INNOVATIONS IN TEACHING AND LEARNING IN THE COVID-19 CRISIS

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Double-Blind Peer Review Process

Every chapter in this book was individually double-blind peer-reviewed by experts in the discipline. The editors ensured that a double-blind peer review process was done on each of the chapters.

Peer Review Declaration

The COVID-19 pandemic challenged higher education institutions (HEIs) to adopt new ways of doing things, and technology became the backbone for the teaching and learning process. These chapters in this book were written by experts in different technology fields and have researched teaching and learning in higher education institutions (HEIs). The book Innovations in Teaching and Learning in the COVID-19 Crisis is a well-thought-out academic, ready-to-use book that contains original and empirical research work from experts. The research work from experts involves literature and practical grounding that makes teaching and learning during and post COVID-19 pandemic possible through technology. Both quantitative, qualitative, and mixed research methods were explored in this book, providing the reader the opportunity to reflect and present innovative teaching and learning during and post the COVID-19 pandemic period. The book further provided strategic insight into innovative ways to handle teaching and learning during and post-COVID-19 pandemic, emphasizing technological application in the teaching and learning process.

A good number of submissions were received when the call for papers (chapters) was made. The editorial board members rigorously screened all the submitted chapters, and only the best ones were considered. The considered ones were subjected to plagiarism check using *Turnitin Plagiarism Check,* and after which a rigorous double-blind peer-review process was done by two experts in the chapter subject area. The review report was recorded and kept by the Editor-in-Chief and can be retrieved upon request in the case of inquiry. The review reports received from the reviewers were further screened for consistency before sending to the respective authors for corrections. In the end, all the chapters were subjected to language editing, and the report was preserved in possession of the Editor-in-Chief.

Every chapter's content contributes to HEIs technological teaching and learning processes during and post COVID-19 pandemic crisis. Some chapters provide empirical and practical evidence that can provide deeper insights for students, lecturers (teachers), researchers, practitioners, and other stakeholders to understand the crisis period's practical teaching and learning process. Each chapter seeks to provide answers to existing academic research questions and solutions.

Editors

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Krishnan Umachandran

Preface

In late 2019 and early 2020 till now, the education systems globally were hit with the insurgence of the COVID-19 pandemic. Many educational institutions were not adequately prepared to host online teaching and learning activities because structurally, they were ill-prepared. Therefore, educators need to innovatively come out with workable strategies to assist in the effective delivery of teaching and learning activities at all educational levels. This book scholarly explores possible innovative strategies that could be implemented to enhance teaching and learning during the sudden strike of the entire educational systems in countries following the outbreak of the COVID-19 pandemic. It discusses theoretical and practical approaches in implementing various learning management systems, digitalizing knowledge management practices, and offering psychological strategies for both students and teachers to adapt to the technological swings brought about by the COVID-19 pandemic.

Specifically, twelve (12) chapters in this book present some of the time-tested and innovative approaches used by educators globally in deploying teaching and learning amidst the COVID-19 pandemic. *Chapter One-Teaching & Learning during COVID -19* illustrates e-learning practices among large student groups with the aim of evaluating the mediating roles played by configuration, metadata and statistical research. *Chapter Two-Students Psychology towards the Technological Changes in the Education Sector* highlights the emotional conditions and possible mental health challenges associated with the sudden switch to online education, especially among students. This was seen as crucial to provide awareness of the often-ignored negative implications of technological approaches to teaching and learning and offer solutions to eradicate them. *Chapter Three-Impact of Learning Management Systems in Tourism and Hospitality Education in Bangladesh* discusses how learning management systems could be deployed in achieving better management of educational courses within the tourism and industry field of study within the Bangladesh context. *Chapter Four-Impact of digitalization in organizational learning and knowledge management* explores the existing knowledge management (KM) practices and how they can be digitized to enhance their deployment in this COVID-19 period when education has been moved online in many educational institutions. It highlights the demerits of existing knowledge management practices and highlights how digitization could be used to ameliorate the challenges to enhance better teaching and learning experience. *Chapter Five-Exploring Asynchronous and Synchronous E-Learning of Management-Business' students in The Independent-Campus Program, Indonesia* comprehensively discusses the merits and demerits in the use of various applications for embarking on distance and e-learning from the perspectives of students in Indonesia in relation to their abilities in the use and understanding of each of them in the teaching and learning processes. *Chapter Six- Industry 4.0 technologies applied in Teaching & Learning* highlights the application of industry 4.0 and how it has and would impact the changes in learning in areas of quality of thinking, usage, and innovation in global educational contexts. It discusses how Industry 4.0 technologies powered by Artificial Intelligence applications assist in building comprehensive knowledge repositories for teaching and learning in and beyond the COVID-19 period. *Chapter Seven-Learning content development using Generative Pretrained Transformer (Modelling a Decision Matrix)* describes how multi sentential texts could be generated using the generative pretrained transformer in simplified and elegant forms to enhance

language development and studies in teaching and learning within and beyond the period of COVID-19. *Chapter Eight-Applying the Monitor Model Theory on Online Language Teaching and Learning* explores the adaptation of the Krashen Monitor Model Theory in the effective teaching and learning of second language acquisition. It presents innovative ways that language instructors in educational institutions could tactfully adhere and implement the Monitor Model Theory during online language lessons to achieve excellent learning outcomes. *Chapter Nine-Fostering Learner Autonomy: Key to Advancing Learning in Post Covid-19* illustrates how the theories of learner autonomy hinged on the pioneering works of Fishbein and Aizen could assist students in gaining independence in their learning in the COVID-19 period and beyond. Also, it touches on how learners' readiness as well as instructors' constraints could be effectively addressed through the innovative enhancement of learner autonomy in the virtual and face-to-face classroom settings. *Chapter Ten-Video-based courseware for Learning Management Systems envisioned on Student Learning Outcome and non-cognitive skills* innovatively explore the use of high-quality video modules housed on learning management systems such as Moodle in deploying effective teaching and learning. The video-based courseware was developed meticulously following the Gagne model's nine steps for easy downloads by instructors and students in their teaching and learning activities. *Chapter Eleven-The role of the University in industry networking through academic spin-offs* discusses the relevance of ensuring university-industry linkages in the transfer of knowledge and technologies in improving the operational activities and service models for regional economic development, tactfully positioning both industries and universities to compete with the high demands of the global market. *Chapter Twelve-Innovation in Hospitality Management Education: empirical evidence from University of Naples* presents various innovative strategies in the teaching and learning processes in hospitality management education with the case of the University of Naples in Italy. It offers general applications for the teaching and learning of other programmes in different country contexts, especially in this COVID-19 period.

We hope that this book that offers innovative strategies in carrying out teaching and learning activities within the COVID-19 period and beyond would be a great tool to assist educators globally.

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Chapter One

Teaching and learning during COVID -19

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Abstract

Remote learning, which until now was mainly the domain of the business world, also found its way to universities and schools due to COVID-19. Supporting e-learning through interactive virtual campuses has therefore become a necessity and not just a future goal of education. Models measuring the level of acceptance, learning efficiency and academic effectiveness, but also taking into account the level of skills and social competencies, are just emerging. In this aspect, we conducted research on large student groups to evaluate the remote learning process for which configuration, metadata, and statistical research are necessary in order to evaluate a learning management system.

Keywords: Integration of information and communication technologies, Education management, Learning management, e-learning; social competences, Teaching effectiveness, Academic effectiveness

Introduction

In theory, the transition from one education system to another in the 21st century should be smooth. However, the practice, as research has shown, is different. And as European research shows: more than 85% of teachers had no previous experience with e-learning, and therefore it was difficult for them to implement in the world of e-learning platforms, video conferencing software and remote communication with students. As many as 36% of teachers also complained about students having problems with the equipment. These problems resulted not only from too few computers in the homes but also due to the fact that some of them do not support the software chosen by the teacher. Over 46% of teachers complained that distance learning is too time-consuming, which is due to, for example from the need to learn how to use the software, reply to dozens of messages from students or university administration, as well as prepare and check materials sent by students online. There were also problems related to network security (West, 2020; Santiago et al., 2020). Commonly used learning platforms also had problems with connection security. In addition, there were psychological challenges (related to the feeling of isolation) (Maddox, 2020). That is why it is worth thinking about how to improve the e-learning process. The aim of the study is to learn

and diagnose the sources of variability and the impact of distance learning during the first phase of COVID-19 on the learning outcomes of students.

E-learning efficiency and effectiveness

Teaching and learning are built to benefit communities of practice both domestic and global. The extraordinary time of the pandemic and remote learning provided an opportunity to reconsider what it means to create a community, without face-to-face engagement and experience. Technology provided us the platform of an equitable approach to focus and fostering an inclusive virtual teaching and learning experience to mitigate the likely worsening equity gaps in the education process. Features that were innovative, novel, and useful at such a period were, mediums for messaging, online project submission and response paraphernalia for providing comments, which were audio/video (A/V) facilitated. The virtual Blackboard had real-time video conferencing through virtual classrooms, file sharing, screen-sharing, online chat etc. Additional features were footage and distribution of lectures, inserting links to footages on webpages, switching easily to view various other recordings, self recording and downloading of videos for offline viewing were optional, even through mobile applications (Cabero-Almenara et al., 2018; Maddox, 2020). Appreciating that traditional bell-to-bell teaching is by no means practical in distance learning environments that may extend for now into the future; educational institutions need to maximize contact, communication, and instruction suited best for the students.

Determining developmental expectations that are obvious, dependable, and reasonable is the basis for designing a safe, encouraging educational situation where each student is capable of accomplishing and flourishing. Teaching to meet those prospects, offering suitable support, and acknowledging success are key to good student development. Through sincere, supportive interactions, and training in socially sensitive understanding, every student can get into an institution that is secure, warm, pleasant, and gratifying. Access to gadgets and the Internet only are not adequate to guarantee delivery of high-quality distance education that is obtainable and connects all students. Formulate several delivery modes for remote education, avert an over dependence on gadgets to simplify student learning, and ensure ample assistance for families to be allies in the process of student learning. The pandemic has formed an occasion for institutions to method the delivery of education in exceptional and varied ways. Virtual education has expanded in frequency for assessing the expanded use of technology, in all its structures, to efficiently convene students' requirements and prepare the staff in their curriculum delivery. The use of technology along with availability of Internet resources within a community and its access by students and staff to those resources, bridges the digital divide (VQoE, 2020). Emerging new trends in the educational process are classroom-free learning, flexibility, personalized learning, mentoring, practical application, project-based thinking, learning and working, ownership, evaluation instead of examination, and data interpretation will become a fundamental new aspect of the curricula (Mogoş et al., 2018; Maddox, 2020).

Change and support to stakeholders

Every teacher has a unique teaching style which has been learned over a period, to build rapport with the students, observing their body language in class, their interaction with classmates, but this

online teaching in a digital environment is different when seen on computer screens and new kinds of interruptions and disturbances. There were accessibility and other problems faced during this mode of education, which included availability of devices or gadgets, network signal strength, electricity availability, parents' affordability to children's educational needs, government-imposed curfew, and loss in earning ability and others. COVID-19 has necessitated shifts to online teaching and learning formats, indicating openness for positive learning outcomes, along with community acceptance and engagement. New means of information sharing and teaching have an enormous potential but are likewise troubled. Conference in person has physical, impalpable, and an experimentation value. Not all of our learners have the wish to study online, and not all have the capabilities to do so (Maddox, 2020). Like regular face -to-face teaching where the teaching content has invited students to learn new information implicitly by giving physical representation to academic concepts. In practice, this could involve taking a break in the lesson to do some stretching, building up mind maps around the classroom (Khalifa & Morgan, 2018), the digital classroom should also devise certain newer ways to connect the students. The use of the technologies for enhanced learning in education depends on factors, like management decisions, the teaching and learning material support, institutional infrastructure facilitations, easiness to adapt to the curriculum, readiness of the teachers and students to technologies, are the vital requirements from the stakeholders in order to create the environments that will be motivating and simulating an educational ecology for the future. Pandemic time infuses to educate students to think about the big picture and all social options available; while empowering the teachers to take a responsible role as experienced educators in providing the students with appropriate tools and choices which can shape them even during the period of crises (Ginsberg, 2020; West, 2020; Santiago et al., 2020).

Research material, methods and techniques

Research method means a set of theoretically justified concepts and methods covering the entire investigation procedure. The research technique, in turn, defines a set of practical activities, determined by certain procedures, allowing to obtain verifiable facts, information or opinions. The research technique in this work is to conduct an interview, distribute questionnaires. The research tool was to be used for data collection (Durkheim, 2007). A questionnaire is a method for assembling information, containing exposed information by the respondent, in a standardized format with or deprived of the existence of an enumerator (Nowak, 2007). The questionnaire research used in this research was aimed at examining a certain group of students. They were based on a specific type of interview, which is a written interview, in which the questionnaire played an important role. In this study, it was completed by the respondent himself, and the role of the researcher was to develop a questionnaire, select people, and distribute the questionnaires. The questions specified in the questionnaire were both open and closed. In order to implement the assumptions, research was carried out using an interview questionnaire (Durkheim, 2007).

This study was intended to use both teaching and technology applications in education, from a measurable method to a questionnaire on an illustration of 520 university students. The studied phenomenon was the development of remote learning during the Covid-19 pandemic in Poland at the University of Life Sciences in Lublin and its impact on the academic community, the

University's activities for development and the scope of activities undertaken in this direction. This research was supported by an appropriately prepared questionnaire, thanks to which it was possible to study this phenomenon and its impact on many issues. The selection of respondents was random. The research was conducted in the period from March 20 to May 30, 2020 in the fields of: technical, natural and management.

The study verified the following, zero research hypotheses:

Distance learning methods are essential for learning outcomes against the null hypothesis that remote teaching does not affect the learning outcomes of students. The questions included in the survey mainly concerned the assessment of distance learning and its impact on the learning outcomes, including:

- developing knowledge and skills,
- development of social competences,
- factors favoring the development of distance learning,
- the impact of distance learning on the personal development of students,
- barriers limiting this development,
- actions taken by the University's administrative authorities to develop distance learning.

Descriptive statistics were used as the first and basic step in analyzing the collected data. It was used to assess the state of education, create the possibility of better use of the existing didactic and cultural base and identify opportunities and possibilities of using the natural potential of the University, thanks to marketing and other activities.

Results

Importance of distance learning for the academic community of the university

The age structure of the surveyed students was not very diverse. People aged 19-24 took the greatest part in the research, which constituted 92% of all respondents; 8% of the respondents are over 24 years old.

Shaping students' awareness was of the greatest importance for the development of the academic community (29%). Equally important for the development of the academic community, according to the respondents, was the need to increase the quality of life in society (26%) and the preservation of natural resources (25%), which will remain for future generations and others - 20% (Fig.1).

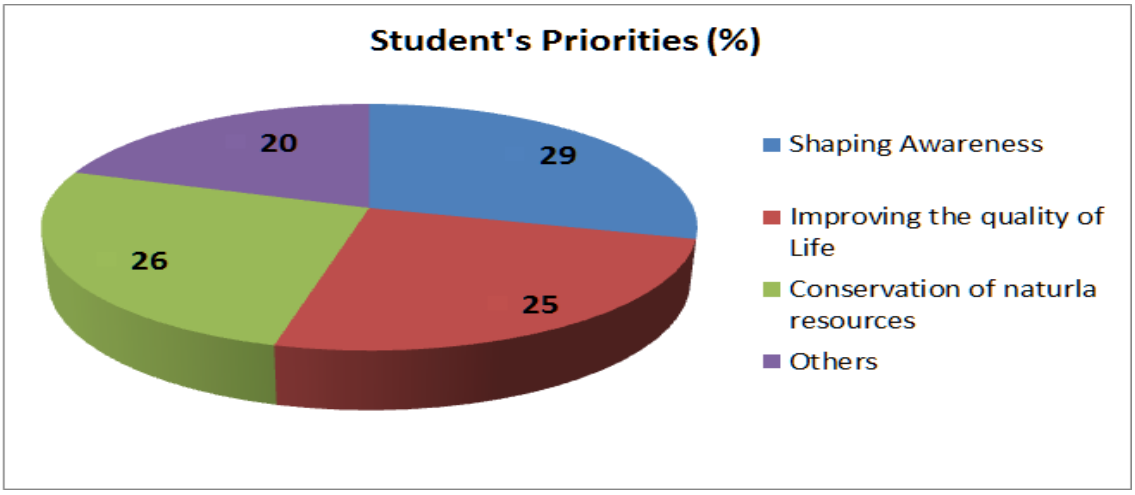

Figure 1: Students' priorities

Source: Authors' Construct

Shaping society for the sake of the environment accounted for 33%, and the new pattern of spending free time - 51% of all respondents' answers. Moreover, the respondents believe that the improvement of the education system will bring the desired increase in social capital (16%) (Fig. 2). The influence of the development of sustainable education systems on the academic environment is, according to the respondents, a positive phenomenon.

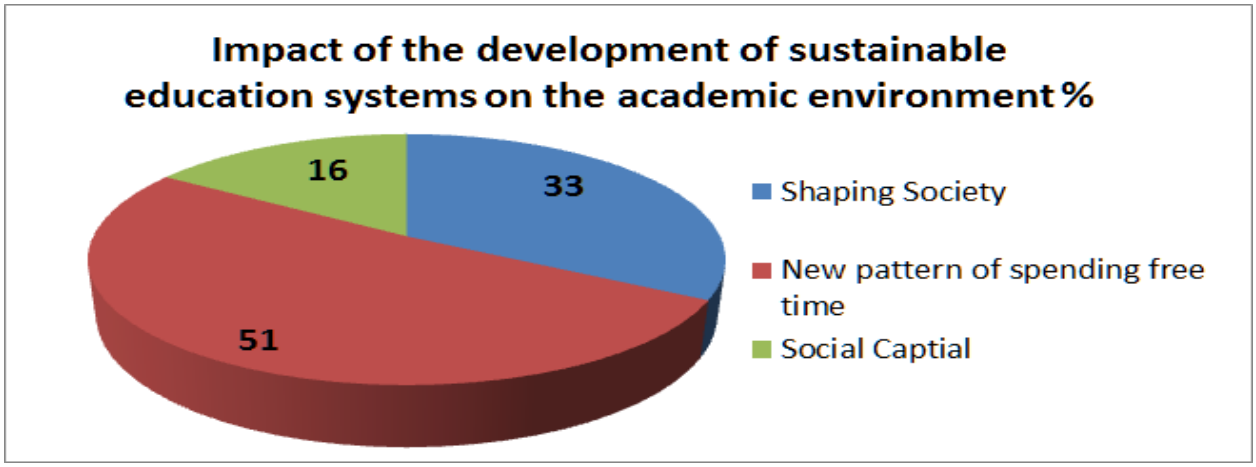

Figure 2: Impact of the development of sustainable education systems on the academic environment

Source: Own research

Sustainable actions for development of the academic community

A number of activities were undertaken at the University for the sustainable development of the academic community, but the most frequently observed were training of students and employees on the operation and use of e-learning platforms (36%). Classes were held regularly and at the appointed time on legal platforms recommended by the university authorities (30%). There were also observed savings in the management of office materials (15%) and pro-ecological waste

management (13%). Training aimed at shaping ecological attitudes and behaviors among students were also undertaken, according to 6% of the respondents (Fig. 3).

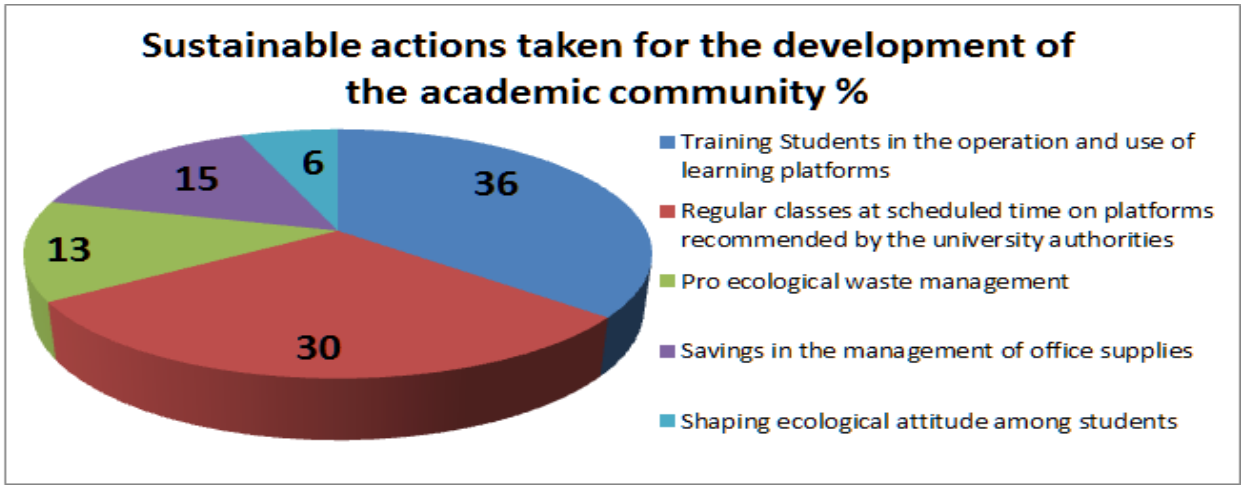

Figure. 3: Sustainable actions taken for the development of the academic community

Source: Authors' Construct

Opportunities and barriers impacting sustainable development in teaching technologies

According to 47% of respondents, the chances of integrating teaching technology into sustainable development are high. For 33%, these chances are small, and 20% of respondents find it difficult to say anything about it (Figure 4).

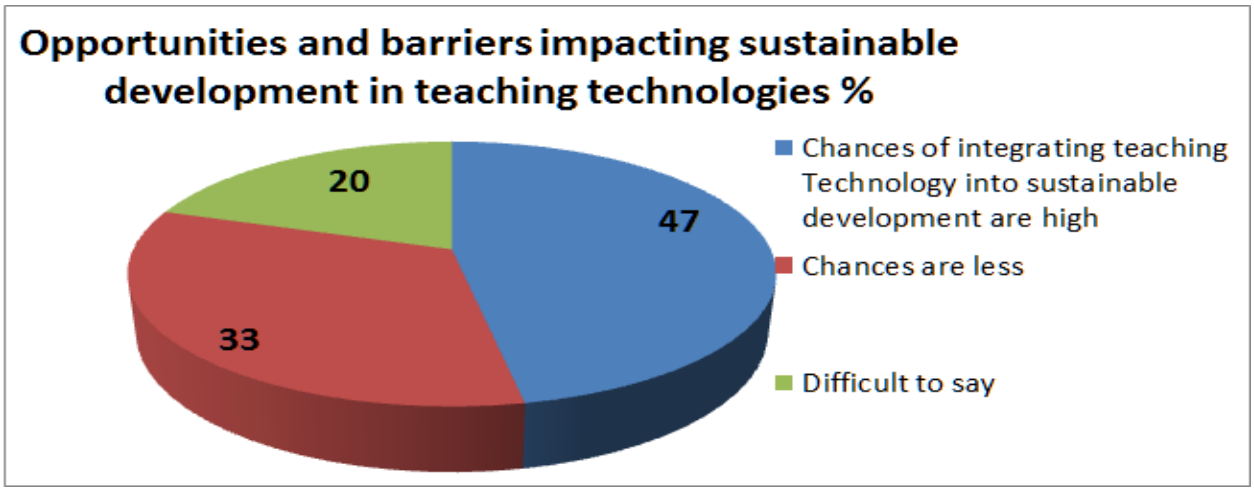

Figure 4: Opportunities and barriers impacting sustainable development in teaching technologies

Source: Authors' Construct

One of the major barriers limiting the development of advanced teaching technologies is, according to 33% of respondents, the poor general condition of the IT infrastructure. In the opinion of 22% of respondents, little awareness of this subject is also an obstacle in overcoming barriers to the development of teaching technology. According to 28% of respondents, in overcoming these

barriers training in new, advanced technologies is necessary, as the small capital of an educated community is a serious barrier. According to 17% of respondents, the level of social communication should also be improved, because the poor condition of interpersonal relations significantly reduces the development of advanced technologies (Figure 5).

