Electromaterials Science and School of Mechanical, Materials and Mechatronic Engineering, University of Wollongong, Wollongong, Australia. From 2014 to now, he is Head of Department of Research Management and International Relationship, Hue Industrial College. His interests include: Robotic system, Control algorithm and Teaching Pedagogy

Do Thi My Trang (F '80) is a lecturer at Ho Chi Minh City University of Technology and Education. She got a Master of Education in 2006. She also has had a lot of experience in teaching for 20 years. Currently, she is researching students' learning approaches and self-learning skills as well. mytrang@hcmute.edu.vn

Nguyen Thi Lai Giang (F '72) is presently a main lecturer in the Graphic Arts and Media Faculty for 21 years. Besides, she also works as a Deputy of HR Department at HCM City University of Technology and Education. She graduated with a Master of Printing Management in 1995 and a Master of Education in 2005. She is interested in studying packaging design and packaging technology, and instructional design for e-learning.
giangntl@hcmute.edu.vn



Lai Jiang. (F'77) is a researcher and an educational consultant. She has delivered training and advised educational organizations and policymakers in more than 13 countries in Asia, North America, and Europe. The training topics are diverse, such as student assessment, thesis supervision, course planning and curriculum development for both face-to face and online settings. Lai currently is working at KU Leuven and the Institute of Tropical Medicine, Belgium. Her expertise and special interest is on how to design technology-supported courses/programmes that stimulate students' critical thinking and self-learning ability (ljiang@itg.be).