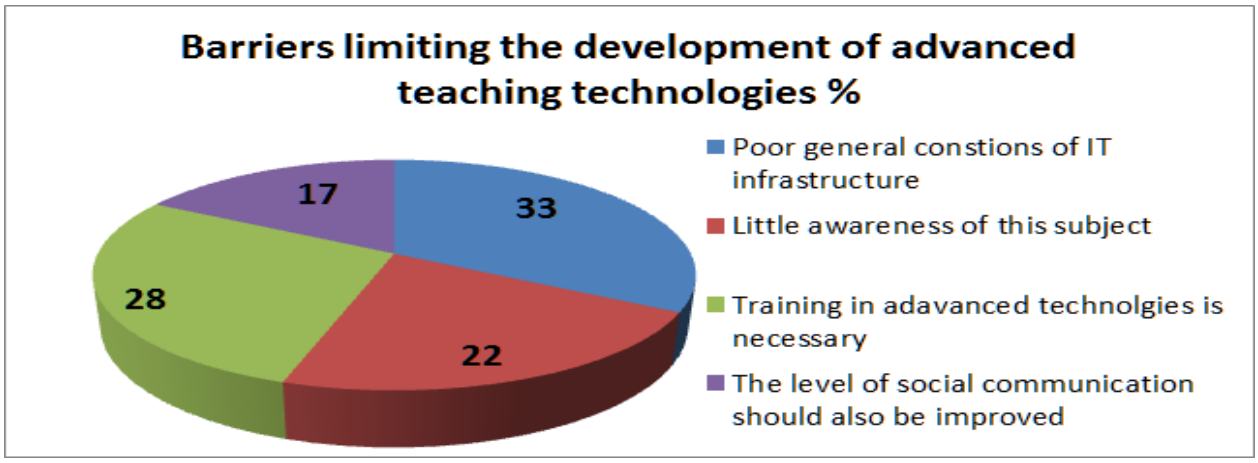

Figure 5: Barriers limiting the development of advanced teaching technologies

Source: Authors' Construct

Knowledge of security systems at the university

One of the questions in the questionnaire - the survey was to determine whether, according to the respondents, the university where they study on a daily basis has a security and crisis management system implemented. As many as 47% of the respondents stated that their university rather has such a system, and 31% of the respondents decided that their university did not have the above-mentioned system. Only 2% of respondents believed that it had no system in place, and 20% did not express an opinion on this subject (Figure 6).

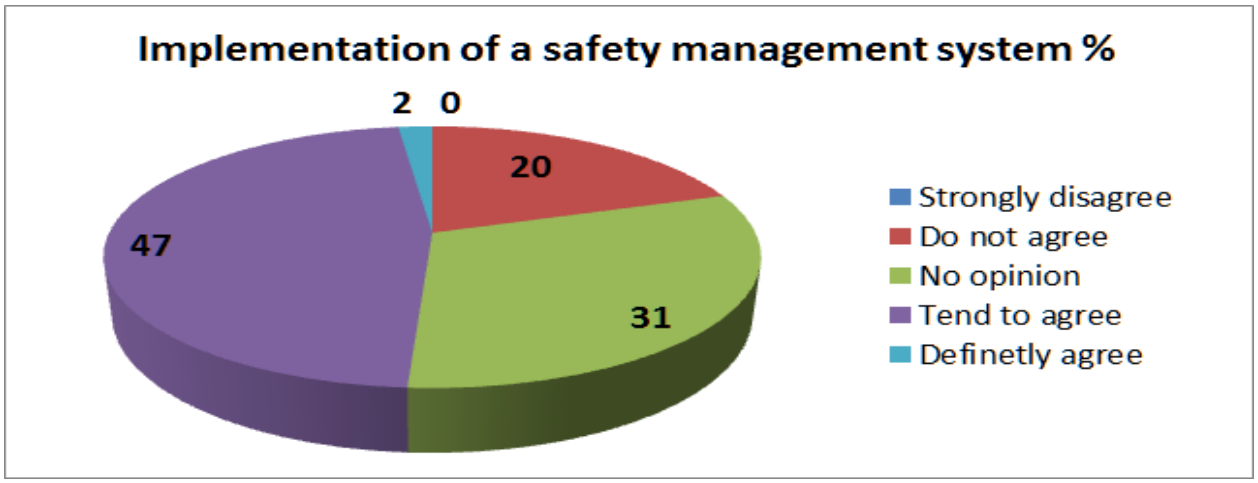

Figure 6: Implementation of a safety management system (%)

Source: Authors' Construct

This means that the vast majority of students have adequate knowledge of the University's security. Hazard Analysis and Critical Control Points allows you to ensure safety during threats caused by suddenly occurring threat factors. Not being aware of the existence of this system may lead to failure to comply with the relevant requirements.

Descriptive statistics of data

For the interpretation of empirical data, analytical methods were used, such as: descriptive and quantitative, based on models and statistical measures. Within these methods, the following measures of central tendencies such as median, and descriptive statistics such as kurtosis, skewness and coefficient of variation were used

Table 1: Descriptive statistics of independent variables

Parameters	x1	x2	x3	x4	x5	x6	x7
Median	3,0	5,0	7,0	8,0	5,0	6,0	8,0
Kurtosis	-0,1	2,1	-0,5	-1,8	-0,2	-0,8	0,1
Skewness	1,2	1,6	1,1	0,8	1,1	1,0	1,2
Range	58,0	62,0	54,0	52,0	58,0	55,0	56,0
Minimum	2,0	2,0	2,0	1,0	1,0	1,0	1,0
Maximum	60,0	64,0	56,0	53,0	59,0	56,0	57,0
coefficient of variation (V)	130,0	132,5	119,4	118,4	127,5	120,9	119,5

Source: Field survey.

Legend: 1 - developing knowledge and skills, 2 - development of social competences, 3- factors favouring the development of distance learning, 4 - the impact of distance learning on the personal development of students, 5 - barriers limiting the personal development of students, 6 - activities undertaken by the University's administrative authorities for the development of distance learning; 7 - Implementation of a safety management system

The average of the obtained results was at the level of 20.0. The numerical value of the median indicates that more than half of the results obtained are below the median value. Kurtosis is a degree of the absorption of results. On its basis, it is concluded that the obtained results are varied. Most of the features have values below 0, so there is a poor absorption of results around the mean. Skewness is a measure of asymmetry of the results. The skewness coefficient was close to "0" for the following variables: factors favoring the development of distance learning, the impact of

distance learning on the personal development of students, barriers limiting the personal development of students, activities undertaken by the University's administrative authorities for the development of distance learning; implementation of a safety management system. Among the other features, the skewness was> 1, which proves the right-hand asymmetry of the distribution. Positive skewness describes a distribution with asymmetry extending towards the positive values. Minimum and maximum are the elements that define the data range of each feature. From the formula: V = S / x * 100, in which S means standard deviation, x is arithmetic mean, and the coefficient of variation was determined. The impact of distance learning on the personal development of students turned out to be the least variable. The greatest variability was noted in the development of social competences (Table 1).

Table 2: Pearson's simple correlation coefficients

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*
x1	1,00						
x2	0,99	1,00					
x3	1,00	0,98	1,00				
x4	0,98	0,96	0,99	1,00			
x5	1,00	0,99	1,00	0,99	1,00		
x6	1,00	0,98	1,00	0,99	1,00	1,00	
x7	0,99	0,99	1,00	0,99	1,00	1,00	1,00

Source: Field survey; *designations as in table 1.

Pearson's simple correlation coefficients were determined to determine the relationship between random variables. The strongest positive correlation was found between x5, x6 and x7, and the weakest correlation was found between x4 and x2. Almost all of the studied features turned out to be strongly positively correlated with each other (Table 2). The use of statistical methods allowed us to determine the characteristics of the student population, the coefficients of variation, and

allowed us to assess reliability, accuracy and correlations, using and integrating also data used by other researchers.

Discussion

In the age of COVID-19 University of HE institutions around the world have recognized the necessity to assume and fit in ICT to encounter the occasions and contests of invention in learning and teaching. As a result, this situation has led to the employment of virtual education settings, which functions to support supple and active education within a constructivist method. Virtual learning is fetching one of the greatest recurrently applied training means both in e-learning application as a solo stream; and in combination with face-to-face (F-F) learning and e-learning in higher education. Though, it is progressively accomplishing other levels of education (Luo et al. 2017; Molla & Cuthbert 2019) due to its flexible adaptability, interactive, multimedia and decentralized learning. The technology is reinforced by Learning Management Systems (LMS) (Pérez et al. 2008, 2016; Rienties et al. 2014; Moldovan, 2019), and the 'Moodle' system is one of the most used platforms in the world (Kerimbayev et al., 2017) and has a number advantages such as: no modification in each operation is a PHP compatible system. It acts on a set of components and permits modification by adding or deleting items at various stages. According to Inzunz et al. (2014), Horvat et al. (2014) and Priyana (2020) on this web-platform, tutors and learners have a high level of technological fulfilment and reception, and tutors incline to remark that its use improves instructive practice and represents immeasurable benefits (Kerimbayev et al. 2017; Jenaro et al., 2018; Sari & Ashadi, 2020). However, other studies have shown that there is great acceptance of use to the LMS Platform, but there is no general evidence that the use of a particular platform causes changes in pedagogical practice (Brown, 2008; Kinchin, 2012), where tutors pass on knowledge rather than develop it, or create new knowledge (Fariña et al. 2013; Santiago et al. 2020). It stimulates the debate in universities about the implementation of educational systems and educational practices, and these do not change so quickly.

In the wake of Industry 4.0, VET practitioners and academics are called upon to sustain and promote future curricula not only for students but also for employees. In this aspect, the research and the analysis of the literature make it possible to find a framework for classifying learning outcomes, skills and social competencies according to various sectors of science. In fact, by answering the research questions, our aim was to propose a comprehensive view on this aspect to (a) shed light on competencies for Industry 4.0 and (b) propose a possible framework for training programs (Symon & Whiting, 2019, Tommasi et al. 2020). As you can see, combining competencies requires particular attention to job sectors and role aspects. In this spirit, practitioners and researchers must understand the characteristics in order to tailor training programs to the different needs of students, staff, and organizations (Moldovan 2019, Molla & Cuthbert 2019, Umachandran & Della Corte, 2019).

Competencies support the high demand for soft skills and interpersonal competencies. Among all the reviewed points, there is a common understanding of the need to ensure sufficient support for interpersonal relations and internal aspects, such as the ability to adapt to the ongoing changes and deal with new technologies. Finally, the current literature review on the subject has some limitations. Although the method used is used in the literature, only a few remarks have been

identified and analyzed, and there is other relevant information that influences the characteristics tested. Larger studies could try to explore the development of more inclusive criteria as well as include an empirical examination of the evidence presented in the literature review.

Conclusion

Everyone is going through some type of home teaching and learning now because of the pandemic; hence it is important to note that it is the epitome of a critical educational style now. Engage openly with the students and open the space for them to share. Please offer them multiple avenues to contact you whenever they are struck with any learning difficulty, struggling so they can do so privately or in group discussion. These options will make the virtual teaching and learning scenario a space for safety, and accommodative. COVID-19 pandemic gives a chance for students to have a sense of purpose, and to use classroom conversations for trying to understand the options that could lead to the present situation and the course corrections that could be made to address them. As responsible citizens they can be encouraged to voice their views on the critical and continuing decisions, wherein they can commit themselves for guided actions, affecting the future. Widespread digitalisation in education can mitigate the learning loss caused by school-closures. However, in reality there are still concerns of economic impact affecting the students with stress, who live in under privileged home-learning environments devoid of relevant infrastructure such as gadgets and internet connection.

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Chapter Two

Fostering learner autonomy: Key to advancing learning in post COVID-19

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Abstract

The pandemic has made us rethink how teaching should be carried out to ensure effective learning takes place despite all the constraints faced. To do this in ways that will be most supportive of the learner's readiness to learn and the teacher's capacity to understand and capitalize on that readiness, this paper proposes fostering learner autonomy as the key to advancing learning in post Covid-19. Theories related to the premises of learner autonomy were presented based on Fishbein and Ajzen's work on the relationship between beliefs, attitudes, behavioral intentions, and behavior and Bandura's self-efficacy. Three models which emphasize on understanding the learner's learning readiness and teacher's instructional constraint form the basis for addressing the issues faced. Last but not least, strategies for learner autonomy enhancement in the classroom were provided.

Keywords: Learner autonomy, Learning readiness, Behavioural intentions, Instructional constraints

Introduction

The pandemic has presented us opportunities to step away from the historically honored models of "teaching" that expect "teachers" to make detailed plans for the information, processes, and progressions by which students are expected to learn. The system of supervision and accountability requires that teachers develop and present such plans even before they meet the students they will be teaching. There are many problems with the effectiveness of such models, but the one that has always bothered us most is the practice of "grading" learner achievement in terms of the individual's success in meeting outcome goals as if it were the student's fault

for succeeding or failing to meet the curricular standards that were set without appropriate assessments of the readiness of the learners to undertake the learning prescribed, either in terms of their entry skill levels or the learning goals they may bring to the experience.

Teachers, from preschool to advanced graduate studies, usually make an effort to "motivate" their students to engage the topic at hand using the "carrot/stick" method … learn this and something I value will be your reward or don't meet the standard the system and I set and you will be judged to be a failure for not sharing our excitement regarding the topic at hand. There is a long history of students accepting the challenge to learn on the teacher's terms, feeling "smart" because they got a good grade, or worse, laughing behind the teacher's back about how little of value they learned while achieving the status of "good student." There is an even longer history of students who are judged to be unable to learn simply because their teacher never asked them if they have questions or interests related, no matter how remotely, to the general reasons the topic at hand has been included in the curriculum. The "intellectual death toll" inflicted by this condition is documented by failures on national examinations and voluntary dropout rates worldwide across cultures, economic and political systems, and geographical conditions.

Some have urged educators, and those who influence the formal systems of education, to take a more "student-centered" approach. To be sure, society needs assurances that its investment in education provides a "reasonable return on investment." But, throughout the history of humankind, the ratio of "successful learners" to "failed learners" has provided overwhelming evidence that our approach (CG1) has been unsuccessful. But that light at the end of the tunnel, provided by the constraints of the COVID-19 pandemic, may not just be an oncoming train. To do this in ways that will be most supportive of the learner's readiness to learn and the teacher's capacity to understand and capitalize on that readiness AND for the teacher to survive the longstanding practices of administrators, parents, employers as well as the learners themselves who expect the teacher to have "instructional plans and practices" that fit all their students as if one size fits all. The entire population of those who participate in any dimension of the learning enterprise will need to understand and implement the principles of learner autonomy.

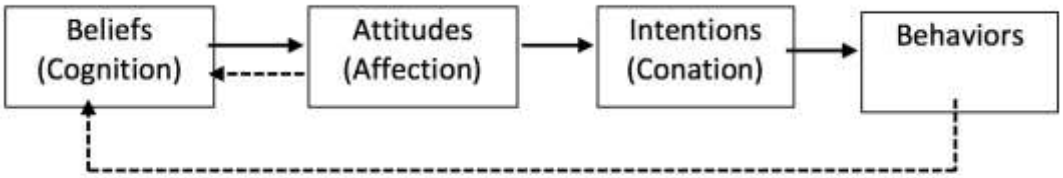
Understanding learner autonomy

So, what is learner autonomy? The concept of learner autonomy, as it is presented here, has deep historical roots. Over the years, several influential learning theorists used evolving terms to describe fundamental aspects of the phenomenon. For example, Margaret Fuller, the literary editor for the New York Herald Tribune in the 1940s, encouraged "self-cultivation" by means of reading. Malcolm Knowles further refined essential aspects of adult learning when, in 1967, he differentiated "andragogy" (learning in adulthood) from "pedagogy," which had previously been applied to learning at all levels of maturity. Other important understandings were contributed by Albert Bandura, who in 1977, described the social cognitive influences of self-efficacy and behavioural change as they relate to learning, and Lucy Guglielmino, who in that same year, produce a survey instrument that has been widely utilized to assess the self-directed learning readiness of prospective learners. The term, "autodidaxcy" had been in use for many

years before Alan Tough operationalized the concept in a way that made it possible to study the phenomenon systematically. His insights were derived from his studies of adult learning projects which he defined as "a major, highly deliberate effort to gain certain knowledge of skill (or to change in some other way.)" (Tough, 1979: 1).

In 1981, George Spear and Donald Mocker provided a very useful model for understanding the ways in which self-directed learning is influenced by environmental determinants. In 1991, Gary Confessore produced a ten-year follow-up study of talented adolescents that revealed relationships among desire, resourcefulness, initiative and persistence as they are associated with learner autonomy in adulthood. His studies of talented adolescents led directly to the development of the Learner Profile Questionnaire (Confessore & Confessore, 1994) and to its expansion and refinement in the Learner Autonomy Profile. Taken together, and elaborated in the work of many more, these works have led directly to the construct of learner autonomy as it is presented here as a matter of connotation or the learner's behavioural intentions. Indeed, Ponton (1999) provides a model of learner autonomy derived from a general behavioural model that posits an interactive relationship of beliefs (cognition), attitudes (affection), intentions conation) and behaviors originally described by Fishbein and Ajzen in 1975. See Figure 1.

Figure 1: A Simple Behavioral Model



Within this model, beliefs represent the cognitive process of assigning attributes to objects where "the terms 'object' and 'attribute' are used in a generic sense, and they refer to any discriminable aspect of the individual's world" (Fishbein & Ajzen, 1975: 12). They further assert, "the object of a belief may be a person, a group of people, an institution, a behavior, a policy, an event, etc., and the associated attribute may be any object, trait, property, quality, characteristic, outcome, or event" (Fishbein & Ajzen, 1975: 12). Building upon Long's (1989a, 1998) work, Confessore (1992), Carr (1999), Ponton (1999), Meyer (2000) and Derrick (2001) assert that autonomous learning focuses on the psychological and cognitive conditions necessary for understanding the learner who continues to engage in learning throughout life. Further, Confessore (1992) contends that in order for a learner to engage in autonomous learning, the learner must exhibit desire, initiative, resourcefulness and persistence in learning. These constructs are described as conative factors because each is predicated on an individual's internal motivation to engage in learning activity. It is a balance of these connotative behaviors that leads to the development of desire, which then leads to the self-perception of being a lifelong learner and, as a consequence of this development, persists in educational pursuits (Confessore & Confessore, 1994). Confessore and Park (2004) further emphasized that "learner autonomy focuses on understanding the capacity to productively participate in learning experiences. This capacity consists of a range of functional learner autonomy that is bounded

by two relatively dysfunctional learner states, which are dysfunctional learner dependence and dysfunctional learner independence. Confessore and Park (2004: 41), postulate that functional learner autonomy is a range of ability and willingness to participate in selecting and shaping learning experiences in which the learner may function independently or in concert with others. Besides, the degree to which an individual is engaged in functional learner autonomy is expressed in the extent that the learner optimizes the learning process by making efficient and appropriate use of their personal resources and the resources of others".

Merriam and Caffarella (1999) assert that the situational variables of technical skill set, experience with the subject at hand, determination to learn, and degree of self-efficacy regarding the learning event, are the greatest influencers as to whether individuals exhibit autonomous behaviors. However, it is important to heed Candy's (1991) admonishment that skill set, experience, determination to learn, self-efficacy, and other related influencers are likely to vary from one setting to another, educators should not assume that a learner's success in one learning event, either in a formal instructional setting or other settings, reliably predicts success in a different setting. Four major variables appear to have the most influence on whether individual adult learners exhibit autonomous behaviour in learning situations; their technical skills related to the learning process, their familiarity with the subject-matter, their sense of personal competence as learners and their commitment to learning at this point in time (Merriam & Caffarella, 1999). Since this combination will vary from situation to situation, a learner's autonomy is also likely to vary from one context to another, and educators must avoid the automatic assumption that simply because a person has successfully learned something in the past, either in an instructional setting or outside it, he or she will be able to succeed in a new area (Candy, 1991).

The pandemic and current learning

The pandemic has changed the way we learn. The COVID-19 has forced universities and colleges to close doors to campuses across the world. In addition, institutions have switched classes to online learning. As a result, education has changed dramatically, e-learning has increased dramatically and the learning setting is much more likely to involve elements of remote and or asynchronous learning than was traditional prior to the onset of the pandemic.

Online learning faces many challenges. Some students without reliable Internet access and/or technology, struggle to participate in digital learning; this gap is seen across countries and between income brackets within countries. According to OECD 2018 data, 95% of students in Switzerland, Norway, and Austria have a computer to use for their schoolwork, only 34% in Indonesia do. In the US, there is a significant gap between those from privileged and disadvantaged backgrounds. It was reported that virtually all 15-year-olds from a privileged background said they had a computer to work on, nearly 25% of those from disadvantaged backgrounds did not. However, with the current trend of Covid-19 cases still surging, this pandemic will definitely widen the digital gap. In terms of learning effectiveness, some research has shown some positive impact with online learning. Research shows that on average, students retain 25-60% more material when learning online compared to only 8-10% in a

classroom. Students are found to be able to learn faster online as e-learning needs only 40-60% less time to learn than in a traditional classroom setting. In addition, there are many advantages via e-learning as students can learn at their own pace, going back and re-reading, skipping, or accelerating through concepts as they choose (World Economic Forum, 2020).

Learner readiness and instructional constraints

Confessore (1992) asserts that success in learning is ultimately dependent upon the individual's psycho-social characteristics of agency and self-regulation, which contribute to behavioural intentions to learn. He also notes, as did Merriam and Caffarella (1999), that differences in experience, skills and commitment influence how any given individual approaches learning, especially as the circumstances of the learning event vary. Ponton, Carr and Derrick (2004: 4) reaffirm that "understanding an individual's strength and weaknesses with regard to learner autonomy will provide insight into learners who are able to continue to learn throughout the lifespan with or without the presence of a teacher". In addition, adult learners come from different backgrounds, skills and experiences and thus, may contribute to the different approaches and attitudes towards learning. The learners' diversified background in terms of their learning styles, perception towards learning environment, computer technology experiences and English language proficiency may influence their learner autonomy or intentions to participate actively and productively in a learning process (Ng & Confessore, 2011).

Learning is a life-long process. The COVID-19 has changed the way education is being perceived. As remote and asynchronous learning has become a more substantial portion of many formal learning programs, the need for educators to facilitate their students' capacity for autonomous learning. Learner autonomy, however, needs to be understood as a psycho-social construct as differentiated from autonomous learning, which is a pattern of observable behaviors. It is often confused with encouraging self-instruction, and this could certainly be one of the consequences, but the idea goes far beyond that: by taking control of their learning, we want students to become more actively and deeply involved, try more difficult tasks, have a higher achievement, and know how to learn so that they can learn more efficiently. What's more, it should help to boost their capacity to learn as they gain their own voice. There are some interesting and effective models suggested in the literature that educators may wish to consider as they strive to understand the learners' autonomy and address the issues faced by them. We have chosen three such models to present here.

Model 1: Houle (1961), understanding the reasons individuals have for engaging in learning activities

Houle (1961: 19-29) describes three categories of learner orientation that accounted for most adult learners in his study. These are: (1) activity-oriented learning -- "The activity-oriented take part in learning primarily for reasons unrelated to the purposes or content of the activities in which they engage" (19). He asserts, the person "who takes courses simply for the credits themselves or for the diplomas, certificates, or degrees which may eventually be won by piling up the proper number of credits," is an activity-oriented learner (21). (2) Goal-oriented learners

– He explains, "… are the easiest to understand, chiefly because their views accord so well with the usual beliefs about education. Knowledge is to be put to use, and, if it is not, why bother to pursue it?" (16.) "The continuing education of the goal-oriented is in episodes, each of which begins with the realization of a need or the identification of an interest" (18). "The need or interest appears and they satisfy it by taking a course, or joining a group, or reading a book, or going on a trip" (18). (3) Learning-oriented adults are those who are involved for the sheer pleasure of learning something new. What they do has continuity, a flow, and a spread that establish the basic nature of their participation in continuing education. For the most part, "they are avid readers and have been since childhood: they join groups and classes and organizations for educational reasons; they select the serious programs on television and radio" (24). Houle found this group to be the most homogeneous. "They have goals; they enjoy participation, and they like to learn. Their differences are matters of emphasis" (29).

Confessore and Park (2000) found that Houle's learning-orientation and goal-orientation categories appeared to include very homogeneous constellations of reasons for engaging in learning. However, the constellation of reasons for engaging in learning seemed not to account for two important considerations. The concluded that individuals Houle included in the activity-orientation categories were better understood as learners when they were distributed into three categories: social-orientation, required orientation and goal orientation. Houle had labelled those "who take courses simply for the credits themselves or for the diplomas, certificates, or degrees which may eventually be won by piling up the proper number of credits." However, based upon interviews conducted with subjects in their study, Confessore and Park (2000) concluded that such individuals were better understood to be goal-oriented learners, since their reasons for engaging in the learning activity at hand was to achieve "goals" related to the benefits of "certifications."

Their study also revealed that those who reported that they were engaging in selected learning activities for "social" reasons such as seeking opportunities to spend time in learning activity where the social interaction was more important than the subject at hand formed a distinct sub-group of Houle's activity-oriented learners. Hence, they created a social-orientation category. Further, they found a relatively large number of individuals who reported that the main, if not only, reason they were engaged in the learning activity they described was that they were "required" by their employer to do so. Although it is clear that such learners could be placed in the goal-orientation category given that they had a "goal" of keeping the job, there is a clear sub-group who asserted they were just meeting the requirements established by some authority figure. Hence, they created a "required-orientation" category. Figure 2 presents the flow of changes to Houle's typology proposed by Confessore and Park (2000).

Figure 2: Proposed changes to Houle's typology

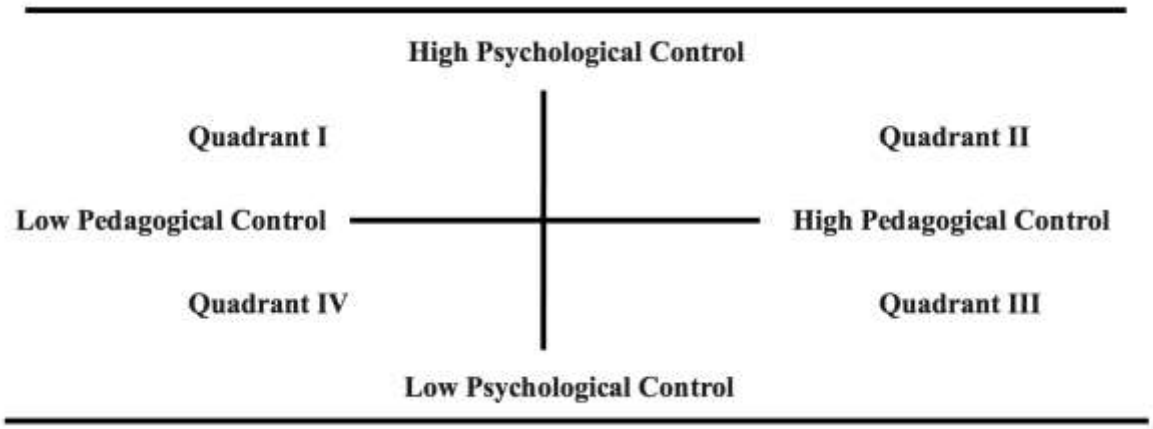
<table>
<tr><td colspan="4">Houle's Typology</td></tr>
<tr><td>Learning-Oriented</td><td colspan="2">Activity-Oriented</td><td>Goal-Oriented</td></tr>
<tr><td></td><td colspan="2"></td><td></td></tr>
<tr><td>Learning-Oriented</td><td>Social-Oriented</td><td>Required-Response</td><td>Goal-Oriented</td></tr>
<tr><td colspan="4">Confessore & Park Typology</td></tr>
</table>

The cells in this figure are not intended to be proportional. Neither Houle nor Confessore and Park assert that the various orientations cannot overlap.

Model 2: Long (1989), understanding the relationships of instructional constraints and learner readiness

Among the many important constraints experienced in formal, corporate or institutional instructional settings is the necessity to ensure that instructional goals and activities contribute to achievement of the sponsoring agencies' reasons for providing the learning experience. Yet, it is clear that not all learners thrive in the same instructional environment and responsible educators seek to accommodate learner differences while striving to conform to agreed upon standards of instructional outcomes. Long (1989) and Grow (1991) provide helpful insights into these concerns. Long (1989) asserted that the extent to which the psychological and pedagogical control levels of the teacher and the learner are complimentary or at odds has a substantial effect on the efficacy of the learning outcomes of any given interaction. He expressed his impressions in terms of the learner's level of "psychological control" and the teachers' level of "pedagogical control" using a "quadrant model" which is replicated here in Figure 3.

Figure 3: Long's representation of teacher/student relationships



Quadrant I represents a relationship in which the learner needs a relatively high level of direction or support in order to have a successful learning experience and the teacher has not prepared or does not feel the learning event should include a high level of support for the learner. In such cases, the learner is less likely to have a successful learning experience. Quadrant II represents a relationship in which the learner needs a relatively high level of direction or support in order to have a successful learning experience and the teacher is prepared to provide a high level of support for the learner. In such cases, the learner is more likely to have a successful learning experience. Quadrant III represents a relationship in which the learner needs a relatively low level of direction or support in order to have a successful learning experience, yet the teacher feels the learning event should include a high level of support for the learner. If the student welcomes the higher level of support than is needed, this need not be a problem. However, if the student feels the teacher is exercising unnecessary control over the student's learning experience, this could diminish the success of the learning experience. Quadrant IV represents a relationship in which the learner needs a relatively low level of direction or support in order to have a successful learning experience and the teacher feels the learning event need not include a high level of support for the learner. If the student welcomes the lower level of support as providing opportunities to exercise higher degrees of learner autonomy, this may contribute to greater satisfaction for both the teacher and the student. The message to be taken from understanding Long's model is that both the teacher and the student will be in a better position to produce a successful learning experience if they engage in open frank consideration of the degree to which their separate and joint expectations are accommodated in the course of the learning experience.

Model 3: Grow (1991), understanding the relationships of instructional constraints and learner readiness

Grow (1991) went a step further in providing guidance as to how to minimize mismatches between the control levels of the learner and the teacher. He provided a very helpful table to convey his "staged self-directed learning model, which is presented here as Table 1.

Table 1: Grow's Staged self-directed learning model

	Student	Teacher	Examples
Stage 1	Dependent	Authority-Coach	Coaching with immediate feedback. Drill. Informational lecture. Overcoming deficiencies and resistance.
Stage 2	Interested	Motivator-Guide	Inspiring lecture plus guided discussion. Goal-setting and learning strategies.
Stage 3	Involved	Facilitator	Discussion facilitated by a teacher who participates as an equal. Seminar. Group projects.
Stage 4	Self-Directed	Consultant-Delegator	Internship, dissertation, individual work or self-directed study group.

Replicated from the table presented in Grow (1991: 129).

Every teacher must believe and understand that all their learners have the capacity to learn and the capacity to be autonomous in their learning. The above three models are essential to help teachers to understand the reasons learners have for engaging in learning activities and the important relationship of instructional constraints and learner readiness to ensure meaningful teaching and learning. These understandings are even more essential in this period of uncertainty as learners need more guidance and motivation than ever. Besides the models stated, we also recommend some strategies to encourage learner autonomy in our classrooms.

Fostering Learner Autonomy Strategies

Activating students' prior knowledge

All teachers and learners must account for the fact that readiness for new learning depends on the specific conditions of the new learning event and that it proceeds from the learner's established skill set, prior experience, self-efficacy, and commitment to learn the material at hand. These conditions directly influence the learner's beliefs, attitudes and behavioural intentions to learn in the present event. Therefore, instruction for students must be carefully designed and planned with specific knowledge of the learner's prior related experience and degree of interest in the topic at hand so that students are able to access the content without readiness becoming a barrier. Activating prior knowledge means that teachers need to take into consideration what knowledge and skills learners bring to the task. Teachers should understand what students know before they plan their lessons. This understanding is essential to help

teachers to choose contexts and topics that they find meaningful. Choosing engaging contexts and topics based on students' prior knowledge will boost meaningful interaction and encourage curiosity in learning.

Creating flexible learning

Flexible learning will change the task and techniques of class instruction, and interactivity is the key to the transition. Tasks are designed to encourage students to make connections, think critically and explore different possibilities. Instructors are encouraged to use open-ended questions to encourage participation while accepting all sorts of answers equally. Learners have to become actively involved in the educational experience. No matter what interactive media (PC's, CD-ROMs, the Internet, audio/video-conferencing, email, web-chat) are utilized, it is imperative that the instructor inspires participation and requires interaction. Frequent questioning, probing and checks of understanding should be built-in throughout the course. Formal and informal feedback and positive reinforcement should occur at regular intervals and critical junctures throughout the course. Dialog and debate among the students and with the instructor should be encouraged. As noted by researchers and practitioners alike, the "key to successful (flexible) learning lies in changing the way courses are taught. Flexible tasks in engaging contexts built upon their interests and knowledge are the first steps in making students active members in the learning process. Indeed, learner-centred interactive strategies provide extra motivation as they give students some control over the learning process.

Learning collaboratively

Learning through collaboration promotes active learning, student empowerment, and cognitive enhancement as students collaboratively construct knowledge. According to Dillenbourg (1999), learners acquire skills of negotiating, analysing and synthesizing solutions to problems constructively through collaborative learning. Little (1995) argues that collaboration is indispensable to the proliferation of learner autonomy as a psychological capacity. Collaborative learning does not necessarily refer to learning more but to enhancing the strategies of learning and assisting learners to become more self-reliant, creative and autonomous. In the course of collaborative learner autonomy, learners participate in social interactions and interdependently negotiate and perform tasks with their peers.

Learning collaboratively

Learning to take risks

The pandemic has oriented learning towards the future with uncertainty and insecurity. Educators and learners are being confronted with the dilemma of how effective learning should take place. Whether we like it or not we are taking blind risks with the learning processes we design for our students. The pandemic has presented us with the necessity to expand opportunities for students to learn in ways that rely less on the traditional, face-to-face instructional models that have been the historical mainstay of formal education. We must take risks with new approaches and we must take care to carefully evaluate the efficacy of the resultant new mix of instructional models to be sure we are improving, or at least sustaining,

the quality of the learning opportunities we create. It is critical, at times like these, for teachers and students alike to embrace risk-taking, balanced with careful assessment of outcomes, as we seek to optimize learning in the pandemic and post pandemic world. Simply put, we cannot meet the changed conditions of our world without changing ourselves. Thus, it is paramount to encourage teachers and learners to become risk-takers who are ready to objectively separate their successes from their failures, keeping the improvements and walking away resolutely and without recriminations from their failures

Creating opportunities for learning reflection

Creating opportunities for learning reflection is essential in fostering learner autonomy. Students need to become aware of the beliefs and attitudes they hold that strengthen their capacity for learner autonomy. They need to consciously remind themselves of these strengths and apply them as they strive to acquire new knowledge and master new skills. Similarly, they need to become aware of the beliefs and attitudes they hold that undermine their capacity for learner autonomy. They need to consciously remind themselves of these influences and strive to quiet them when they begin to retard their progress as learners. Instructors have to create tasks that can help students to reflect on different aspects of a lesson while allowing choice. Reflection is one step towards self-assessment. Peer-assessment is another one: students often need to be exposed to other types of feedback before they can assess themselves in an effective manner.

Conclusion

The theories and models presented here provide food for thought about what we have learned so far during the COVID-19 pandemic. They are reminders to learners, teachers and all who have a role to play in optimizing the learning experiences in which we engage in the future.

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Chapter Three

Impact of learning management systems in tourism and hospitality education in Bangladesh

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Abstract
The software program that is aimed at management, reporting, recording, tracking and automation followed by the delivery of educational courses and other learning, training and development programmes is called Learning Management System (LMS). In concept, LMS emerged from eLearning directly. The application of this system is rather new in a developing country like Bangladesh. But the interest in it and the facilities for offering the system are gradually increasing. There is evidence that several universities and research centres are well equipped to deliver its flagship courses in Bangladesh with LMS. The country's tourism and hospitality industry has been considerably expanding at least for the last few decades. This expansion resulted in the inclusion of tourism and hospitality education in major educational institutions in the country. Considering the better management of these educational courses, LMS can possibly be emphasised. This research outlines factors to apply LMS in tourism and hospitality education management in Bangladesh.

Keywords: Tourism, Hospitality, Education, Learning Management System, Bangladesh

Introduction

Online education is progressively becoming popular in higher education and is emerging as an opportunity for delivering education online. A vast area is occupied by Learning Management System (LMS) hereof as public and private universities in Bangladesh are increasingly adopting this method. This has been influenced by the recent pandemic of the corona virus whilst, in the midst of this global stagnation, having no other options left, online teaching and learning has become the most important and effective tool in the field of education in Bangladesh, like other countries in the world (Alam, 2020).

Bangladesh is trying its best to develop its entire system so that Information and Communication Technology (ICT) can be facilitated in all corners of the society, including

higher education (Karim, 2014). To meet the challenges of the future, LMS should be initiated in tourism and hospitality higher education too. Tourism is one of the most challenging sectors in the current business world. World Travel & Tourism Council (*WTTC*) (2019) testimonies that, one job was created against four new jobs by the hospitality sector in Bangladesh in the last five years, accounting for 1858900 jobs and it gave employment to 330 million jobs across the world in the tourism sector. The most special thing about LMS is it overcomes the time, distance and cost barriers to higher education as it gives access to all kinds of education and learning resources to students and learners from any geographical location. But this is coupled with multifaceted obstacles and glitches too, for the application of LMS in supplementing teaching and learning in a country like Bangladesh, which lacks in technology friendly infrastructure. In this circumstance, this research put light on the extent of application of the Learning Management System in higher education in Bangladesh, especially in Tourism and Hospitality Education in Bangladesh. It also tries to specify the factors and challenges in implementing LMS in the country. Some holistic measures are also suggested for ensuring sustainable implementation of LMS in Tourism and Hospitality Education in Bangladesh.

Literature review

LMS is used in universities throughout the world for connecting students and teachers overcoming the limitation of interacting in physical classrooms. This is facilitated by a setup, backed by a software program, where students receive learning materials and resources as and when needed (Adzharuddin et al., 2013). Asisri (2012) identifies the internal and external variables those are important for determining acceptance of LMS to the faculties of Saudi Arabia, where challenges faced by them and other demographic factors are classified as internal aspects and faculty members' perception of e-learning, competence level and attitude were categorized as external variables. Alias and Zainuddin (2005) identify the concerns of lecturers regarding the use of the learning management system in Malaysia, in which it was found that respondents even belonging to the traditional teaching system demonstrated affirmative and open-minded attitude towards the assumed change. In the context of Bangladesh, Alam (2020) argues that, though the key stakeholders of online education- the teachers and learners face various barriers; eradication of those issues can create a congenial environment for this alternative education system that will further bring better outcomes in all magnitudes. On the other hand, Mahmuda (2016) discussed about the multi-dimensional tools like software, social media network and gadgets etc. used in online teaching in Bangladesh and the changes this has brought in the in the big picture that has made it more accessible to the faculties, learners and other beneficiaries of the country.

According to icddr,b (2020a; 2020b), icddr,b, which was known as the International Centre for Diarrhoeal Disease Research has experience of research for more than 50 years in the field of providing information about epidemics in developing countries. More than 65000 physicians, laboratory personnel, managers, trainers, faculties and students from 87 countries attended icddr, b's training/education programs, most of which are provided through their state of the art online Learning Management System (LMS). They also provide training on LMS that focus on utilizing the updated features and capabilities of technology and gadgets those are used for

LMS, in this case Moodle; the incumbent of which is Moodle course users like faculties, trainers, students and learning and development professionals. (icddr, b, 2020). Bangladesh University of Professionals has introduced such Comprehensive Learning Management System (LMS) that the software makes it easier to conduct online classes and examinations, communication between pupils and faculties, results publication on academic performance, management of participants' profiles, upload audio-visuals, submission and checking of internship report, thesis and assignments etc. as well as conducting plagiarism checking through customized app- enabling the university's online learning more updated and responsive to global crises like corona pandemic (Bangladesh Post, 2020). North South University is striving to acquire a topnotch LMS within a very short time with the objectives of achieving better administration and supervision of classes and more fair examination settings for the students (The Daily Star, 2020).

Daffodil International University (DIU) started their Learning Management System called Blended Learning Centre (BLC) in 2013, through which the classes can be easily made visually appealing, with videos from multiple sources like YouTube, Google, Drive, Edpuzzle, H5P interactive content. To create courses for students, teachers can upload a variety of multimedia files, images, PDFs, docs, excel sheets and so on. (The Daily Star, 2020). They have also launched a mobile app available in Google Play Store name DIU Blended Learning Center, which includes different projects like partnership with other institutions of the world to conduct online courses and curriculums, recruitment and training of teachers, dissemination of class modules, quality control of course contents, perform research on teaching-learning advancements and technology based education, publishing research based blogs and monthly magazines (DIU Blended Learning Center, 2020). Biswas, Roy and Roy (2020) measured the opinion of university students regarding use of cell phones for education amid Corona Pandemic in Bangladesh where the findings illustrate pupils' positive opinion towards m-learning and social media in claiming it to aid in recovering the learning gap during the pandemic.

Methodology

For data and information generation, the chapter used primary sources like in-depth interviews with relevant stakeholders like faculty members and students of Daffodil International University and North South University of Bangladesh. Apart from these, secondary sources like published articles, reviews and online resources were applied.

Findings

Learning management system

The revolution of ICT and its widespread practice in teaching- learning has changed the contribution of teachers and trainers in education as well as has resulted into creation of new terminologies in the educational arena, like- web-based learning, e-learning, m-learning, online/virtual class, digital contents, learning management etc. that (Asiri, 2012). A software program or internet-based technology that helps to design, perform and evaluate different teaching-learning processes coupled with providing a teacher/trainer tools to develop and

deliver learning materials, observe learners' engagement and evaluate their improvement online can be called a learning management system (LMS) (Alias et al., 2005). Regardless of its types like Moodle, OLAT or SAKAI, an LMS's characteristics can be two-fold, one- in managing courses it helps administration and dissemination of education and two- in managing learners, it enables their enrollment, documentation, payments and many more (Clarke-Okah, 2009).

Learning management system in Bangladesh

The exponential growth of computer literacy recently has resulted into the emergence and advancement of different kinds of IT based software and devices beneficial to the teaching initiatives and for the improvement of e-learning and learning management systems, which have become increasingly acquainted with faculties, learners, trainers and educational and training institutions. According to Karim (2014), Bangladesh, being a developing nation, has been ambitiously trying to accelerate its socio-economic development through vigorous investment in establishment of Information and Communication Technology in every sphere, especially in education and training both in public and private sector. Bangladesh Open University (BOU) has commenced ICT supported Open and Distance Learning (ODL) from previous television and radio based distance learning through widespread use of LMS, web2 technology, webTV, webRadio, eBooks and mobile app; which has facilitated equal access to education to mass people and has taken the country one step ahead towards attaining the Digital Bangladesh agenda of government and achieving Sustainable Development Goals (SDGs) (Mannan, 2016). As discussed by Islam (2017), there are different types of LMS available currently. Among them, there are: open source LMS (Moodle, canvas, authors and others), Cloud LMS (DoceboLMS), Proprietary LMS (Blackboard, eCollege, edmodo etc., Historical LMS (click2learn, Learn.com, Geolearning and others).

Some public and private universities in Bangladesh are also adopting different types of Learning Management Systems for deploying education. But this is happening to different extent, especially in the recent Covid-19 pandemic situation. Among them, the following ones are found (as displayed in their websites) to be disseminating learning through different e-learning and LMS tools to different extent. Extent as in some of them are in trial stage, some are in early development stage and some are in fully functional stage in their operation.

Table 1: Name of the universities providing education through LMS (based on information available in the universities' websites)

	Name of the University	**Name of LMS / e-learning Platform**

1	American International University-Bangladesh (AIUB) Dhaka	LMS
2	Asian University for Women	Moodle
3	Bangladesh Open University	LMS
4	Bangladesh University of Professionals	LMS
5	BRAC University	LMS
6	Daffodil International University	BLC
7	International University of Business and Agriculture and Technology	Moodle
8	Islamic University of Technology	LMS
9	Jashore University of Science and Technology (JUST)	LMS
10	North South University	RDS
11	Northern University Bangladesh	LMS
12	Primeasia University	Orbit OCP
13	United International University	LMS
14	University of Liberal Arts Bangladesh	Moodle

During COVID-19 Pandemic, the drastic change in the situation of academic activities, many universities could not arrange well designed LMS for continuing classes. Most of these institutions successfully fight one of the greatest crises occurring to global education by utilizing Facebook Group as an LMS (Munni & Hasan, 2020). Research done by Chaka and Govender (2020) with the objective to ascertain the utilization of social networking media Facebook's role as a platform for teaching and learning showed that, mobile learning remarkably bring improvement to the condition of learning environment and academic performance of students in institutions as it addresses the lack of physical facilities and improves reading practices in learners. It was found that Facebook in this case acted as a learning management system in different ways by incorporating tools and features like - Facebook live, Facebook group, Facebook watch, Facebook messenger room, social learning, education center, Facebook Mentorship Program and others (EDUCAUSE review, 2020; TECH & LEARNING, 2020). One of the largest eLearning platforms called 10 Minute School using Facebook as a learning platform (10 Minutes School Live, 2020).

Learning management system in tourism and hospitality education in Bangladesh

In Bangladesh graduates are increasingly joining the labor market, but are left empty handed without jobs for a long time. On the other side of the coin, the tourism and hospitality industry of this country suffers the need of tourism professionals and entrepreneurs. This gap can only be reduced by converting these high potential human resources into human capital by instilling up to date employability skills in them through practical and dynamic mode of education like online learning and LMS (Islam and Akthar, 2020). This can be achieved by equal participation of public and private universities who are offering courses in this area.15 Out of 107 private universities and 2 out of 46 public universities (University Grants Commission of Bangladesh, 2020) provide Tourism and Hospitality Management education. Following are the universities that do so:

Table 2: Name of the universities providing tourism education in Bangladesh

	Name of the Institution	Type of the Institution (Public/Private)
1	American International University- Bangladesh	Private
2	Bangabandhu Sheikh Mujibur Rahman Maritime University, Bangladesh	Private
3	Cox's Bazaar International University	Private
4	Daffodil International University	Private
5	European University of Bangladesh	Private
6	Fareast International University	Private
7	IBAIS University	Private
8	International University of Business and Agriculture and Technology	Private
9	Primeasia University	Private
10	Rajshahi University	Public
11	Royal University of Dhaka	Private
12	Southern University Bangladesh	Private
13	The People's University of Bangladesh	Private
14	University of Dhaka	Public
15	Victoria University of Bangladesh	Private
16	Victoria University of Dhaka	Private
17	World University of Bangladesh	Private

Source: Developed by the authors (2020)

Technology in Higher education helps us to bring the world to our fingerprints and this is of much necessity in the field of tourism education, as application of LMS has the potential to give access to international resources and diversified learners from different corners of the country and the world. In this context, only 4 universities were found have their own LMS out of 14 universities for deploying tourism and hospitality education and they are:

Table 3: Name of the universities providing tourism education through LMS

	Name of the Institution	Availability of LMS/ online teaching-learning
1	American International University- Bangladesh	Available
2	Daffodil International University	Available
3	Primeasia University	Available
4	International University of Business and Agriculture and Technology	Available

Source: Developed by the authors (2020)

Upon discussion with some students and faculty members, it was found that among all these, 4 universities are using a full-fledged LMS in deploying education and as a matter of fact, for Tourism and Hospitality education too. BLC is the digital teaching and learning hub of DIU to connect teachers and students effectively allowing to track progress of individual students and better facilitate their learning. According to Daffodil Family (2020) and Daffodil International University (2020), DIU specialises in process automation and digital teaching and learning management. Almost all the processes and activities of the university are run by a digital infrastructure, web applications and software. To mitigate poor internet connection for the students located in remote locations DIU has worked on collaborating with Grameenphone and Robi to provide low price data packages for its students. BLC has a well-structured and robust e-Learning Management System and is a one stop solution to create, organise,

communicate and manage courses. It is very simple to use and manage for teachers and students with incredibly powerful plugins and integrations that comes with a drag and drop Course Builder that helps teachers to publish courses with ease. It is convenient to add or create (link or embed) course materials, new lessons' videos, audios, PowerPoint slides, drive resources, any files from the desktop, and even interactive content. The platform contains over 25 inbuilt features along with hundreds of plugins and integrations that extend the possibilities for teachers to engage their students in multiple and flexible ways. 100% academic activities of the university are going on in full swing smoothly using the BLC platform which DIU started in 2013, during the frequent interruptions caused by strikes, hartals and blockade programs, which equipped the faculty members with necessary skills (The Daily Star, 2020). BLC is the purchased and updated version of Moodle for DIU. Very few universities have their own LMS in Bangladesh, due to high maintenance, costing and efforts. But DIU has been having it for five years. The students and teachers are greatly engaged in BLC currently, which provides all types of facilities including classes, lectures, exams, interactive contents, grading etc. (The Asian Age, 2020).

It was found that, LMS has enabled their students and teachers to:

- Receive every administrative services and activities online, which are otherwise provided physically in the institutions.
- Submit term papers, coursework and answer copies virtually as well as get examination results and tabulation sheets.
- Engage in student-to-student discussions and increase interaction among student and faculties.
- Improved academic proctoring of the teaching-learning procedure by subject instructors
- Course advising and enrolment.
- Improved learner performance through access from home.
- Improved engagement level of students in pedagogical activities resulting in higher satisfaction level.
- Frequently get admittance to academic resources like teachers and course materials backed by a service oriented learning community.
- Attend webinars, workshops, ''Learning Summit'', ''Job Fest'' etc. development initiatives virtually.

Factors of digitalisation of tourism and hospitality education in Bangladesh

The factors that might make digitalisation of higher education a success can be derived from the conceptual framework of Harasim (2000) that can help to guide, design and implement online courses. In this framework, Harasim (2000) presented five beneficial factors and in this research, the identified potential success factors are: many-to-many group communication, time independence, place independence, text-based/media-enriched messaging, computer facilitated environments. These findings can be articulated into a summary incorporating tourism higher education students of Bangladesh.

Table 4: Success factors of digitalisation in Tourism and Hospitality higher education in Bangladesh

Factors	Impact on students
Many-To-Many Group Communication	Social inspiration resulting from communicating with friends; dynamic and smooth information exchange surroundings; emergence of fresh perceptions, diversity; opportunity of comparing, sharing and modification of ideas. Chance of interaction in social networking media.
Time Independence	24/7 access; ability of immediate response by users or as per their convenient time; constant development of knowledge; learners' participation depending on their readiness to learn.
Place Independence	Access to the local as well as international resources from diversified academic and geographical area; resulting in shared interests, shared knowledge, virtual travelling.
Text-Based/Media-Enriched Messaging	Verbalization and expression of concepts; decreased demographic discrimination by concentrating on message rather than on the messenger; clear communication of ideas; diverse collection of ideas.
Computer Facilitated Environments	Facilitate searchable, transferable and adjustable documentation, manifold permissions through discussion; developing tools to interchange and organise concepts, maintenance of collaborative education; designing templates, frameworks and academic materials.

Source: Modified by the authors from Harasim (2000)

Apart from the aforementioned factors, online education software, virtual class platforms, internet availability, adequate bandwidth and online connectivity are the prime factors for students to get access to LMS provided by their universities. With the patronage of mobile and tele-communication infrastructure, these are more or less ensured in most of the urban areas in Bangladesh. However, the accessibility of telecommunication and data communication facilities is not reasonable on the other hand. Still students and teachers are found to get some Infrastructural support provided by the stakeholders (2020a; 2020b), on behalf of the Ministry of Education (MoE) implemented through joint financing of Bangladesh Government and World Bank.

A high performing data communications setup named Bangladesh Research and Education Network (BdREN) has been organized by the government and University Grants Commission (UGC) of Bangladesh with the objective to provide connectivity among public and private educational and research oriented organizations. It is funded by the Government and World Bank. (University Grants Commission (UGC) of Bangladesh, 2020a; 2020b). BdREN has multi-gigabit capacity and their objective is to create connection among universities, research institutions, medical colleges, libraries, laboratories, healthcare and agricultural institutions across the country as well as to assist geographically dispersed academics, medical professionals, scientists and researchers with reliable access to high-end computing, simulation tools and datasets. For successful execution of BdREN framework, UGC signed an IRU contract with Power Grid Company of Bangladesh (PGCB) Ltd. for using 2 (two) core from its country-wide distributed OPGW network. BdREN is also connected with other regional and trans-continental Research and Education Networks (RENs) (for example. TEIN, GEANT, Internet2 and others). It has connected the teachers and learners of Bangladesh to the

international academic communities and educational resources. It also supports intercultural collaborative research and catalyzes innovation in the country (BdREN, 2020).

Grameenphone, a telecommunication service provider of the country has created a common platform where people in less developed areas, especially the ones living in villages can get access to high quality ICT services like internet, voice calls, video conference and other online activities. This is called the Grameenphone Community Information Center (GP-CIC), which currently is operating in more than 400 unions out of 4553 through their 550 cubicle booths. Learners from nearby villages and unions come to these booths at their class time and are able to attend online class, submit their homework or attend examinations (Grameenphone, 2020). Again, according to Access to Information (a2i) (2020a; 2020b), a whole-of-government program of ICT Division, supported by Cabinet Division and UNDP has design an internet access platform in remote rural area through the ‘‘Union Parishod’’ Internet facility namely “Union Digital Center (UDC)”. Moreover, they are planning to develop an education network like this concept paper and very soon place that proposal to Bangladesh Parliament. In this process, Students device (mainly cell phones) could be registered with the UDC internet access router, so students are able to connect to the internet through the UDC Wi-Fi facility. Otherwise, the local UDC authorities have to facilitate computers with internet access to students. In that case, the UDC computer has to be equipped with a webcam and some software like Zoom, web browser (Firefox, Google).

Challenges in Implementing Learning Management System in Tourism and Hospitality Education in Bangladesh

Like other sectors in spite of having technical and infrastructural shortcomings in facilitating online education in tourism and hospitality, there is potential of successful implementation of it in Bangladesh, overcoming the barriers related to traditional classroom based teaching-learning environment; a glimpse of which has been observed in the recent COVID-19 situation. Farah and Ahmed (2014) stated that, though Bangladesh has initiated different project to get the support of ICT, some issues like poor ICT infrastructure, high primary cost for infrastructural development, less reliable technology, high cost of equipment, continuous up gradation of technology are reason of concern for the e-learning benefactors; moreover, technological and economic instability create challenges for LMS to be implemented in Bangladeshi education system also.

According to Islam (2016), lack of motivation in learners and teachers to adopt the newly emerging educational system, lack of user friendly policy to support the mobile learning, deficiency of cost effective and accessible ICT support system for the learners, poor quality maintenance in deploying educational resources, lower accessibility of learning equipment and cultural hardness acts as challenges to upgradation of e-learning in Bangladesh. The other barriers that are likely to be faced while implementing e-Learning in Bangladesh are- high price of computers and laptops, insufficient electricity supply, poor English proficiency, slow and inconsistent internet speed, costly internet access, insufficiency of technical support in remote villages, inadequate budget for computer network growth, social and cultural issues, low

internet and broadband performance, inequality in learners regarding involvement in learning , rapidly growing population, low per capita income, corruption, globalization , lack of political commitment etc. (Khalid, Jahan & Sobhan, 2009)

Every educational institution has its own operating procedures, types of courses, types of students, categories of programs, structure of course materials and different groups and forums to be included in the LMS framework. But, LMS, being a small part of education management and requiring optimum level of customization to adhere to exclusive needs of the organization and type of operation and content makes its scope limited to draw attention to be invested or funded by management (Clarke-Okah, 2009). The challenges in adopting technologies like online learning, mobile learning and LMS in the developing countries can be manifold. Lack of availability of consistent and reasonable power supply is a basic issue. Low internet bandwidth and connectivity makes it difficult to carry compressed documents so that people living in dispersed cities and villages are not able to get access to academic resources like images, videos and zipped files. Teachers with limited knowledge of technology and deficiency in hands-on experience face difficulties to use them to engage and support learning. Lack of motivation in putting extra effort into acquiring this new skill is also a barrier. If such kind of initiatives related to online and technology based education is not made sustainable in less developed countries, its initial appeal and paper-heavy solutions will go in vain, resulting in mass peoples' deprivation of quality education and development opportunity (Mahmuda, 2016).

Suggestions for application of learning management system in tourism and hospitality education in Bangladesh

The decision for implementation of LMS and application of a certain LMS depends on vigorous organizational and technological forecasting. This is considered a high risk decision as it involves the interest of a multi- multi-dimensional group of stakeholders and impacts interrelated factors like institutional policies, administrative activities, funding, future orientation and generalization potentiality of the organization-wide LMS (Coates et al., 2005). Some suggestions, based on the findings of this study, are proposed to facilitate the implementation of LMS in universities providing tourism and hospitality education in Bangladesh.

Infrastructural development of ICT sector

Reliable and affordable access to power needs to be ensured throughout the country to confirm participation of a wide variety of learners. Planned installation of marine telecommunication cables causing increased internet connectivity and accessibility should be taken by Government and private enterprise like mobile phone companies.

Partnership among Government bodies, universities and telecommunication service providers

Key organisations need to come in partnership to bring radical change in this new learning system. Education board, public and private university authorities, University Grant

Commission (UGC), ICT department, Academic faculties, Internet and Telecommunication authorities & service providers need to work hand in hand to execute LMS. Advisory board with representatives from these stakeholders can be formed to discuss policy issues and give directives to all of the above. Technology based education systems need to be supported, maintained and modified to make it effective and keep it functional. Proper execution plan needs to be formulated and implemented to ensure sustainability. The system being expensive for universities and students needs to be supported by government and corporate bodies involved in tourism business by providing sustainable infrastructural and intellectual backing.

Increasing e-preparedness of students and community

Successful application of LMS in education needs involvement and conviction of the government, universities, teachers, guardians, learners and the whole community. Holistic approaches should be taken to increase e-preparedness of students in every socio-economic level of the nation by development of local technology, software & learning apps as well as reduction in cost of devices and internet packages so that when they are incorporated into a LMS system in higher education, they do not lag behind because of lack in preparedness.

Training for faculty and administrative people

Faculties and administrative employees of the institutions should receive practical, well-designed and adequate learning and development opportunities that will enable them to perform professionally in their classrooms and online work framework. Motivational initiatives should be taken to instill genuine interest in teachers regarding learning about and imparting online education, try new methods and technologies as well as strive to improve themselves. To keep newly joined teachers and students up to date and make them capable of yielding the full merit of online learning, authorities should arrange training on a continuous basis.

Help and support mechanisms

Help and service mechanisms on learning management systems like customer care centers and web based tools like video tutorials and electronic performance support systems should be initiated for faculties and learners to decrease hindrance of service due to technological problems. Constant consultations for support and training can be deployed through helpdesks, call centers, mobile service teams and many more.

Conclusion

For sustainable development and consistent success of a promising industry like tourism and hospitality, an educated, open minded and groomed workforce is mandatory, who are capable of fighting the fierce competition that is already present in the international market. This research presents evidence that the tourism and hospitality education in Bangladesh lacks sufficient technology supported LMS as well as suffers from manpower shortage and slower workforce growth. These are due to the lack of technology backed advanced and quality higher education, which as per today's reality is only possible through proactive and dynamic application of LMS in all the universities providing tourism and hospitality education. Taking lead in implementing LMS by these institutions has several implications. LMS aids

organizations by creating a mode for dissemination of learning initiatives at a large-scale meeting the immense and growing demands for exposure to the opportunity of better education and higher degrees. It ensures effective and efficient distribution of learning in a context where teacher students ratio is very high. It expedites decentralized education through access to international educational resources like faculties, experts, academics, learning material and ensures enriched student learning. Tourism industry is international that considers incapacitated without the application of technology in every single step of its operation. The use of LMS in education ensures e-Preparedness and technology smartness of the students prior to entering the global tourism market that can be the agenda for future research.

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Chapter Four

Innovation in hospitality management education: Empirical evidences from university of Naples

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Abstract

The tourism sector is characterized by high labour demand and education plays a key role. The competitive feature of the tourism sector requires highly skilled and specialized human resources. Higher education institutions have to guarantee new innovative teaching ways in collaboration with hospitality firms. Professionalizing courses seem to be the right answer to an innovative teaching approach which is closer to the labour world. Innovative teaching does not only include the introduction of digital tools but also a different teaching approach based on an inverted didactic through which academic professors, students and firms can interact and students are called to collaborate with universities and firms to co-create new knowledge and value. Tourism sector trends have greatly influenced the way in which education is conceived, prompting even particularly traditional contexts such as Italy to forge partnerships between the academic and business worlds in order to build new pathways that are linked to the specific needs of companies, demonstrating proactive attitudes in launching and seizing new challenges linked to digitalisation, the strong heterogeneity of demand and the increasing global competition. Professionalizing courses do not only contribute to reduce gaps between the academic word and labour word but they also have been supporting the hospitality sector during the pandemic, indeed students, professors and academic had the opportunity to meet in order to discuss about the tourism industry crisis due to the travel restrictions that have indirectly forced the closure of hospitality firms as hotels and restaurants. Digitalization, in this

case, has played a key role to facilitate the communication between universities and firms, on-line webinars, on-line delphi panels have allowed discussions and to cooperate to face the economic crisis. This chapter offers a literature contribution focused on innovative teaching supported by empirical evidence in hospitality management education.

Keywords: Innovation, Education, University, Teaching, Hospitality

Introduction

From an employment point of view, workers in the tourism sector amount to 3.5 million (ONT, 2019). If we consider the decade 2008-2017, employment in the tourism sector has increased by 20%; while, in the last twenty years, there has been an increase of 43%. Thus, the tourism sector has seen an increase in the employment rate in the medium to long term, both in the hospitality and in the catering sectors. From the Excelsior Information System (Unioncamere, 2018), which provides a forecast of employment and professional needs in Italy in the medium term (2018-2022), it emerged that the tourism and catering sector is the one that recorded the absolute highest rate of demand expansion (3%), i.e. the incremental demand for work recorded through the annual variation of the stock of employees for a specific sector. From the Synthesis Report on the Occupational Condition of Graduates conducted by Almalaurea in 2018, it can be seen that for three-year degree courses related to the tourism sector, about 50% of those interviewed declared that they were working just one year after graduating. The percentage improves considerably if we consider a broader time spectrum, taking as a starting point the results for the Master's Degree Courses in the field of Planning and Management of Tourism Systems; indeed, it turns out that three years after graduating, more than 80% of those interviewed manage to find stable employment with high levels of satisfaction for the work they have done. European data also confirm the need to build pathways with specific skills because, according to the Europe 2020 objectives, the EU labour market requires high professional qualifications for about 35% of jobs. In this scenario, Italy is in last place as only 25% of young people aged 25-34 have a tertiary level qualification compared to 42% of the average of OECD countries (Miur, 2017).

It is clear, therefore, that these indicators are particularly relevant in relation to the economic, social and civil development of the country: the knowledge economy requires, in fact, professional figures who possess a particular combination of transversal and digital skills together with a high degree of specialisation and knowledge of the sector. More specifically, the OECD statistics clearly show that the employment rate is influenced by the organisation of higher education chains and that, despite the fact that employment rates of traditional graduates tend to be similar among the most advanced countries, the absence of intermediate segments in advanced technology sectors has a strong impact on youth unemployment. The various analyses agree, therefore, in stating that one of the main causes of this gap is to be attributed to the structure of the educational offer, which has always suffered from the absence of short and highly professional courses, closely integrated with the economic and productive context and aimed at enhancing both the human capital and the productive system of the territories. The analysis of the data and the trends in employment and training levels in the national and international context also reveal the opportunity and importance of activating a

professionalising degree course. At national level, degree courses in tourism science tend to have a multidisciplinary approach, very much oriented towards the analysis of the territory and with a high humanistic-cultural matrix in the curricula. The bachelor degree courses, although more oriented towards economics and management, have a predominantly generalist educational offer, with the aim of opening up opportunities in areas and businesses connected to the tourism sector (with reference to the entire supply chain rather than to a specific sector) and cultural heritage. In Italy the first initiative in this direction is the professionalising degree course in Hospitality Management at the University of Naples Federico II.

According to the analysis carried out, today there is a strong gap between theoretical knowledge and the practical skills required by the working world. According to AlmaLaurea data (Report on the Profile of Graduates, 2018) 42% of Italian graduates have not carried out any internship or recognised work experience. Moreover, there is still a strong need for a greater connection between the world of tourism education and the business world. In this direction, recent legislative measures (DD.MM. 635 and 987/2016 and DD.MM. 60/2017) have established professionalising degree courses, characterised by about one third of training in companies, open to no more than 50 students and with placement targets of at least 80% within one year of graduation. These courses contribute to combating this phenomenon by creating a link between the world of study and the corporate world. Professionalising degrees have been conceived with the aim of increasing the percentage of graduates in the country: less than 27% of Italians between the ages of 30 and 34 have a degree, a figure that puts Italy in second-to-last place among European Union countries: a gap that remains unchanged compared to ten years ago, ISTAT. Tourism is a leading sector of youth employment. The latest observatory on the tourism labor market in Italy estimates that the tourism sector has almost 1 million jobs in Italy, a figure that represents 5% of national employment. From the travel industry, with agents and tour operators, to the hotel and restaurant sector, this sector offers more and more opportunities to young people and those who want to work in this area. Young people account for 63% of the employed, 602,000 employees under 40 and 342,000 under 30. The sector also guarantees economic stability as workers hired with permanent contracts represent 67% of the total.

Moreover, a comparative analysis of the best universities in the world shows the undeniable role played by innovation both in the methodological approach to teaching and in the actual co-creation of courses of study in partnership with the business world. Promoting the employability of qualified professional figures means to invest in their training and professional growth. As shown by international university cases, the drivers of innovation can be found in the strategic vision of companies and universities, which strongly believe in the creation of professional courses, in innovative tools to support teaching, in the ability of companies to appoint mentors who accompany the student in his path so that he can conceive it as a continuum in which university and company interact to contaminate each other, in the psychographic and cultural profile of the students, from which emerges a strong proactiveness towards a professionalising course of study, in the territory, which represents the container of the territorial identity but also the real humus where relations at various levels take place and in respect of which it is necessary to build a strategic storytelling that represents the basis of

tourist attraction, both current and prospective, in the hardware component of the training places such as classrooms and internship structures, which must be highly innovative.

The pandemic scenario

The COVID-19 pandemic crossed all barriers, affected every country indiscriminately and destroyed entire economic sectors, with no exception of education. Indeed, the sanitary emergency has highlighted the vulnerability and fragility of education systems. In particular, educational institutions have done and are still doing their utmost to assure the continuity and regularity of the educational pathways, relying on new teaching methods and tools, known as distance learning or e-learning. For students this has meant to equip themselves with essential resources to ensure their participation in virtual classrooms, lessons, courses and examinations. Governments in many countries have introduced economic measures to support students and educational institutions in order to face school and university closures. In 2020, the Italian government introduced measures to foster distance learning, such as: economic resources allocated to acquire licenses to use digital teaching platforms, to train staff, and support less affluent students to purchase digital devices and internet connections (Law decree 17th March 2020 n.18). In addition, in May 2020, the italian government, in response to the persistent state of emergency, has introduced further measures which seek to provide extra funding to cover costs at the school and university level (Law decree 19th May 2020 n.34).94% of students would benefit from eLearning and taking online classes and lessons, in most cases (65%) with satisfaction, but this doesn't mean that face-to-face lessons and direct relationships with teachers can become relinquished.

ICT and Education

Research on the use of ICT in education is a central issue and is explored in a specific field of applications (for example, mathematics rather than geography - Bray and Tangney, 2017; Livingstone, 2012) and according to different levels of education (primary, secondary, high school, university, etc.), highlighting the benefits both for students and teachers. Information and communication technologies (ICT) is widely recognized as a great influencer in the area of education (Zucker, 2008; Van Oostveen et al., 2011). However, if ICTs, on one side represent a useful tool to support and contribute to make education more effective, to foster daily connection and respect for subjective norms, as highlighted by the study of Voet and Wever (2016), on the other side, these cannot prescind from teachers and replace their knowledge or minimize their role in the educational process and in supporting the ICT journey undertaken by students (Lang et al., 2016). "ICT self-efficacy" (Aesaert et al., 2015, 2017; Fraillon et al., 2014), meaning the ability to use computer and Internet, depends on the actual competences (i.e., accuracy of ICT self-efficacy), on the gender (Bench et al., 2015; Pajares & Kranzler, 1995), on the individual cognitive ability (Nietfeld & Schraw, 2002) and on the familiarity with the topic of interest (Zell & Kriza, 2014). The use of ICT is relevant to enhance team relationships, to give emphasis to practical exercises "through modelling, visualisation, manipulation and the introduction of more complex scenarios" (Bray & Tangney, 2017). However, there are some studies that show critical points to take into account: the large use of ICT can generate a strong dependency, create isolation from the other colleagues, and/or deny

the role of the teachers, reduce the propensity to work in teams, damaging interpersonal relationships and creating difficulty in integrating within the place of work's environment. The set of tools that provide services to educational institutions and promote interactive learning by leveraging digital technologies and content, is commonly known as the 'modern e-learning phenomenon' (Tikhomirov et al, 2015: 49) but, as several authors point out, in the literature, scholarly attention has focused on the technological applications and solutions rather than on identifying a paradigm linking ICT to smart education.

In accordance with these arguments and in light of the systematic literature review, this study introduces a new model suitable for addressing the issue of smart education in the current context, offering interesting theoretical and managerial insights into the role of ICT in the field of smart education. The concept of smart education, as defined by Tikhomirov et al. (2015), is characterised by three dimensions: educational outcomes, that refer to the aims to be achieved in terms of acquisition of competences, skills, knowledge and social values; the ICT dimension, which covers different aspects of education, from smart environment to smart educational technologies and smart educational materials, and lastly the organisational aspects that include "educational programs, forms of learning, and principles of teaching" (Tikhomirov et al., 2015: 53). As emerges from this model as well as from the literature on this topic (Frand, 2000; Zucker, 2008; Van Oostveen et al., 2011; Prensky 2001), the role of ICT in smart education has to be studied according to an overlapping perspective between the demand side (students) and offer side (people involved in the educational system).

The drivers of innovation can be traced in the strategic vision of companies and universities that strongly believe in the establishment of vocational courses, in innovative tools to support teaching, in the ability of companies to designate mentors who accompany the student on his path so that conceive as a continuum in which universities and companies interact to contaminate each other, in the psychographic and cultural profile of the students from which a strong proactivity towards a professionalizing course of study emerges, in the territory that represents the container of territorial identity but also the real humus where multi-level relationships occur and with respect to which it is necessary to build a strategic storytelling that represents the basis of current and prospective tourist attraction, in the hardware component of training places such as classrooms and internship structures that must have a strongly innovative character tive.

Hospitality Education Empirical Evidences

In light of these innovation drivers, an interesting case is represented by the Professionalizing Degree Course in Hospitality Management of the Federico II University of Naples. The latter, which for years has been involved in the tourism sector thanks to the research and teaching activity of a specialized teaching staff, has launched an experimental professional degree course in the tourism hospitality sector starting from the 2019-2020 academic year: Professionalizing Degree Course in Hospitality Management, aimed at creating specialized figures in the hospitality sector, with respect to the main areas of activity of companies. This objective arises from the need to orient the three-year degree program in a more targeted

manner with respect to the needs of the world of work. To this end, the course was created in collaboration with companies that most express the tourism hospitality sector in the Campania region, nationally and internationally. These companies have expressed a concrete interest in participating in the initiative, not only for internships and internships but also for on-the-job training, managed together with the university. This aspect represents an undeniable strength, as the interaction with companies concerns all stages of its implementation. The Hospitality Management course aims to train specialists in the culture of hospitality, with particular reference to Hotel Management and Food and Beverage Management, in the hotel sector. The training profile that is generated, acquiring knowledge and skills in various aspects of business management, also concerns possible entrepreneurial figures in both areas. A strong point, which characterizes the degree course, is represented by the teaching based on innovative methodologies such as the flipped classroom and the creation of digital educational content (smart-apps, videos) aimed at promoting cooperative learning and education. between peers, not only between students, but also between teachers and between teachers and students. The course, in fact, includes digital didactic laboratories in which students acquire the use of skills for the use of new technologies thanks to which they increase their transversal skills. As part of the redesign of teaching, the teachers of the professionalizing course in Hospitality Management enhance their innovative teaching skills connected:

- the use of e-learning and e-tools to support the courses envisaged in the teaching plan;
- teaching skills in an EMI (English as a Medium of Instruction) context both for teaching and for creating teaching material in English;
- the creation of interactive content through the use of specific platforms (for example, H5P, Articulate 360, Moodle, etc.), based on the concept of knowledge-sharing;
- the ability to connect teachers, students and the corporate world for the creation of open e-books and open e-content on the topic of hospitality management;
- the ability to combine the classic view of exams, conceived as an evaluation tool, with that of verifying skills and any critical issues in order to strengthen students' curricula;
- the creation of an open educational model to be shared with the faculty as a best practice in an educational context 4.0;
- the creation of synergies, in the context of the third mission, with the reference are through a specific "within the territory" teaching that enhances it, from a tourist point of view, through the creation of educational workshops. The output of the labs can refer to innovative ideas for the territory that connect the business world, local artistic crafts, the realities operating in the third sector that deal with tourism and other players in the social ecosystem;

Thanks to the implementation of innovative teaching, students have the opportunity to experience a real multimedia academy conceived as a place for sharing knowledge, where the students themselves produce educational content in the form of individual and group projects. Furthermore, students can confront challenges in order to develop business ideas in the tourism sector through the support of partner companies and business incubators.

Students have answered calls proposed by the firms in order to face the pandemic crisis (applying strategies to encourage a domestic demand, favouring the upgrading structure,

projecting and implementing digital devices as apps to facilitate the customer relation or the service provision). In the first lockdown from March 2020 to May 2020, panels of experts were organized through online webinars to collect data regarding the perspectives of managers and academics. The panels were conducted in three different periods of the pandemic crisis: at the beginning of the pandemic, during the full lockdown and during the re-start phase. During the panel a series of questions were subministrated to firms to understand their perceptions concerning the following aspect as the travel behaviour, their forecast on the reopening of tourism business, the investment that they will support in terms of digital marketing and sustainability.

Conclusions

The technologies used for teaching become tools capable of supporting and facilitating collaboration and socialization, improving the learning experience of students. The student participates personally in the construction of knowledge. The classes are equipped with a digital whiteboard connected to the Internet line and, moreover, each student has his own workstation to access the Internet line.

The inseparable combination at the basis of the didactics of the degree course is "teaching-learning" which allows a continuous improvement, in terms of quality, of this process. A fundamental role is played by the interaction between student and teacher and the use of technologies represents a transversal component that facilitates the exchange of knowledge and the creation of innovative outputs for teaching.

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Chapter Five

Video-based courseware for LMS envisioned on student learning outcome and non-cognitive skills

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Abstract
The effectiveness and efficiency of an innovative learning environment like Moodle LMS can be further enhanced by implanting high quality Video modules and courseware which is complementary and supplementary. Video modules were designed and developed based on pedagogical principles to offer the course according to Video Production principles, offered as Short videos to ensure student listening and ease of uploading. A website was developed and a customized Moodle LMS was embedded in the site. The courseware comprising the formative evaluation activities was designed and developed based on the 9-steps of Gagne's model. The video module was uploaded as video lessons in the website; various formative evaluation activities like Quiz, Assignment and Discussion forum were designed based on the Learning Outcome using revised Bloom's Taxonomy. The gain of the non-cognitive skills namely Attention and Motivation, Confidence in Communication and Self learning capability is assessed by a methodically designed questionnaire for each skill.

Keywords: MOODLE, Short videos, Gagne's Model, Revised Bloom's Taxonomy, Learning outcome (LO), ARCS Model, QAMLM

Introduction

Elearning has shifted learning from a teacher-centred to student-centred procedure. For obtaining the intended results to the best possible extent, this shift in paradigm has to be supported by scaffolding techniques with sound pedagogical basis. Innovative methods in e-content development play a vital role in the process. Hence, research implementation in this area generates developments in the methodologies and techniques, most conspicuously, awareness, knowledge and training in the respective skills and eventually in attitudes in the participating teachers and students. From the prior research in the area, educational videos when followed up with the activities in LMS complement and supplement each other parenthetically work in increasing the effectiveness of the Teaching-learning process. Current research tends to assess this effectiveness by observing the performance of the student through

the learning outcome. In addition, an effort is made in assessing the gain of non-cognitive skills namely Attention and Motivation from listening to the videos, Confidence in Communication and Self-learning capability by participating in the Video-based course administered through the LMS Moodle.

Moodle

Modular Object-Oriented Dynamic Learning Environments (MOODLE) (Cole, 2005) is a free and Open Source Learning Management System. MOODLE is often considered as a Virtual Learning Environment with Social Constructivism as its basis originally developed by Martin Dougiamas at Curtin University in Australia. Fig 1.1 shows the salient features of the OS LMS Moodle justifying its selection as the VLE for the course administration.

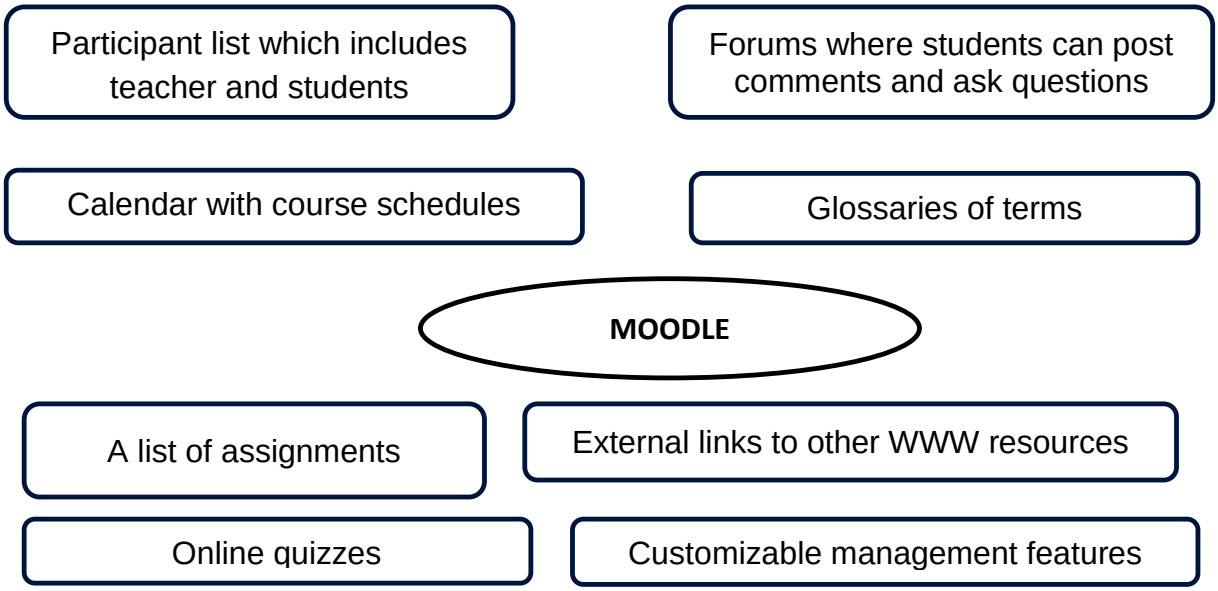

Figure 1: Features of the Open Source LMS Moodle

The results of the study conducted by Arun et al. (2013) to understand the perspective on the use of a Learning Management System (LMS) shows the excitement in 82% of the students to have LMS support to enhance their learning level. The LMS environment for the study was based on Moodle Platform; it is noted that the students believed that LMS would certainly help to gain more competitive advantage and excel in terms of academic outcome. More such studies justified the selection of the MOODLE platform for the study.

Design and development of Video / courseware based on Pedagogical principles

Video content (Bates, 2005) was designed and developed with the aim of initially gaining the Attention of students into the subject, then in sustaining the created interest and subsequently creating motivation in them to work in the subject area. The steps are described in Figure 1.2. Although every Educational Video is planned and captured with the direction by the presenter, who acts as the Subject Expert, the physical absence of students during the shooting schedule may be a hindrance in bringing out their wholesome expertise. The steps in fig 1.2 can be a useful guideline while creating the new paradigm of learning, the VLE or the online classroom.

For instance, the apt illustrations dealt in the classroom by a teacher can be expressed through the right visuals in the Video. Quality assurance (QAMLM by CEMCA, 2010) and Post production steps are vital for the feasibility in uploading the Videos into LMS.

Design and development of courseware for Moodle based on 9-step Gagne's Model

Gagne (2005) proposed a series of events which follow a systematic instructional design process that share the behaviourist approach to learning, with a focus on the outcomes or behaviours of instruction or training. Each of the nine events of instruction are shown in fig 1.3 with the respective expectation from the event given in parentheses respectively. Each event can be followed by sample methods to help implement the events in your own instruction. Gagne's nine events can be used in conjunction with Bloom's Revised Taxonomy (Bloom, 1956) to design engaging and meaningful instruction (Gagne et al., 2005).

Learning outcome and Non-cognitive skills

A learning outcome is a clear representation of what a learner is expected to be able to do, know about and/or worth at the completion of a unit of study, and how well they should be expected to accomplish those outcomes. It states both the ingredient of learning and how its accomplishment is to be demonstrated. Learning outcomes in addition to serving the purpose of directing the content and design of a unit of study, they form the base of assessment and are also linked to the larger outcomes of learning set by the University in the form of generic and/or course/discipline-specific graduate attributes.

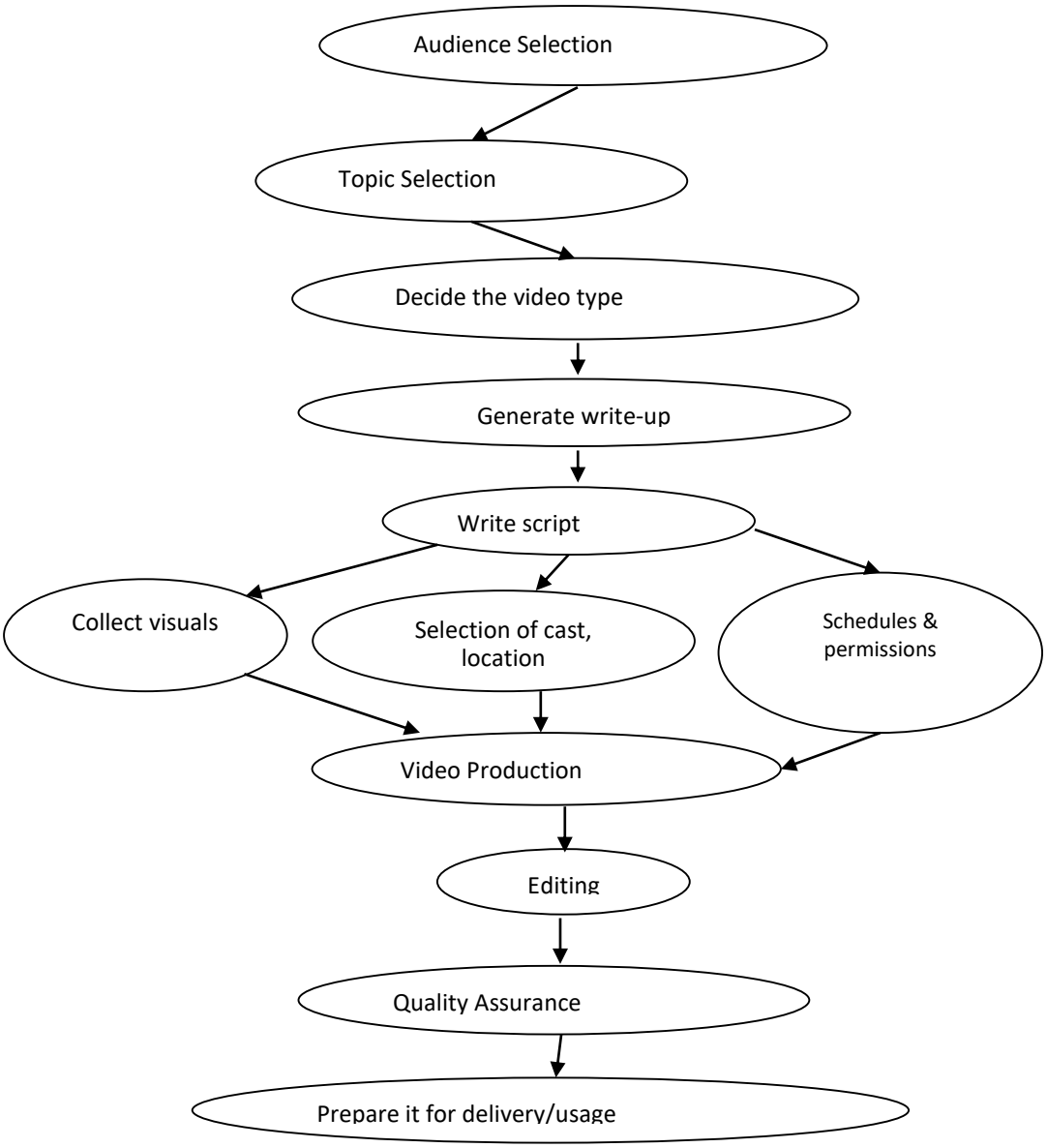

Figure 2: Steps in video production

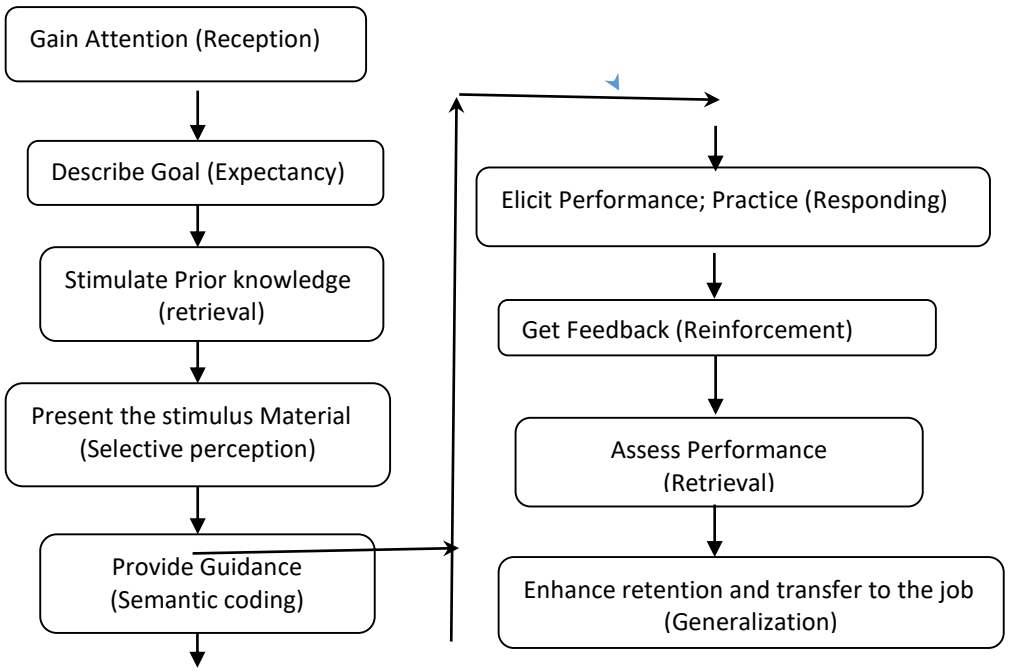

Figure 3: Block diagram of Gagne's Model

Sallam and Alzouebi (2014) in their study to investigate the perceptions of a teacher toward the use of Moodle LMS, to enhance the quality of Teaching and Learning, explored the effectiveness of Moodle as a tool for enabling learners' motivation. Paynter and Bruce (2012) have undertaken two case studies relating to the effectiveness of Moodle in Teaching and Learning process; in these they have demonstrated the implementation and assessment of the effectiveness of Moodle in enhancing the student engagement and learning outcome. Aside from cognitive outcomes, there are identified non-cognitive constructs that are developed during and after exposure to LMS which includes self-regulation (Magno & Ocampo, 2015), engagement (Rashid & Asghar, 2016), and motivation (Mayer, 2014). It is notable in studies that students develop specific skills while going through lessons that are delivered via LMS as explained by the cognitive affective multimedia learning (Brunken, Plus, & Moreno, 2011). These non-cognitive skills include self-regulation, motivation, and engagement. There is a call for more research that empirically examines theoretically grounded constructs of learning and motivation in the context of learning with the use of LMS (Lepper & Wolverton, 2004). One of the major indicators of student learning is their performance overtime after the use of computer-based learning environments such as the LMS. The performance is determined as a result of the material and competencies presented to learners.

ARCS Model

The ARCS Model (Keller, 1987) of motivation was developed to find effective ways of understanding the major influences on the motivation to learn, and for systematic ways of identifying and solving problems with learning motivation. The resulting model contains a four category synthesis of variables that encompasses most of the areas of research on human

motivation, and a motivational design process that is compatible with typical instructional design models.

Methods

A website was proposed to be created with Moodle customized in it. Computer Science students are considered as the target audience; Object Oriented Methods is chosen as the topic for the course. Video contents were to be designed and developed based on pedagogical principles; the other courseware for the LMS namely the text lessons and the formative evaluation tools quiz, assignment and forum had to be designed and developed based on Gagne's Model and revised Bloom's Taxonomy. The Formative Evaluation tools and Video content were to be developed with the plan for assessing Learning Outcome described in Section 3.

Schema of the work: Research preparations

- Video lessons were designed, developed and prepared for administration through LMS after being validated by experts through a questionnaire with criteria from Quality Assurance for Multimedia Learning Materials (CEMCA, 2010).
- Activities in LMS were designed based on Gagne's 9-step model, with revised Bloom's Taxonomy used to design questions for formative evaluations; Implementation plan and preparations made
- Design of questionnaires for self-assessment of student gain of non-cognitive skills.

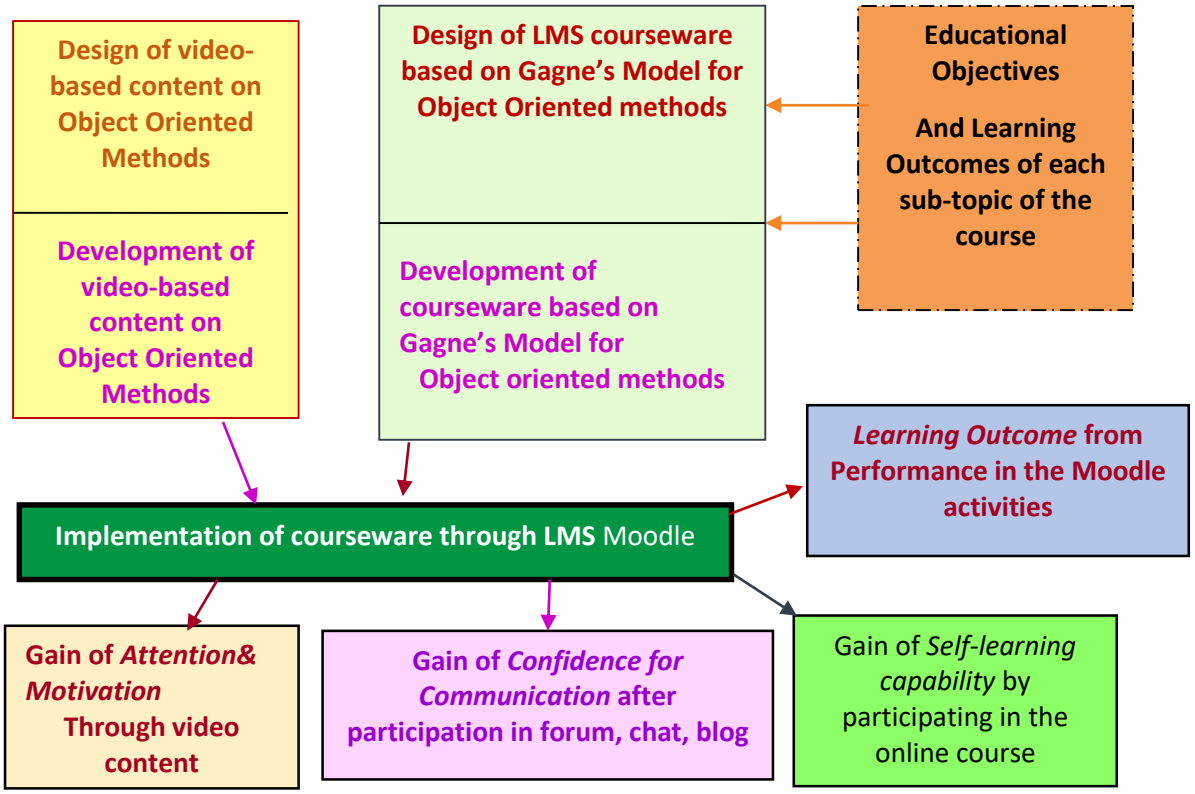

Figure 4: Schema of the work

Video content

Based on the procedure in Table 1 the stages were carried out. The basis for deciding the topic, division of modules, all based on the major factor Learning Outcome which will be explained in Section 3. The detailed design encompasses primarily the fact that in every stage of Video production, from collection of resources, editing and preparation for uploading, the fundamental principles are recalled and imbibed.

Table 1: The stages

Stage of video production	**SubTopic1**	**SubTopic2**	**SubTopic3**
Audience Selection	Students studying in B.E. / B. Tech. /B.Sc. /M.Sc. programmes in CSE, MCA		
Topic Selection	Introduction to Object oriented Methods	Object oriented programming through C++, Java	Trends in object oriented approach
Generation of write-up	Instructional material	Instructional material	Instructional material
Script from write-up	Script	Subject Expert Presentation	Subject Expert Presentation
Cast	1. IT employee who completed college last year 2. II Year B.Tech student	1.Computer Science Professor 2. B.Tech Computer Science student	1) Computer Science Professor 2)Computer Science Professor 3) Computer Science Professor
Schedules & permissions	Getting the schedules of subject experts and production crew together took nearly 2 months	1. Getting Professor's schedule took 3 months 2. Getting Student's schedule took 10 days	Totally 2 months, since separate interviews are taken.
Collection of visuals & audio	Visuals for various concepts, examples Appendix 1b	PowerPoint slides designed by the presenters	PowerPoint slides designed by the presenters
Video production – shooting	Was done on one day after rehearsals The Cast, the crew, the course creator present	Was done on one day after rehearsals The Presenter, the crew, the course creator present The Presenter, the crew, the course creator present	Professor presented his portions – 1 day A Professor presented his views Professor presented her views
Editing	Done in a week	Done in 2 weeks	Done in 2 weeks
Quality Assurance	Done by the production crew, course creator during editing, then by Subject Experts with QAMLM standards		
Final video	1.88.24 min video on Object oriented Methods		

	2. Available as 4 videos on 4 sub-topics		
Presentable size & format	2 video clips in MP4 format	13 video clips in MP4 format	3 video clips in MP4 format

LMS courseware based on Gagne's model

Courseware for LMS was designed based on 9-step Gagne's model as described in Section 1.3. Hollis (2012) discusses how Moodle modules can be designed based on the 9 steps of instructions of Gagne's model. Based on this Moodle modelling, the course on Object oriented methods was designed as given in Table 2.

Table 2: Moodle modelling based on 9-step Gagne's model

Step#	Aim	Implementation
1.	Gain attention	➢ Pulse video on clicking ➢ Division of the course into sub-course topics. ➢ Motivation messages in the news forum for each sub-topic
2.	Describe Goal	When each sub-topic is clicked, students see the respective goals
3.	Stimulate prior knowledge	Quiz is prepared for each sub-topic; Displayed on the home page. Students can enter the quiz just on a click.
4.	Present material	When the sub-topic is clicked, file names of video contents and text contents are displayed to facilitate easy access.
5.	Provide guidance	As they learn from the content, for any clarifications, a blog is opened for each sub-topic for free communication to students through Blog posts. Teachers are motivated to guide the students continuously during the course days.
6.	Elicit performance	A discussion forum is opened for each sub-topic. All students and all faculty members participate, clarify, contribute, compliment and by the way encourage each other.
7.	Provide feedback	An assignment on each sub-topic is provided. The submission is followed by a discussion through a blog. It is called a Workshop activity.
8.	Assess performance	An Assessment quiz on each sub-topic.
9.	Ensure Retention & transfer	Repeat steps 6 to 8 several times until satisfied with results. Concluding remarks in the news forum of every sub-topic is meant for the purpose.

Each tool is designed with the rules framed based on the Learning objectives of the particular tool; Rubrics are designed for evaluating student performance in each tool. For instance, the rules for designing the quiz and the rubrics are given below.

Learning Outcome (LO)

Introduction

Learning Outcome (LO) must be practised all through the learning process. Accordingly, the implementation was done all the way through the course starting from the design of the resources, through the activities and formative evaluations during the course and till the end of the course.

Plan for assessing LO

When the curriculum is framed, the course topic is divided into suitable Sub-topics, keeping in consideration the feasibility, benefits for the students. For the overall course and for each sub-topic the expected outcomes are noted. Subsequently, the Learning Objectives and the Learning Outcomes are formulated. Formative Evaluation method / tool weightages are formulated accordingly.

Implementation of LO

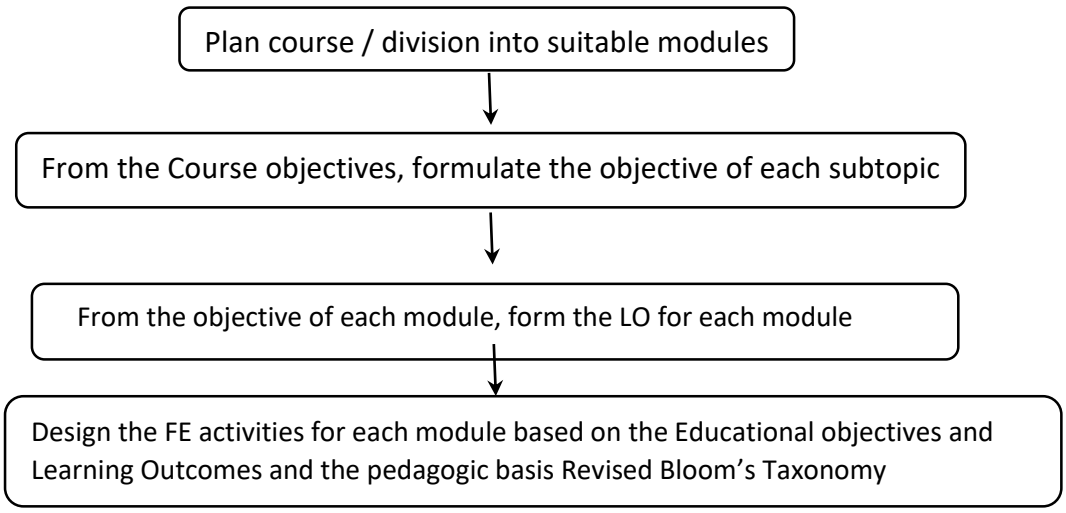

Figure 5: Implementation of LO

Based on the procedure in fig 3.1, the plan to implement LO is formulated. Table 3.1 from the Course Specification demonstrates the formulations. From the table, it can be observed that depending upon the nature of a sub-topic, the skills to be decided as outcomes and hence the weightages for the formative evaluation tools can vary, though all are given equal weightage in this case; the reason for equal weightage is the short duration for the course administration. Following the design of weightages for the formative evaluation tools, the design of the tool quiz is demonstrated which includes the guidelines for question paper setting, evaluation and the evaluation rubrics.

Table 3: from the Course Specification

No.	**Intended Learning Outcomes (ILOs)**
	Knowledge
1	Describe the significance of object-oriented approach
2	Describe the principles of object-oriented programming
3	Describe the trends in object-oriented approach
	Intellectual Skills
4	Design and analyze Problems
5	Apply the concepts of data encapsulation, inheritance, and polymorphism to real-life problem solving
6	Create computer algorithms to solve different problems
7	Design software solutions to real world problems
	Professional Skill
8	Decide the suitable object programming language
9	Design and develop object-oriented computer programs
	Transferable Skill
10	Formulate problems as steps so as to be solved systematically
	Attitude
11	Develop software with team-work in mind

Table 4: Mapping of ILO to contents

Criteria	**Knowledge**	**Intellectual skills**	**Professional skills**	**Transferable skills**	**Attitude**
Introduction to Object oriented Methods	1	4,5		10	11
Object oriented programming	2	6,7	9	10	11
Trends in Object Oriented Methods	3	-	8	-	-

Table 5: Assessment

Assessment Methods	Weightage			Remarks
	IOOM	OOP	TOOM	Names of the sub-courses
Discussion forum	10	10	10	Scores based on the rubrics
Assignment	10	10	10	Scores based on the rubrics
Quiz	10	10	10	Scores based on the rubrics
Total	30	30	30	Result in each course
Grand Total	90			Consolidated result of the course
Chat & Blog	Conducted, but not used for assessment			
News forum				

Activity Quiz

Formulation of the activity quiz

- Based on revised Bloom's taxonomy, the questions were framed for the Assessment quiz in each sub-topic to be conducted at the end. The pre-assessment quiz was conducted at the

beginning of each sub-topic to stimulate knowledge, i.e, each question paper was designed in such a way that there are more known questions for which they are expected to know the answer in order to attend the particular sub-topic. The idea is to give confidence while reviving the earlier learnt.

- For the Assessment quiz, questions were tough testing the student's learning, purposely providing the student an opportunity to reflect on the learning.
- Most of the questions are of the type Multiple Choice Questions. True or False questions were also given.
- The feedback for the right answer is important; for a wrong answer it is more important. While planning the feedback comments, the teacher had to empathize with the student and give the comment prior. It should encourage the student; but to progress calmly and peacefully, and not to sit and relax.
- Quiz permits the creation of a question bank to be created and questions from the pool and shuffled to form different question papers.

Evaluation guidelines for Quiz

The performance in the quiz can be evaluated by analyzing the level of preparedness and the quality of presentation through the following conditions:

A. Contribution
B. Class and performance

The activity **Quiz** was designed for a score of 8 distributed across these 2 conditions that were to be evaluated namely Contribution and Class & performance. These conditions had to be evaluated with a rating value ranging from 4 to 1, 4 being the highest rating and 1 being the lowest rating for each condition. Thus, the total highest score that a student could achieve in the quiz activity was 8 and the lowest score 1. The rubrics for evaluation are provided in Table 6.

A. Contribution

The idea that students attempt the quiz itself was a great effort and it must be appreciated. So, it was decided to be considered and eventually added to the learning outcome.

B. Class and performance

In the template meant for activity quizzes in Moodle, the answer for each question and remarks is to be given while uploading questions through the question paper template. The students can get the answer to a question, immediately after completing the question. However, the student can have the option to either see it together at the end of the quiz or try for successive trials with a penalty. Successive trials of the student and the tendency to perform to the best are accounted for under this condition.

Total score = (1 to 8) / 8 in each quiz.

It was converted to out of 10 and tabulated for the pre-assessment quiz activities and the three Assessment quiz activities.

Table 6: Rubrics for evaluation of quiz

S. No.	Criteria	Excellent	Good	Average	Poor	Score
1.	Contribution	Attempts the quiz when it has been opened and is well prepared to answer all questions.	Attempts the quiz when it has been opened and answers only 80% of questions.	Attempts the quiz when it has been opened and answers only 50% of questions.	Attempts the quiz when it has been opened and answers less than 50% of the questions.	
2.	Class and Performance	Keeps returning to the material until the student has mastered it	Keeps returning to the material until the student has mastered it. (80%)	Keeps returning to the material until the student has mastered it. (50%)	Attempts only once irrespective of the marks obtained.	

The other two Formative Evaluation tools namely Assignment and Discussion forum are formulated just like Quiz with the pertinent criteria.

Evaluation of performance in Moodle activities

The scores of each student in the assessment activities of the three sub-topics are provided by the participating teachers as per the guidelines for assessment. For each of the three sub-topics of the course, the evaluations done are:

1. Discussion forum - as per the scoring rules in the rubrics
2. Assignment - as per the scoring rules in the rubrics
3. Assessment quiz - as per the scoring rules in the rubrics

Consolidated score was calculated for each student by adding the total scores in the three sub-topics out of 30 each the total out of 90. From this, a consolidated % score was calculated. The data are recorded and prepared for analysis.

Evaluation of learning outcome

The learning outcome for each student was evaluated by considering the percentage of assessment score as per rubrics described in the course specification. The learning outcome

grades are evaluated as per the rubrics in Table 3.3 and presented to each student through a Performance Certificate. It is sent to each student at course completion through email.

Table 7: Rubrics for evaluation of learning outcome from performance scores

Criteria	**Excellent (> 90)**	**Good (76-90)**	**Satisfactory (61-75)**	**Marginal Pass (50-60)**	**Fail (<50)**
Introduction to Object oriented Methods	The student acquires excellent knowledge in the need for OO approach	The student acquires good knowledge in the need for OO approach	The student acquires satisfactory knowledge in the need for OO approach	The student acquires a very little knowledge in the need for OO approach	The student has not acquired any knowledge in the need for OO approach
Object oriented programming	The student acquires excellent knowledge in the principles of object-oriented languages, namely, data encapsulation, inheritance, & polymorphism in C++ and Java.	The student acquires sufficient knowledge in the principles of object-oriented languages, namely, data encapsulation, inheritance, and polymorphism in C++ and Java.	The student acquires average knowledge in the principles of object-oriented languages, namely, data encapsulation, inheritance, and polymorphism in C++ and Java.	The student is able to describe the meanings of data encapsulation, inheritance, and polymorphism, and to give simple examples on them from C++ and Java.	The student is unable to describe the meanings of data encapsulation, inheritance, and polymorphism, and to give simple examples on them from C++ and Java.
Trends in Object Oriented Methods	The student acquires excellent knowledge in the current and future applications of object oriented methods	The student acquires good knowledge in the current and future applications of object oriented methods	The student acquires satisfactory knowledge in the current and future applications of object oriented methods	The student acquires a very little knowledge in the current and future applications of object oriented methods	The student have not gained any knowledge in the current and future applications of object oriented methods

Non-cognitive skills

Questionnaire for self-assessment of gain of Attention and Motivation through the Video-Based Course through LMS Moodle

Attention and motivation

Based on the characteristics described in Section 1.5, the criteria can be formulated to create the questionnaire to measure motivation. Considering the engagement and motivation aspects, the gain of the attitude 'Attention and Motivation' as a result of viewing the video can be assessed. The questionnaire to measure the effectiveness of the video is hence formed using the 9 characteristics to assess the gain of Attention and Motivation by listening to the video content listed as:

- Stimulation of curiosity
- Quality helping to hold attention
- Appease
- Element of surprise
- Presentation enabling ease of understanding
- Enjoyable when recollected
- Content matching student's personal interest
- Inspiration for software development
- Inspiration for video content development

Each of these statements was rated on a scale of 1 to 5. The questionnaire to measure Attention and Motivation was prepared on five point Likert-type scale and the objects labeled as:

Strongly disagree : 1, Disagree : 2, Neutral :3, Agree : 4, Strongly agree : 5.

Validity and reliability

Validity was tested by qualified and competent Professors. The reliability of the "Attention and Motivation" questionnaire was tested by calculating Cronbach Alpha Coefficient. The value of Cronbach Alpha was 0.78 which is better than the acceptable limit of 0.6. Reliability of the survey instrument is the measure to determine the consistency of similar measures in a scale in producing similar results (Rosenthal & Rosnow, 1984). It has two dimensions, namely, repeatability and internal consistency. Internal consistency refers to the ability of a scale item to correlate with other items in the scale that are intended for the measurement of the same construct. Items measuring the same construct are expected to be positively correlated with each other. A common measure of internal consistency of a measurement instrument is Cronbach's alpha (Cronbach, 1951). In general, a scale is considered reliable in measuring the construct, if the Cronbach's alpha value is greater than 0.7 (Nunnally, 1978).

Questionnaire for self-assessment of gain of confidence for communication by attending course through LMS Moodle

Confidence for communication

Based on the characteristics of engagement and motivation, it is understood that, Confidence is an affective aspect which causes Engagement, Challenge of expression is created by Cognitive engagement and the interest and initiative to share the learning experience, and

Interactions show the Behavioral engagement. Hence with characteristics from engagement aspects and ARCS instructional model of Motivation, the characteristics for gaining Confidence for Communication are located. The following 11 characteristics comprise the assessment of the gain of Confidence for Communication by participating in the activities of the LMS Moodle.

- Encouragement for active participation
- Variety of resources and activities retaining attention
- Participation in small group discussions – starters
- Initiative to interact with teachers to review assignments, tests or to ask doubts
- Contribution to discussions through questions
- Challenge to express
- Motivation to complete tasks for future Satisfaction in activity completion
- Gain of confidence to express ideas through discussion forum participation
- Feedback and comment
- Confidence and interest to share the experience with others

Each of these statements was rated on a scale of 1 to 5. The questionnaire to measure Confidence for Communication was prepared with a five point Likert-type scale and the objects labeled as:

Strongly disagree : 1, Disagree : 2, Neutral :3, Agree : 4, Strongly agree : 5.

Validity and Reliability

Validity was tested by qualified and competent Professors. The reliability of the "Confidence for Communication" questionnaire was tested by calculating Cronbach Alpha Coefficient. The value of Cronbach Alpha was 0.86 which is better than the acceptable limit of 0.6.

Questionnaire for self-assessment of gain of Self-learning capability by attending the Video-Based Course through LMS Moodle

Self-learning capability

Based on the qualities of Self learners as discussed and approved by Bandura (1994), the questionnaire meant to measure self-learning capability is designed with 7 criteria as listed below:

- Enjoying discovery of new ways for task completion
- Trying to get the association between unknown to known
- Developing useful ways to learn
- Active participation in class activities
- Ability to find ways to make the course interesting
- Confidence to self-learn and perform well
- Interest to extend the experience gained to other subject learning

- Scoring of the variable

Each of these statements were to be rated on a scale of 1 to 5. The questionnaire to measure Self-learning capability was prepared with a five point Likert-type scale and the objects labeled as:

Strongly disagree : 1, Disagree : 2, Neutral :3, Agree : 4, Strongly agree : 5.

Validity and reliability

Validity was tested by qualified and competent Professors. The reliability of the "Self-learning capability" questionnaire was tested by calculating Cronbach Alpha Coefficient. The value of Cronbach Alpha was 0.72 which is better than the acceptable limit of 0.6.

Implementation, data collection and analysis

The researcher approached Principals, HODs, concerned faculty, met students as a whole class and a few faculty members. While meeting the students, the researcher made a presentation on the significance of the problem in hand and explained to them about how they may be benefitted by participating in the course. Then the researcher got the contact details of students and their opinions about the research project by distributing a hardcopy of a questionnaire and getting it filled up. Also a pretest was conducted. They were given an introduction about working with Moodle. The researcher took the responsibility of registering the students and faculty from an institution into the course. The contacts throughout the course and tests at the end were conducted fully online.

After the course is administered for a week for batches of size 30 students and 4 faculty members, as per a schedule with defined roles and responsibilities to the faculty and students, the self-assessment questionnaires are administered to the students through Moodle and responses are collected from around 400 students. The collected data are analyzed.

Conclusions

A critical appraisal of the existing literature and research reports on the technology enabled learning, constructivist theory, cognitive theories of learning suggest that students learn better when the instruction is provided in visual format using "Videos". Hence, when video based learning mode is embedded in LMS tools like Moodle, it could benefit the students by enhancing their understanding, engagement and ultimately improving their learning outcome. When the design and development is based on the improvement in the LOs and non-cognitive skills, the module may become more fruitful. This fact supports the attempt of the researcher in undertaking the current problem. The rationale of this research was to "Design and Development of Video-Based Courseware for LMS envisioned on LO and non-cognitive skills"; subsequently measure the effectiveness of the same by administering with a sample of students.

The research work was divided into different parts. The focus of the first part was on the design and development of the video-based lessons on "OOAD" to be administered through the Moodle LMS. The focus of the next part was on observing the effectiveness of the video-based lessons when administered through LMS; assessment of the learning outcome of the students and assessing the gain of non-cognitive skills namely "Attention and Motivation", "Confidence for Communication" and "Self-Learning capability" by participating in the course. A formative evaluation of the video based learning using Moodle LMS was also undertaken by analyzing the interactions and experiences of students with tools of LMS like Quiz, Assignment, Forum and Chat. The final part of the research focused on the measurement and analysis of experiences of students and faculty members with the proposed video-based courseware on Moodle LMS.

Design and development of video modules & LMS courseware

Video production was done based on a pedagogical basis. The developed Video was validated for content and constructed by subject and media experts respectively. A questionnaire was designed based on QAMLM standards prescribed by CEMCA; opinion was obtained from 60 faculty members who taught Computer Science.

As the step towards Implementation of the course, the website www.mahalmsforcs.com a schedule is formed; the roles and responsibilities are formed. The four roles are Administrator, Course Creator, Teacher and Student. The researcher played the role of site administrator and course creator. The responsibilities and roles are planned for 3 stages namely (i) before the course, (ii) during the course and (iii) at the end of the course. The responsibilities include giving support, confidence and instruction to the participating teachers and students at every stage regarding how to gain entry and take up the course till completion.

Learning outcome & non-cognitive skills

The results of comparison between the pre-test (M = 84.88) and the post-test (M = 87.79) show that there was significant gain in the knowledge of students on "Object Oriented Methods" due to the participation in Video-based courses through Moodle LMS. The level of significance was 0.01 level with paired sample t-value as 10.606. Learning Outcome of each student was evaluated on the basis of the performance in the course activities as a percentage and a grade based on rubrics; the score and grade were presented to the students through a Performance Certificate sent through email on completion of the course.

The analysis of data collection from the students showed a more positive perception toward the Video based Course on "Object Oriented Methods" using Moodle LMS. The mean rating of students for the variables are "Attention and Motivation" (M = 4.24), "Confidence for Communication" (M=4.46) and "Self-learning Capability" (M=4.30) each out of 5 was better.

Experiences during design, development of video

Some of the experiences gained by the researcher in the design and development of Video Content Using Moodle LMS is explained below:

Video content development is found to be expensive in terms of resources required which includes a studio, equipment, trained manpower and supporting manpower.

1. Bringing together the subject experts and the media experts in the production crew is the most difficult job, since each of them has his own tight schedules.
2. Creating write-up, development of script, and collection of visuals are done with better quality in shorter durations when done in a team of like-minded experts rather than done alone.
3. While the job of developing examples for abstract concepts is challenging, it can be extended to an innovative way, that is, good lecture videos from the available repositories can be taken and contemporary examples in the form of visuals including images, videos and animations can be added to give it a new appeal.
4. Though video production is done with a clear plan and taken care of at each stage, achievement of 100 percent of what is conceived and perceived before developing the video in the case of Educational Video Production where heavy budget allocation is difficult.
5. Video through LMS provides an opportunity to add the left out portions of the content that could not be included in the video to be added through the resources in the courseware for the LMS like text and PowerPoint presentations.

Experiences during implementation of moodle course

Some of the experiences gained by the researcher in the implementation of the course using Moodle LMS is stated below:

1. Ensuring students' participation in the course was not easy in the beginning of every batch. They had to be motivated and clarifications with reminders on the course through Email, SMS and calls in mobile phones were found necessary.
2. Students expressed eagerness to learn, once they understood how to use the tools in Moodle for the various activities.
3. Managing the files and various scores and the network traffic in the site was a challenging job.
4. Training the faculty in the use of the LMS was challenging in each batch, the reason being they were overworked and had less time to explore into Moodle, and then to guide the students in the course
5. However, most of the faculty found it useful, interesting and rewarding at the end of the course.

Limitations

Some of the limitations of the current research work are listed below:

- The course was administered only for a short period, a week covering a part of the subject Object Oriented Methods (OOM).
- Only a few activities like "Quiz", "Assignment", "Forum" were included in the Moodle LMS framework in this research.
- Only three non-cognitive skills were considered in this research.

- Only a quasi-experimental study was conducted.

Recommendations and suggestions

The major recommendations and suggestions provided as an outcome of the research study is given below:

- The teaching and learning process should not be confined solely to the traditional mode involving lectures (one way communication). Rather other approaches in teaching and learning like ELearning have to be introduced effectively.
- The study recommends that faculty members are provided training in creating video based lectures on their favorite subjects.
- It is recommended that education institutions can form a team comprising a team of students and faculty members to make videos on each subject and store them in the repository for common access and usage.
- It is also suggested that existing videos lectures and online instructional resources can be used after seeking appropriate permissions instead of creating video lessons for all the modules in the syllabus.
- It is recommended that institutions can consider mandatorily introducing at least one Moodle LMS based course in initial years of graduate study.
- Formative evaluation activities and weightage given can be flexible based on the type of the topic rather than making the same pattern for all courses.
- As the course progresses, more questions and more quiz events at higher order thinking skills can be given as an added option for better performers to raise themselves still higher.
- It is recommended to prepare courses in different formats and media so as to accommodate students with different learning styles and learning orientations.
- The motto of every ELearning initiatives in the institutions should focus on four factors viz. reusability, interoperability, accessibility, and modularization.
- The success of LMS based ELearning courses strongly depends on the commitment of teaching faculty. Hence, it is suggested that training has to be imparted to teaching members by organizing workshops, interventions and short term courses from time to time, so as to empower teachers and enable them to develop their own courses effectively.

Scope for future research

Some of the scope for further research in the present work is highlighted below:

- The effectiveness of video-based learning can be investigated in detail with different types of videos contents like video lectures, animations, simulation videos, animated characters and others.
- Effectiveness of video-based learning on improving students' outcome can be investigated for different courses with longer duration involving more contents.
- The effectiveness of different LMS (other than Moodle) can be investigated by integrating video based learning. The results of students' experience and learning outcome across different LMS based learning can be compared.

- The study was conducted as a cross-sectional study in which students attended the video based LMS course simultaneously. It is suggested that future research may focus on conducting a longitudinal study involving the same set of samples (students) over a period of time and investigating their involvement, engagement and measuring their learning outcome.

Conclusion

The growth and development in the Elearning tools and technologies pose significant challenges and opportunities to the educators in designing the learning experiences for millennial students. The insights and cognizance gained from the review of literature together with the inputs from the experts enabled the researcher to design and develop an effective video based courseware in "Object-Oriented Methods (OOM)" and implement the course in Moodle LMS. A convenient sample of 400 student respondents who attended the course in Moodle LMS were optimistic by expressing their positive experiences with the proposed Elearning environment. The results of the data analysis has evidenced the results of the evaluation of videos.

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Chapter Six

Students psychology towards the technological changes in the education sector

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Abstract

Over the past few centuries, the emergence of modern technologies has drastically changed our world. There are transformations and changes in the means of communication, customs, culture, and even the inter-personal relationships of human beings. Education is one of the most important institutional processes that have been highly influenced by the inception of technological advancements. Although it has positively impacted humans in a great deal, there are large amounts of unfortunate consequences that are to be least considered, and mental health is one of these subjects that is highly ignored by most. We focus here on how technological advancements in education systems affect the mental health of students. The intent is to provide awareness about the neglected consequences of technology.

Keywords: Inter-personal relationship, Cognition, online learning, Technological advancements, Education sector, Psychological impacts.

Introduction

In the present scenario, our eyeballs are rolling intentionally more than the eyeballs of stock market brokers. It means that developing technology has taken over into every corner of our life unknowingly by surfing the internet, using gadgets, tablets, smartphones and computers had a great impact on our body and mind (Rowan, 2017; Cowie, 2013). Compared with fifty years ago, we capture three times more information in our daily life. Statistics highlight that people are spending an average of twelve hours in front of computers, mobile phones and others (Chou, 2005). Despite what we all know, techno tailings are bad for us mentally and physically.

Multitasking is common and normal, and however people feel like they are more competent, but the studies show it has the opposite effect. It is very difficult for multitasking personalities to filter irrelevant information when they are concentrating on one task at a time. Spending much more time with technological gadgets will reduce our life period even if you are cycling, swimming and jogging one hour per day (Haughton, 2015). The detailed experimentation confirms that the women who remained stuck to their seats over six hours a day were 37% more likely to lose their life during the time period studied than persons who sat less than three hours per day (Amichai-Hamburger, 2003). Technology permits the peoples to attach without the restrictions of geography, it makes the activities more competent and it supplements the effectiveness and intelligence of our brain. However, it's terribly vital variability of identical positive features, the public as a whole usually doesn't contemplate it conjointly has negative attributes as well. Youth are significantly prone to these probable negative effects like emotional instability, deteriorating memory, ineffective eyesight, hearing issues, joint and muscular pain and Heart problems (Kautiainen, 2005).

During this era, self-motivated youths are trying to earn much to become financially self esteemed with the guidelines and necessary certifications supplied by pinnacle organizations (Halupa, 2020). Variety of techniques and guidelines are tainted in the information superhighway to achieve the target (Mitchell, 2011). For example, ambitious youths are getting attraction from all over the world through hyperspace by showing their skills, photography, blog writing, cooking, artwork and plenty of other significant activities (Vagg, 2020). Developing technology provides a platform to serve humans leisure as a stress reliever by performing through Youtube and other social media (Mitchell, 2011). The Internet is one of the major resources wherein things go viral with the speed of light (Hammoglu, 2018). Ultimately, the focus of every budding technology is to practice it constructively and not for the negative activities. Though the lifetime is short, energetic and enthusiastic youths are attempting to learn new things as much as possible in the existence period. Prominent apps like Amazon, Zomato and Ola Caps are making our lifestyles easy. They have made our life a whole lot less difficult than earlier than it was. vocal exchange of money has become smooth among all. Developing communication devices are made easier to connect others around the world. All these technological developments are coined by young minds. Even then, they are the resource of our present and future. Significant care and continuous guidelines are needed for the young minds to overcome the opposite effects. However, our lifestyles are in a series form or alternative form, all the living things are connected to each other in the life cycle. Frequent effects have been observed when the people are wrong. This will trigger a respectable life in

the meantime if anybody acts truthfully, which stimulates others in a right way. Right utilization of technology leads the people in a correct way (Siddhpura, 2020). With the intention of moving towards a valuable and productive lifespan, technology should be utilized in an appropriate way. “One machine can do the work of fifty ordinary men. No machine can do the work of one extraordinary man. - Elbert Hubbard".

Despite the mentioned advantages, mobile conversation influences humans in a bad way in terms of being sociable and making face-to-face contact. Human relations and communication have drastically decreased in the mobile communication era. There’s much less non-public time, in which you locate which you don't have enough time for yourself because you’re continually in touch with a person. Similarly, it leads to distracting us from our regular activities. There may be additional loss of privacy, because all and sundry can discover you anywhere, at any time of the day. In the end, all these items impact how humans act today. Without technological advancements, our way of lifestyles would no longer be as complicated. Technological impacts form the way human beings act these days.

In this aspect, we will see how technological advancements in the educational sector affects the psychology of students. Psychology is defined as “the study of behavior” ‘which refers to any observable action of a body; that includes all the motor activities, affective activities, and cognitive activities. It does not just cover the overt behavior but also includes covert behavior considering an individual’s inner experiences, mental processes, subconscious, and unconsciousness.

Education and Technology

Education is a kind of process that takes part in every aspect of human life in various manners for leading a good meaningful life. It means the act of teaching or training (Rao, 2014). In the education sectors, over the past 19th century, the teacher will provide knowledge to the students through blackboard by referring to some standard textbooks. In this case, the teacher will act as an instructor, and students will become a listener, which is almost a one-way communication. Then, students feel very difficult while preparing for the exams because they don’t have a clear idea about the content to learn, and they miss out on information in their absence (Johan, 2014).

In the present 21st century, Technology plays an inevitable role in the education sector which makes the students interactive, forceful and retains concepts better. In this COVID-19 pandemic situation, the use of ICT tools by the teacher has become an essential one by PowerPoint presentation, 3D visualization tools, and computers integrated with softwares, digital cameras and digital boards. It enhances the students' learning ability, to participate more among the classroom and be more interesting (Raja, 2018). This chapter aims to focus about the psychological effects of four divisive technologies in the present scenario for the following education sectors:

- Virtual reality
- Artificial Intelligence and Machine Learning
- Social Media
- Biometrics

Virtual reality

Virtual reality (VR) is a computer-generated environment that gives a realistic experience on various subjects for the users. It creates an artificial environment that is well detailed, designed, and structured to provide a convincing naturalistic vision. VR has now entered the educational sector and has become an exciting learning method for students. Its feature of viewing things in 3-dimension has enhanced the understanding skills of the students. It also allows students to view from all angles providing a complete 360-degree view; this delivers a realistic experience.

Virtual field trips

There are many examples of VR applications in the education process. For instance, virtual field trips allow students to visit and explore various destinations such as museums, research centres, monuments, and even space virtually. It helps in improving geographical, historical, and astronomical knowledge for the learners.

Virtual labs

The virtual laboratory is a computer-based research program where learners can view experiments, interact with experimental apparatus, and conduct new research through a digital platform. This is becoming a great substitute for real-physical laboratories.

Telerobotics

Telerobotics enable learners to control a robot from any distance with virtual reality as an inclusive feature. Students can experience being wherever the robot is and can see and perceive everything live in a first-person view. In the field of education, telerobotics play an interesting role, it enables the students to witness live surgeries, visit research centres, and interact with researchers and professors.

Psychological perspective of virtual reality (VR)

With so many advantages, Virtual Reality has become a new essential innovation. Its main goal is to deeply immerse the users into a whole new world. It is designed carefully to keep the users engaged in it. In the book, Understanding Virtual Reality, Interface, Application, and Design (Sherman & Craig, 2003) has mentioned 4 key features of Virtual Reality. First, virtual reality uses an imaginary space which exists independently from the real environment, this space is made using computer graphics and visual elements. Second, when the users in the virtual space they are completely cut out from the real world on a sensory level by the usage of sounds fully immersing the users into the virtual world. Third, VR uses a sensory feedback feature that tracks the head movements of the users so that the program changes its directions accordingly giving an illusion that they are moving around in the virtual world. Lastly, VR interacts with the users using virtual elements, for example picking up an apple or pressing a button. These key features of Virtual Reality engage the students in the virtual world on an emotional level which provides a realistic experience.

Baños et al. (2006) and Riva et al. (2017) states that VR induces moods in the users. These 'moods' include positive emotions such as interest, attentiveness, and a feeling of presence and it also includes negative emotions such as anger and fear. Riva et al. (2017) found that the feeling of "presence" that is felt while in the virtual world is the main reason to make VR feel realistic. This type of engagement deeply roots the information in the students. Canli et al. (2000) experimented on 'Event-related activation in the human amygdala associated with later memory for individual emotional experience'. Their aim was to show that emotive imagery will be remembered better than those that triggered little emotion, they studied whether amygdala was sensitive to varying degrees of emotion and whether the activation of amygdala enhances the memory. As they aimed, the experiment proved that amygdala activation increases while viewing emotive imagery and that it creates a longer lasting memory. In relation to this psychological experiment, we can say that experiencing virtual reality, triggers the emotions with its vivid, well defined and realistic imagery and so it increases the activation of amygdala; therefore, enhancing the memory of the experience. From this we can conclude that using VR in education will help the students remember the information for a long period.

It is very essential to know both the positive and negative sides of Virtual reality, it is stated that using VR can cause some physiological problems such as nausea or dizziness (Regan 1995; Akiduki et al., 2003) and eye fatigue (Cao et al., 2019). However, there is little information about the negative psychological effects of VR. Slater et al. (2006) states that VR has an ability to evoke negative emotions as it can stimulate emotional arousals that are close to reality. Since VR is very much identical to real life, any negative emotion caused during a virtual reality program will be intensified. It is also reported that VR reduces cognitive performance. Virtual laboratories for example, interact with the students by allowing them to control the computer program. Even though VR is close to reality, it is not real.So, it is less likely for the students to understand how the concepts can be applied in real life. It can be easy to watch an experiment virtually but doing an experiment in person is the real task. When students start to learn a concept using VR by just watching computerized programs, it will reduce their performance skills, thinking skills and problem-solving skills on that particular concept. In the case of Virtual field trips, students are fully immersed into the virtual world being manipulated by its key features that (Sherman & Craig, 2003) mentioned. This might be an interesting way to learn but it sometimes leads to stress, anxiety and physiological effects such as fatigue and headache.

Artificial intelligence

Artificial intelligence (AI), is a machine programmed which has an artificially programmed human intelligence. This can be a robot, an app, a software, or a device. The first AI program was developed in 1955 and from then it has been a very successful invention. Today, AI is being used in various fields and is still being upgraded in many innovative ways bringing up excellent new inventions. These include many mind-blowing inventions that are very much useful in the field of education such as robotics and mobile apps.

Robotics

Robotics is a small branch of technology that studies how a robot is designed, programmed, and engineered. A robot is basically a machine (mostly a human-like figure) that is developed to perform particular tasks. Robotics combined with AI makes the AI robots which are designed in a way that it can react on its own, it senses a specific stimulus and gives an appropriate response to it. In simple words, it is a machine with intelligence. In the field of education, robotics is bringing advanced changes. Robots are being created to teach, respond, and to have effective communication with students. One day these teaching-robots may replace all human teachers.

Mobile apps

Mobile apps are software programs on a mobile device, these include communication apps, gaming apps, search engines, and social media. One category in mobile apps are educational apps, these apps consist of various courses to study, such as Udemy and Coursera. It provides enough study materials that are required for a student to understand the content. It also conducts quizzes and tests to expertise the learner in that subject. Some of these study apps (Example: Duolingo- language learning app) uses AI to understand the learner's level of skills by their input and it trains them accordingly, i.e, it can be personalized appropriate to the student's level of understanding.

Gamification

Gamification is the app that is made with tools to create a game-like program that encourages the user's engagement, learning apps also come in a "gamified" form to increase the involvement of learners (for example, the app Duolingo uses gamification techniques to help and train the learners to remember new words or phrases of a language).

Psychological perspective - Artificial intelligence (AI)

AI robot teachers can be an interesting mode of teaching for the students. They can have very effective communication with students like a normal human. However, these robots don't have human feelings, they acquire only the programmed skills. Therefore, they have limitations, a human teacher can have a personal connection with the students, they can understand the students' emotions, and can change their way of teaching in various methods. Even though AI provides personalized teaching, a robot cannot think or understand why a student is making a mistake and what problem they are facing, but a human teacher can communicate these problems to the students and resolve them. In short, if human teachers are replaced by bots, students will lack the human touch and emotional connection with the teacher. A teacher plays an essential role in a person's development, especially during the developmental stage 'early childhood' (2-6 years). Fenech (2007) states that a teacher has to fulfill two goals of a child during their early childhood. First, they must prepare the child academically, socially, physically, and emotionally for their age. Second, the teacher must foster, care, and provide security for the child in the absence of parents. Teachers do not just educate a child, they play

an important role in the child's social development and a teacher's role determines the future potential of a person. These humane roles cannot be fulfilled by a robot, so the students taught by a robot may not be well socially developed. Mobile apps on the other hand have become a comfortable mode of learning. Gamification method has made educational apps much more interesting. This makes learning easier and various subjects are just at the finger-tip. Here, there is a possibility that the students might develop a dependency on the mobile apps. This has contributed to the increase in home-schooling in the past few years. Home-schooling can be great for many students, but this may not help them develop their social personality. In some cases, it could be a cause of Antisocial personality disorder.

Social media

Social media initiates addition among the people with invariable age limits. It would become an unhealthy habit to endlessly search the data feeds of exclusive social media websites. Experts believe that inside the brain, a few roles such as 'likes' and 'shares' set off the praise center. Unknowingly, our moods are often influenced by these functions. This might be the way in which young people are more attracted towards the digital network than adults. We love our friends and relation; both are influencing how we think of ourselves as social beings. Our day today activities are fully dependent on which is based around social media, this drives a lot of our actions. Young minds attracted towards digital networks literally end up with killing of productive time by posting pictures, digital information shared and watching digital media in the websites as they track day by day. Other tasks, such as learning, regular school activities, sports, and other positive activities, conflict with this addiction.

Online classes:

As a result of COVID-19 pandemic, schools, colleges are locked up all over the world. More than 1.2 billion students are not allowed to enter the school and college premises. Education departments are urging to implement an emerging e-learning technique to overcome this issue. Teaching is carried out remotely on digital platforms to impart knowledge to the students. By means of this unexpected shift away from the regular classrooms in several regions of the earth, few people have thought that the implementation of e-learning will continue post-pandemic and what will be the impact of this shift on the global education market. The online classes are conducted in various platforms like Google meet, Microsoft teams, Zoom Meeting, Kahoot, Photomath and prezi. The acceptance of online platform study for the student's acceptance ratio lies in the range of 60-70 % for our subject as shown in Figure 1.

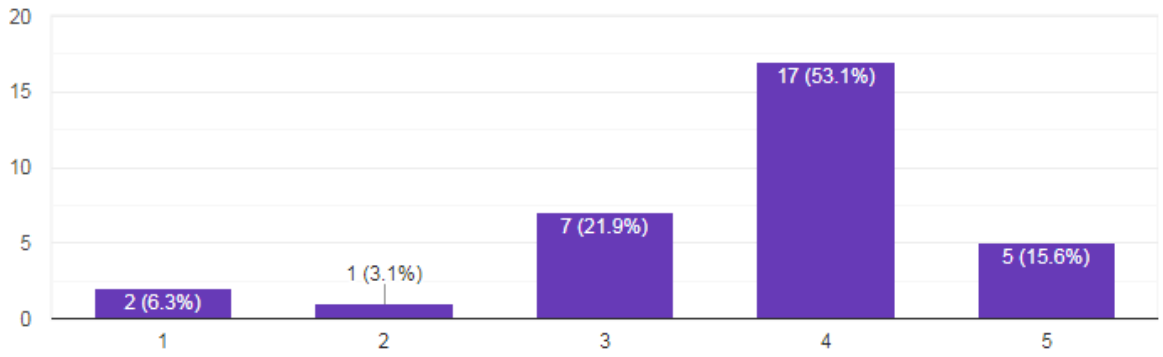

Figure 1: Students acceptance in relation to online classes

Social networking apps

The communication occurs more rapidly between two known individuals, two unknown individuals and groups of people through various social networking apps like WhatsApp, Facebook, Linkedin, Twitter, YouTube, Contentcal, Telegram and Instagram. Due to these apps the relationship among family members has an adverse effect in comparison to previous generations.

Psychological perspective – Social media

Social media has become the new sector of education now. The COVID-19 pandemic has toppled the system of education, it is completely technology based now. Students socialise a lot in schools and colleges, meeting new people and having a human touch is a very essential part of life. Online classes have cut down that opportunity and socialisation has also been vastly digitalised. This promotes sedentary behaviour rather than encouraging the students to live a physically active life. Apart from the physiological problems that come with this style of life, it also causes too many psychological problems. It is reported that physically active children have a greater body satisfaction, self-esteem, and physical self-perceptions than the ones living a sedentary life (Health Education Authority, 1998). Likewise, a positive relationship between amount of exercise and both physical and mental quality of life measures has been observed in healthy adults (Martin et al., 2009). Online classes have led to the increase in social media usage. Instagram, Facebook, Snap chat and Twitter are the main social networking apps that are most commonly used as a communication medium by the young generation today. Posts, stories, tweets and snaps can be useful to update your daily activities to friends, share your thoughts and keep in touch with everyone. Meanwhile, there is also a darker side of it. Likes and comments a feature plays a huge role in affecting mental health. The one that gets a lot of likes, views and positive comments feel positive about themselves, whereas, the one that gets least likes start to feel insecure and low about themselves. Social media has also contributed to a new psychological fear FOMO (fear of missing out).

All this elevates anxiety, stress and causes depression. It was found that forty five percent of British adults feel restlessness when they are not able to access their social networking sites (Anxiety, 2012). The Hearty Soul (2016) states that the longer you spend on social media the more depressed you are, further it also reports that social networking apps are less helpful to students in remaining more focused and less stressed. Kaur and Bashir (2015) researched both positive and negative effects of social media on mental health of adolescents, positive effects include socialization, enhanced communication, learning opportunities and access to health information. While negative aspects include depression, fatigue, stress, suppression of emotion and decline of intellectual ability. In severe cases, it might lead to disorders. Distress and anxiety caused by social media can cause Social media anxiety disorder. Lack of real-life socialization due to digitalisation might cause Anti-social personality disorder. It has also increased the number of cases of Anorexia Nervosa, this is caused by the influence of media in "beauty roles", victims of anorexia starve themselves to lose weight hoping to look beautiful. It is predicted that depression caused by social media and online classes can promote suicidal thoughts. India Today (2020) and Nath (2020) has mentioned that the rates of suicide has

increased during the COVID-19 pandemic and the major causes of the suicide of young students is stress and depression created by long screen-time during online classes. Humans are social animals; they require socialisation in order to survive a normal healthy life. Umberson and Montez (2010) believes that quality and quantity of social relationships affect behavior, physical health, mental health and mortality risk. The longer a person spends their time on gadgets the less socialised they become. Depression is associated with negative social interactions and social isolation (Schuster et al., 1990; Chou et al., 2011) and suicide (Holmaetal., 2010). It is evident that this causes a decline of proper mental health.

Biometrics

The word ‘‘biometrics’’ derives from the Greek words Bio (life) and metron (measure). It is basically a security-based application that authenticates using biological data like fingerprint, iris, and face. Nowadays this biometrics system is used in educational sectors to enhance the security and to count the attendance of a student. These sectors often use fingerprint or Identity Card data authentication, when a student enters the building by authentication, their attendance is also automatically calculated.

Psychological perspective

As biometrics is a technological advancement in educational sectors, it might create an ambience of being a “high-tech” environment. It provokes a feeling of being in a formal artificial setting. Hence, the faculty there may be considered as a higher authoritarian person than in other educational sectors. Milgram (1963) in his study of ‘Obedience’ found that people are more obedient to an authoritarian person and that obedience could even harm a person. Now, in relation to this study, we can predict that students tend to be more obedient in a formal setting especially while being in a highly secure environment. This obedience could result in active participation and increased attendance of a student.

Table 1: Technology vs Psychological effects

Technology	**Psychological effects**
Virtual reality	● Amygdala activation Increases which creates long lasting memory. ● It creates interest and attentiveness ● Anger and fear
Artificial Intelligence	● Lack of live interaction with real teachers. ● Home schooling increases that leads to loneliness.

Social media	● Promotes sedentary behaviour ● FOMO (Fear of missing out) ● Emotionalism ● Depression ,stress, Loneliness and anxiety ● Social media anxiety disorder. ● Anti -social personality disorder. ● Anorexia nervosa ● Increase in suicide rates. ● Decline in mental health
Biometrics	● Relation to obedience.

Conclusion

The four divisive technologies in the education sectors concerning the psychological effects are summarized in relation to the current research. Technology always provides better value to the education; in addition to it the better teaching material, teacher student interpersonal relationship, free from social media addiction will enhance the learner's experience. The education sector, particularly institutions should increase the level of learning and to bridge the gap between the institution and industry which is to be considered in relation to industry 4.0.

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Chapter Seven

The role of the university in industry networking through academic spin-offs

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Abstract

Universities are trying to narrow the gap between science and industry and are urging to create specific units, designing specific programs to assist in breaking the raging of knowledge together with academics, businesses and venture capitalists, seeking to facilitate the transfer of knowledge from academia to the industry while infusing an entrepreneurial culture of innovation. The substantial increase in corporate venture capital spending reflected more fundamental shifts. Along with venture capital, banks, individual angel investors, and corporations are among the other providers of capital for these university- industry linkages. The spinoffs have a vital role in the knowledge and technology transfer process as contributors to the regional economic development and in the promotion of the innovation culture. As knowledge and technologies are transferred to the entrepreneurs, their enterprises can improve their operational processes, services or business models, adapting to compete with the evolving

situations and demands of the market. Although participating in a knowledge and technology transfer provides benefits for university and industry, some barriers hinder this process. This article reviews the relationship between academic spin offs and the role of university to support entrepreneurs collocating it in the network of open innovation intermediaries and proposes a significant model that can be a spinoff support for quick, time bound, and immediate use to any industrial requirement.

Keywords: Technology, knowledge management, Open innovation, Industry agents, Networking, Research, Intermediaries, Deficiency resources.

Introduction

Innovation is inter-disciplinary and embodies a remarkable commonality of purpose among the users to expand the interoperability of connected systems which encourage immediate use and function. Innovation brings a lot of benefits to the economy, diminishes wasteful productivity, reduces obsolescence, increases product reliability and facilitates life with better utilization of resources (Krishnan et al., 2018). Elaborations on innovation includes essentials such as life basics and ecology security; development & modernization in health, safety, environment, waste management, exigencies, and welfare; new technology implementations in computing, mobile, automation, space, imagery, and nano sciences; entertainment areas of cinema, dramatics, sounds, lightings, and laser displays; finally the grey- areas can still have scope for inclusion. The endpoints of innovation are IPR - protecting and patenting; Scaleup incubations - laboratory scaling; and Start-ups requiring a link with venture capitals (Marhaban et al., 2017). Institutions are always embedded in specific contexts; creating regularities and stability, but by doing so, both constrain and enable organizational activities. Firms that adopt product stewardship strategies will evidence inclusion of external stakeholders in the product development and planning processes, prevalent in rapidly changing business and natural environment contexts, demanding continual resource reconfiguration (Paul et al., 2018). Multiplication of stakeholders is leading to new organizational, more hybrid models of governance that help the university cope with the increased complexity of networks and linkages with which it is involved (Jongbloed, 2015).

Interactions among regional stakeholders distinguish clusters from pure agglomerations. These links refer likewise, to horizontal and vertical relations between firms, market-based transactions, and untraded or informal relationships as well as to institutional ties between firms, research organisations and public bodies. Channels of knowledge transfer and interactive learning processes comprise horizontal interactions, vertical relations among competitors, formal and informal cooperation, spin-offs and workforce mobility (Terstriep et al., 2012). Amongst the spatial locations of the geographical proximity between the actors and the firms which they support vary significantly, with a firm's legal counsel being the most proximate, followed by investment bankers, venture capitalists, and independent directors (Donald et al., 2005). Transitioning requires the university spinoffs to focus on the design, convergence, imitation and development, reliability enhancement, cost reduction, weight reduction, higher functionality, improved quality, scale of economies, differentiation & customization, further Scope and combination. The inputs can be enhanced in the students through case studies,

activities, presentations, guest talks, visible exhibits, venture capital and networks (Marhaban et al., 2017).

Universities or Higher Education Institutions (HEIs) develop support mechanisms at all levels of the organisation (Olvera, 2019). Universities increasingly aid innovating firms, particularly in less successful regions lacking other support providers (Benneworth & Dawley, 2005). The difference between Innovation and research are as follows. The research is normally Interdisciplinary, a limited interconnect of disciplines, applied to certain hypotheses, interpreted by the Researcher, experiments, discoveries, finally leads to publications and citations. Whereas the innovation follows an Interdisciplinary approach, expanded interoperable systems, for an immediate use & function, understood and cherished by everyone, evolved through trial-error runs, customizations, for change/ new product/ new service, leading to Patent protection and commercialization (Marhaban et al., 2017). Industries can collaborate with universities to carry out the critical mission of transferring knowledge to society, in a wide range of possibilities such as campus hiring, exchanges of academics/industry professionals, joint institutional research collaborations through contracts, consultations, co-patenting and co-publications, spin-off companies, and laboratories financed by industries and other physical facilities, including informal contacts such as meetings and conferences, as in Figure 1 (Olvera., 2019; Umachandran et al., 2020).

Today's public universities are increasingly becoming like enterprising nonprofits. Partly because of financial reasons, they are turning to the private sector to boost or replace their traditional, predominantly public sources of funding (Jongbloed, 2015). Venture capital has emerged as an important intermediary in financial markets, providing capital to young high-technology firms that might have otherwise gone unfunded (Gompers & Lerner, 2001). Spin-offs are not necessarily the best way to commercialize new technology. The larger part of intellectual capital that is commercialized through universities is actually licensed to established companies. Academic Entrepreneurship is well structured and lives up to create a coherent picture of the spin-off phenomenon (Shane et al., 2004). Many of today's social and economic developments are a result of technological discoveries and developments in fields such as communications, information processing, health sciences and energy supply. These promise smarter, more tailored solutions to the tasks we wish to accomplish. To facilitate innovation the intermediaries perform three primary functions. First, they utilise the opportunity to represent a technological frontier for the firm which due to its inexperience may require external support. Later they involve through engagement with multiple stakeholders, in terms of their origins and logic and the ways they assess and value success and failure. Finally they demand the innovation to move beyond product and process innovation to business model innovation, and as such involves expertise sourced through external and unfamiliar collaboration (Paul et al., 2018). University-Industry alliances in Research and Development are the result of deliberate strategies implemented by national and international governing bodies, as well as the university leadership itself, to promote a more direct involvement of universities in research-based innovation and economic development (Jongbloed, 2015).

Theoretical framework

Constantly, firms need to acquire external-resources, especially innovation and knowledge-based resources through interorganizational networks. The term "Open innovation" was born to underline the networking nature of innovation. Open innovation can be defined as the firm ability to manage the knowledge flows among inter-organizational ties, and the ability to combine internal and external resources based on innovation to create added value. According to Resource Dependence Theory firms are an open system depending on contingencies in an external environment. Firms are not self-sufficient, but their behaviour is influenced by a network of relations with other actors with whom they share and acquire resources and capabilities (Kanter, 1979; Pfeffer, 1981; Ulrich & Barney, 1984). Open innovation processes even happen from outside of the company as well as inside to outside. A company can adopt practises related to each of these processes or combine them. Open innovators benefit in acquiring innovations developed from outside. IPR's internally developed were sold to outside companies, when the company had insufficient resources to develop them, they established spin-out firms to continue developing some of its technologies. It is difficult for new companies to penetrate the commercial sector, further the industrial response to recent corona and global economic challenges, the government and private businesses have recognized the need to restructure and deregulate parts of the economy, particularly in the financial sector. During the commercialisation stage, the different products in its portfolio developed from the idea to the product stage inside the firm, can collaborate and co-create with external partners at different stages, and also purchase the rights from outside.

University role

Universities play a key role in open innovation networks, they are considered the main creators of innovation transferring their knowledge and innovation to firms (Sharifi, Liu & Ismail, 2014). Actors that play a central role in relational and spatial terms can be considered open innovators (Waguespack, 2007). The actor positioned strategically in the network structure is engaged to bridge and broker connections with other players (Jonsson et al. 2015). Universities are involved in different knowledge transfer activities as collaborative research, contract research, consultancies activities, and commercialization activities such as providing intellectual patents and academic entrepreneurship (Perkmann & Walsh, 2007). Engagement activities do not represent only an income source but an opportunity for universities to test the results of their research and obtain new results for future research through the collaboration with firms (Lee, Lee & Pennings, 2001). On the other hand, through university collaboration firms obtain advantages such as an easy access to new technologies and a more easy access to new knowledge production provided by university, they increase their research capacities, and an easy access to human resources as young students and researchers. Different kinds of links between universities and industries can exist at different levels. According to Parkman and Walsh (2007), the centrality of universities in the network depends on activities through which it is involved in collaboration with other organizations. The highest level of collaboration where university holds a key role is represented by collaborative research and consultancy, while spin-offs and academic entrepreneurships are considered at an intermediate level due to the fact that academics and students are supposed to have relations with their former university.

Finally the lowest level is represented by commercial agreements that provide intellectual property that is considered more profitable in terms of income but not much in terms of networking and collaboration.

Engagement activities as consultancy and research collaborations look to be negatively related with the research quality of department and university, maybe because high quality department and universities could find other finance resources. Universities must develop consultancies support, so as to learn to work with clients (Benneworth & Dawley, 2005). Commercial activities seem to be positively related to the quality of departments and universities. Indeed, universities having a research focused approach have a greater interest for external organizations to transfer their research. Commercial agreements have a relevant influence in relation between universities and firms. From collaborations firms benefit from the exploitation of knowledge and universities benefit from additional funds. Staged capital infusion may be the most potent control mechanism a venture capitalist can employ. Staged capital infusion keeps the university on a tight financial control and reduces potential losses from bad decisions. The venture capitalist can increase the duration of funding and reduce the frequency of re-evaluation as the spinoff company becomes better established and conflicts with the entrepreneur appear more likely (Gompers & Lerner, 2001). Universities can undertake commercial collaboration providing firms with patents or through academic spinouts that represent an important link between firms and universities transferring information and innovation to firms and providing universities with a network of firms, academic entrepreneurs favor bridges between universities and firms.

So universities characterized by different academic entrepreneurs have a dominant role in networking with firms in sharing knowledge and innovation. Networks between universities and firms can be considered not only in terms of ties and collaboration but also in terms of space and proximity. It's estimated that the spatial location of an university organization can represent a relevant determinant for the development of an open innovation network. Indeed universities located in the center of a region where there is a pool of firms focused on research and development favours the strengthening of ties between the actors (Vallance et al., 2018). In Fact, universities of high quality research cannot be considered drivers of technology economy development, but they usually belong to networks where there are existing entities with a high level of technology background and only by networking can the economy of a specific region be improved. Then, regions characterized by a fragmented technological and innovative reality and a lack of innovation drives as public and private entities tend to have low levels of technology economy. Proximity is considered an important parameter to evaluate the university role and the quality of a collaborative network. According to authors such as Fantino et al. (2015) and Lauren at al. (2011), the proximity to high quality research universities favours collaborations between firms and industry while proximity to low quality universities reduces chances of collaboration. In conclusion, a strong university-firm network depends more on the level of quality research than proximity.

The role of entrepreneur and open innovation intermediaries

A mature entrepreneurial ecosystem can be built gradually by the university students, faculty and entrepreneurs through their progressive creation of innovation intermediaries and coordination among the local players involved in the creation of start-ups. Entrepreneurs, either social or commercial entrepreneurs, enact opportunities. Social entrepreneurship is the combination of pursuing a social mission and applying entrepreneurial creativity, is for sure no cure-it-all, but it might help rethinking the current way we do business. Social entrepreneurs follow a social mission and aim to enhance social wealth, clearly distinguishing them from commercial entrepreneurs who aim to create economic value for themselves and their shareholders. Social entrepreneurship has implications on a firm level, on an institutional level, and on a societal level. Illustratively, Social entrepreneurs can apply the thought of social entrepreneurship to alleviate poverty, fight unemployment, provide basic medical care, enhance integration of disabled people, or improve education. An innovation and entrepreneurship framework that focuses on organizational issues from the corporate management perspective develops the framework, suggesting that the innovation process begins with a trigger in the form of environmental change, and ensuing innovation and entrepreneurship activities may be partly overlapping or parallel, where the initial idea is implemented internally, innovation activities prevail, including project management, gatekeeping and sponsoring. The entrepreneurial route thus chosen, triggers organizational implementation alternatives, which include future partnerships or possible 'spin-ins' into the original company (Muller, 2012).

The 'hub' university plays a leading role in regional and political level, supporting academic entrepreneurship at the operational level based on its evolution from a revenue maximising model to a model that takes account of social and economic regional development (Schaeffer et al., 2016). Entrepreneurship manifests itself throughout the economy in different forms and with different outcomes, such as the creation of wealth; increasing employment; and tackling inequalities and environmental issues. Managers and academics alike had realized that management difficulties led to corporations extracting only a small amount of the value from centralized R&D facilities. Many of the best ideas languished unused or were commercialized in new firms founded by defecting employees (Gompers & Lerner, 2001). Thus by innovating products, services, production processes, organisational forms, and routines, industries generate economic and social value, thus legitimising their role in the economy and society (Paul et al., 2018). Firms commercialize external sources of innovations by obtaining, integrating, and commercializing external innovations is combined with interaction between the firm and its collaborators. Cluster internal interactions need to be complemented with well-developed external cooperation to transfer critical knowledge beyond the cluster boundaries, and thus to reduce the risk of technological lock-ins resulting from 'cluster blindness'(Terstriep et al., 2012). Research on obtaining innovations includes searching, enabling, filtering, and acquiring each category with its own specific set of mechanisms and conditions.

Integrating innovations have been mostly studied from an absorptive capacity perspective, with less attention given to the impact of competencies and culture. Commercializing innovations puts the most emphasis on how external innovations create value rather than how firms capture

value from those innovations. Finally, the interaction phase considers both feedback for the linear process and reciprocal innovation processes such as co-creation, network collaboration, and community innovation (Joel et al., 2013). Lack of resources to commercialize leads to dependence on entrepreneurs as intermediary organizations, which function and provide complementary and related services in support of scientific commercialization, commonly available within their local ecosystems. The five intermediaries are university technology transfer and licensing offices; physical space - incubators, accelerators, and co-working spaces; professional services providers; networking, connecting, and assisting organizations; and finance providers - venture capital, angel investors, public financing, and crowdfunding (Clayton et al., 2018). Venture capitalists have developed a variety of mechanisms to overcome the problems that emerge at each stage of the investment process (Gompers & Lerner, 2001). There is a positive relationship between the technological knowledge obtained from universities and the innovation carried out by firms, with the capacity to acquire and assimilate the knowledge provided by universities, mainly due to being academic spin-offs or having long-term relationships with them, and receiving more knowledge from universities (Isabel et al., 2016). Social groups and organizations can merge tacit knowledge into a powerful source of breakthrough innovation.

The ability to form and nurture these groups maybe even more important to the long-term competitive advantage of organizations than just the transitory benefits of even the most commercially successful innovation. According to the Resource Based Theory (Barney, 2001), the competitive advantage of an enterprise derives from tangible and intangible resources in the organizational asset and the Knowledge-Based View (Grant, 1996) considers knowledge the most valuable resource of a firm. It is almost impossible for competitors to copy tacit knowledge as that is the idea that the prime role of the firm, and the essence of organizational capability, is the integration of knowledge. Moreover, organizations leverage knowledge both within themselves and externally to their stakeholders and customers (Azeredo et al., 2006). The growing diffusion of the internet and an understanding of its implications triggered the increasing corporate interest in venture capital to grapple with these new technologies and their implications. Entrepreneurs overcome information asymmetry between themselves and potential investors by keeping the financing function as an important issue for research (Shane et al., 2002). Venture capital organizations finance high-risk, potentially high-reward projects, purchasing equity or equity-linked stakes while the firms are still privately held. The venture capital process is also subject to various pathologies from time to time, which can create problems for investors or entrepreneurs (Gompers & Lerner, 2001). The different types of private equity investing such as Venture Capital, Mezzanine, Buyout and Distress are represented as overlapping circles within private equity, with some overlap with hedge funds (Andrew et al., 2011).

Innovation is commonly understood as the recombination of existing ideas or the generation of new insights into new processes and products is widely viewed as the primary driver of growth in modern capitalistic economies. The open innovation model is effective with the network of R&D collaborative activities in public research organizations (PROs) in comparison with the network linked to R&D collaborative activities in private firms (Belussi et al., 2008).

Innovating firms engage in both technology exploitation and exploration to be effective in the short run and to survive and prosper in the long term. Of the four types of innovation namely the incremental, disruptive, architectural and radical, the radical innovation is the one which leads to commercialisation of an entirely novel idea, and brings huge economic rewards to firms, it is an activity fraught with risk, as it is new to the firm and its markets, and it is the essence of value creation by large firms and entrepreneurial ventures (Paul et al., 2018). Regional development has always stressed the role of key economic actors in less favoured regions, particularly in high-technology sectors, in making those regions more attractive to outside investors. universities can play a lead role in having a broader systemic effect on the regional economic environment, by plugging gaps in the local regional innovation system. The commercialisation to solve the problems involved in exploiting intellectual property in the impoverished regional innovation system (Benneworth, 2007).

Academic spin-offs in open network

University entrepreneurship is supported by two main features of knowledge: an innovative knowledge that provides the base to understand new technologies addressed to be commercialized and entrepreneurial knowledge that allows to understand entrepreneurial processes and network from where to acquire new resources and expertises, among which university students are included (Shah & Pahnke, 2014). Academic spin-offs develop new business opportunities based on new technologies deriving from research activities, they represent an academic entrepreneurship output, the academic capacity efforts to transfer benefits deriving from university. Academic spin-offs are more specialized to develop disruptive and radical innovation than converting and commercializing innovation, while firms can offer important support in the production, manufacturing and marketing process (Piva, 2008).

Although the constant development of academic units as technology transfer offices and university incubators to support academic spin-offs, these units don't provide enough knowledge related to the market and production. Indeed, academic managers do not always have enough knowledge to recognize business and market opportunities. University spin-offs present some deficiency in terms of knowledge conversion capability, Zahara et al. (2007) identify three dimensions that characterize this capability as "conceptualization and visioning capability" addressed to identify the functionality of a new innovation and which market can be addressed, "configuration and design capability" addressed to build a prototype to convert the innovation in a potential product to distribute and commercialize, and finally " embodiment and integration" addressed to integrate different knowledge and technologies in a product require by the market.

Networking can reduce these deficiencies, industry networks involve actors external from academic context as customers and suppliers, venture capital firms, public political entities, business advisors. Actors belonging to the industry sector are closed to the market and needs of consumers, and are more specialize in prototype and product design, and they favor the conversion of radical innovation from academic context into commercialized products. In order

to face this deficiency academic spin-offs need to extend their networking, Sousa et al. (2017) illustrate the impact of industry networking in terms of size and frequency on capability of academic spin-offs to convert knowledge in marketable products. The size of a network consists in the number of direct ties among academic spin-offs and the rest of companies involved and it represents the amount of knowledge resources to which academic spin-offs can have access (Hoang & Antoncic, 2003). In part a large network favors firms to have access to much heterogeneous information.

The frequency of contacts can be considered as the measure of trustiness degree among the actors in the network. It favours knowledge and resource integration and encourages the development of interaction models among the actors and favours the trust within the networks, which increases substantially the quality of the resources, abilities and information shared. The first dimension "Conceptualization and visioning capability" is positively affected by the networking industry. A large number of contacts with industry sectors favours academic spin offs- to acquire complementary knowledge regarding the recognition of new opportunities, identification of new markets and of the user needs, and information regarding the utilization of the innovation.

Regarding the second dimension related to configuration and design capacity, a large amount of contacts and frequent interactions favor academic spin-offs to implement the ability to translate a knowledge in a prototype. Network contacts allow academic spin-offs to acquire new knowledge related to production, distribution and commercialization. In case of tacit knowledge transfer, more interaction with the industry sector is necessary. The different backgrounds and tacit nature of the knowledge require a more frequent interaction to convert an intrinsic knowledge in the academic organization into a stereotype production. Regarding the third components, "embodiment and integration" industry networks are characterized by actors belonging to different backgrounds that facilitate integration activities. A high frequency of contact allows different actors to know each other better and to identify any knowledge overlapping. In the case of these specific competencies related to the integration and embodiment, the size of the network is not so relevant than the variety of actors. Infact, integration capability requires access to different kinds of knowledge sources and a network of large size does not always correspond to having access to a heterogeneous amount of knowledge.

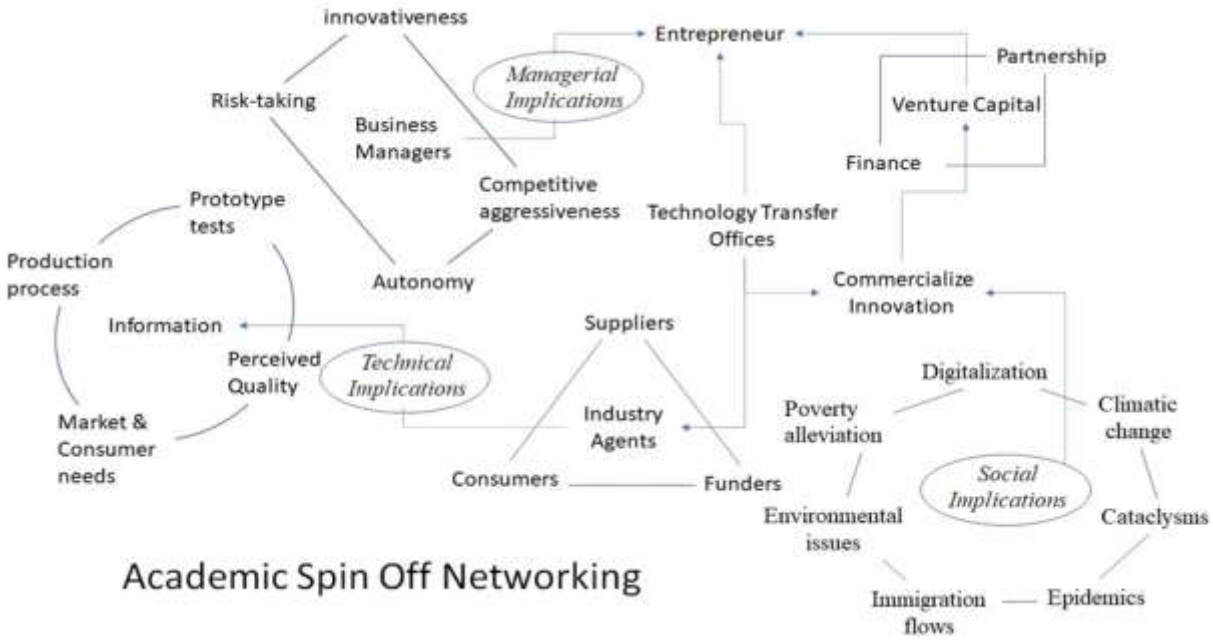

Figure 1: Networking among Industry & Academics

Source: Umachandran et al. (2020)

Innovators have always engaged with their environment, hence open innovation is a paradigm in that the firms can and should use external ideas as well as internal ideas, and internal and external paths to market, and advance their technology. A wide range of media, service, and manufacturing firms realized the potential of the Internet to challenge their traditional ways of doing business which were inadequate in the existing internal resources to address the radically new communications technology. Globalization and social and economic changes in working patterns have increased labour division and the need to integrate talent outside traditional full-time employment arrangements. Interactions with firms' external environment contributes to knowledge acquisition and enhances their learning and innovative capacities. Interactions within clusters can range from competitive to cooperative relationships at vertical, horizontal and lateral level. Cluster internal interactions results from establishment of trustworthy relationships; while with external partners is coloured due to a lack of cognitive proximity always characterised by higher uncertainty and investments (Terstriep et al., 2012). Through Open Innovation, useful knowledge is generally believed to be widely distributed and of high quality. The growing emphasis on knowledge management has a direct effect of its importance for both organizational and social areas. Explicit knowledge is that which can be codified and is therefore communicable in a formal language. Tacit knowledge is highly personalized knowledge, which makes it hard to communicate. Tacit knowledge creation and sharing within, and between, organizations are fundamental for the creation of successful innovations.

Unlike explicit knowledge that can be recorded, tacit knowledge can often be transmitted much more comprehensively through narrative. In fact, the more complex the knowledge, the less effectively it can be codified (Azeredo et al., 2006). Companies adopt an open approach as a direct consequence with strong top management support, focusing primarily on opening the innovation process to source ideas and knowledge. Many corporations reoriented their way in

which they managed the innovation process. Established mainline corporations that had relied on central R&D laboratories for new product ideas during most of the century were exploring alternatives, including joint ventures, acquisitions, and university-based collaborations (Gompers & Lerner, 2001). Improved market institutions such as intellectual property rights, venture capital, and technology standards allow for organizations to trade ideas, and new technologies allow for new ways to collaborate across distances. In addition, research and development are now highly multi-disciplinary and in some areas more resource-intensive, requiring more collaboration, in other cases less resource-intensive to the extent that many distributed researchers can make substantial contributions.

Implications

The seed investments always follow unknowable risks, financial supporters make their decisions based upon their intuitive judgments on extraordinary profitable investments. These intuitive judgments are based on the feeling of decision makers about whether entrepreneurial teams are trusted, are committed, and passionate. The effectively charged judgments are the core of intuition and that intuition has both affective and cognitive components embedding in a dynamic emotion-cognition interaction.Aa process of seed investment decisions of external financial supporters is "truly emotion-cognition interactions". However the reasons can be generalised as that affect the abilities of an academic entrepreneurial team to obtain early-stage investments.

1. The low probability of financial success and the high failure rate of university spin-offs generate the uncertainty of investment returns discouraging the investment decisions of investors.
2. University spin-off has a limited collateral value and a little salvage value in the event of failure.
3. Information asymmetry exists regarding the worth of the spin-off, with entrepreneurs in a position to decide what details about the potential business they will release to investors, limiting their ability to evaluate the proposition and increasing uncertainty (Huynh, 2018).

Variables and factors

Networking plays a key role in affecting academic spin-off performance. The involvement of business managers influences the entrepreneur approach in terms of innovativeness, risk-taking, autonomy and competitive aggressiveness (Diánez-González & Camelo-Ordaz, 2016). Venture capital firms are considered the most relevant actors in the industry network that allow ASOs to have easier access to financial resources. In addition to this, they also provide ASO with new know-how, new partnership, causing an increase of their reputation in the market. Access to financial sources allows ASOs to assume risk-taking behaviour, taking part in projects that can be uncertain in terms of results. Transfer technology offices (TTOs) allow ASOs to commercialize innovation more easily and to obtain more revenues. TTOs favor new and strong relationships with industry agents as suppliers, consumers, funders, and other firms that could facilitate access to information regarding prototype tests, production process, market and consumer needs and quality level perceived by consumers. Finally, collaboration with

TTOs favors easier access to government funds since the support of TTOs represents a guarantee for possible funders and a sponsor for the government.

Managerial implications

The involvement of non-academic managers favours ASO to obtain a stock of resources such as human resources, social networks, skills and to meet and to acquire entrepreneurial traits such as recognizing business opportunities from which obtain a competitive advantage. Managers coming from previous entrepreneurship experiences in academic spin-offs provide managerial and commercial knowledge that academic entrepreneurs don't hold. Academic managers have several knowledge related to technological and scientific context rather than entrepreneurial competencies. Managers from non-academic backgrounds can provide a stock of resources to overcome the ASO limits in management and commercialization and improve their entrepreneur behavior. Managers from business backgrounds are supposed to be risk-taking, flexible and proactive, and to have professional ties with industry sectors to share with academic managers.

Social implications

The engagement of external financial supporters in the seed investments of university spin-offs impacts the capabilities and social networks of entrepreneurial teams. In return the capabilities of entrepreneurial teams affect the decisions of financial supporters to engage in seed investments. The social networks of entrepreneurial teams are likely to have both direct and indirect influences on the decisions of financial supporters through their impact on the capabilities of entrepreneurial teams (Huynh, 2018). Social changes, as digital development, climate changes, natural cataclysms, epidemics, immigration flows, environmental issues, poverty alleviation are external factors that drive firms, industries, capital ventures to invest in research and innovation to satisfy the social needs. University plays a key role training future entrepreneurs, developing models of innovation generating new knowledge to be exploited by commercial and social entrepreneurs. Academic staff and students have a key role in this process, academic spin-offs represent the main actors involved to create radical and disruptive innovation to answer social changes. Networking activities are fundamental to create new technologies, relational and knowledge capabilities skills are required.

Conclusion

Innovation represents an important opportunity to create new business opportunities. University is considered one of the most relevant providers of knowledge and contributor to economic development of a region. The creation of knowledge by itself is not enough, one of the main challenges of the university is to share knowledge with industry sectors that are more closed to the market and customers. Engagement and commercial activities represent the main ways through which universities interact with the industry sector. Academic spin offs represent the main conduit between university and industry, they provide disruptive and radical innovation needed to be converted into a technology product addressed to market needs and industry sectors represent a relevant contribution to the production and marketing process. The universities spin-off productivity may be positive or negative depending on the contribution

offered by different investing sources and the amount of capital required for spin-off is substantial during start-up and then increases in the post start-up period, where the entrepreneurship substitution effects with regard to the amount of innovation using capital, for development, incubation, and demonstration expenses for scalability and market positioning. Conversely when university spin-off companies obtain patents and receive support from the Industrial Research Assistance, will have more demand on luring worthy entrepreneurial buy-in.

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Chapter Eight

Impact of digitalization in organizational learning and knowledge management

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Abstract

The importance of knowledge management in organizational learning and development is well established both in theory and practices. The existing knowledge management (KM) practices in organizations are becoming obsolete and it is necessary to cope with and adapt to new and digitally enabled KM practices. This study critically reviews and highlights the shortcomings of existing KM practices. Second, it brings out the possibilities of digitalization in organizational learning and knowledge management through diverse avenues. Further, it also highlights the implication of digitalization in organizational learning and knowledge management.

Keywords: Knowledge Management, Digitalization, Organizational learning, Organizational Knowledge

Introduction

'If NASA wanted to go to the moon again, it would have to start from scratch, having lost not the data, but the human expertise that took it there last time.'(Brown & Duguid, 2000: 122). Human civilizations existed by creating, accumulating, sharing, and applying 'knowledge' in our day-to-day activities. In the last two decades, an explosive growth in discussion is witnessed about knowledge – knowledge management, knowledge work, knowledge-intensive organizations, knowledge economy and so on. To advance the above discussion on knowledge and knowledge sharing, DIKW Pyramid (refer Figure 1 below) is called upon.

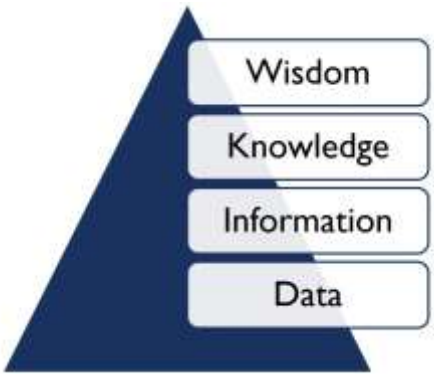

Figure 1: DIKW Pyramid (Rowley, 2007)

In this pyramid, data refers to basic properties of objects which include facts, statistics, and descriptions. These data objects lack context. For instance, computer-aided drawings are examples of data objects. Information is a construct that is generated by processing data and making sense of them. Often this entails embedding basic semantic information about the object so that classification, selection, or sorting is possible (Sawhney et al., 2020). For instance, BIM resides in this layer of information. Knowledge and Wisdom are the two higher level representations in the pyramid. Knowledge refers to the act of making sense of information and deriving further know-how or actionable insights. Wisdom refers to the understanding, appreciation and repeated application of knowledge in different contexts.

Different categories of Knowledge

To develop an effective and successful knowledge management strategy – individuals, teams, and organizations need to understand the different categories of knowledge. These include – explicit, implicit and tacit knowledge.

- ***Explicit knowledge*** – easy to articulate and share. It can be communicated from one to another through different mediums.
- ***Implicit knowledge*** – practical application of explicit knowledge. Skills that are transferable from one job to another are examples of implicit knowledge.
- ***Tacit knowledge*** – knowledge gained from personal experience that is more difficult to express.

Although the phrase 'knowledge management' only came into common usage in the mid-1990s, it is not the case that the management of organizational knowledge processes began by then (Anumba et al. 2008). If that is the case, then how were the Egyptian pyramids, the steam engine or the Apollo spacecraft built? The processes that create and apply knowledge in organizations are labelled as 'knowledge management' (KM). KM also refers to the art and science of optimizing knowledge flows within an organization. The advent of technological growth and changing world, redefines the various drivers of KM as below.

- Quick changes in markets, technology, and competition

- Recognition that innovation is key to competitiveness, and depends on knowledge creation and application
- ·Wealth being demonstrably and increasingly generated from knowledge and intangible assets
- Rediscovery that people are the locus of organisational knowledge
- Growing importance of cross-boundary knowledge transactions
- Making continuous learning essential

As the need for KM are clearly laid out, how do organizations carry out KM activities? KM tools are used for these purposes. The next section describes the KM practices in organizations and the shortcomings of those practices in the digital age.

Research approach

The present study critically reviews the existing body of knowledge on 'knowledge management (KM) practices' across organizations. While the authors utilize the existing literature on KM to position their arguments, it is also bounded by the authors experiences, particularly, Author-1's experience in management of large projects and his real-world exposure to the adoption of KM practices.

Knowledge management in organizations

As Gallupe (2001) states, KM tools are not simply information management tools as they should be 'capable of handling the richness, the content, and the context of the information and not just the information itself'. KM tools adopted should enhance and enable the sub-processes of KM, i.e. knowledge generation, codification, and transfer. Traditionally, KM techniques such as brainstorming, communities of practice (CoPs), face-to-face interaction, post-project reviews, mentoring, training have been in use for a long time. While traditional KM practices are widely adopted across organizations, they have certain shortcomings. These include:

- Knowledge resides in minds of few individuals
- Knowledge transfer mechanisms are not neatly defined
- Intents of decisions taken by organizational managers and top management are not recorded, rather only outcomes are noted.
- Decision makers are often do not share / not available to comment on their decisions
- Strong reliance on capturing lessons but no system to define how to reuse it

Organizational manager's and decision maker's knowledge are largely tacit knowledge, and the existing KM practices do not tap this knowledge. Also, organizations largely believe in post-project reviews. For instance, large project-based organizations gather their core project employees to tap their project knowledge for standardization and re-use of the captured knowledge. However, these post-project reviews also have certain shortcomings. These include:

- Insufficient allocation of time to conduct post-project reviews/lessons learned

- No way to use learnings in same project, emphasis is on next project
- Data/information loss due to time elapsed to capture it
- No effective mechanism to transfer knowledge to non-project team
- Individual groups or departments or virtual organizations capture it, no collaborative approach.

While the existing KM practices and the present-day practices of capturing lessons learned through post-project reviews capture organizational knowledge and enable organizational learning, the shortcomings listed above are inevitable. Hence, the core idea is 'live' capturing of knowledge from organizational stakeholders.

Why "Live" knowledge capture?

- Allows to integrate learnings day to day while projects are in progress
- Can prevent knowledge loss due to time elapsed
- No stress on human memory
- Increases capability to learn faster than the competitors
- Stay ahead of rate of change imposed by external factors
- Probability of forgetting events can be minimized

Capturing of 'live' organizational knowledge can be catalysed through present-day digital technologies. Organizations can take advantage of the available digital technologies to leverage their existing KM practices. The next section covers these aspects.

Knowledge management and digital transformation

Digital transformation is rapidly broadening the range of technologies in use in the workplace. Organizations are filling with new devices, new platforms, and new types of digitally-enabled services. With the rise of the Internet of Things (IoT), many project and organizational processes are now underpinned by entirely new types of devices, frequently in areas of the business that were not previously digitally enabled. Big data systems drive new capabilities and opportunities. The data centre has moved beyond virtualization, to a new hybrid of cloud technologies. Smartphone devices are ubiquitous to access data and information anytime and anywhere. However, these transformations rest on an organization's ability to learn, unlearn and relearn through effective knowledge management.

KM involves the efficient handling of information and resources within an organization, which is an integral part of digital transformation. Managing knowledge provides clarity on the best means of acquiring knowledge, the mechanisms for producing new knowledge and how the learning process undertaken is integrated in practice. This is especially useful in an era where people are more digitally conscious than ever and are comfortable using multiple digital devices. KM helps identify what needs to be digitized. Digitization is the process of digitizing information from an analog format to a digital format. Put simply, it is developing a digital version of a physical artefact or process. For example, it may involve capturing data or information directly on a smartphone or a digital device rather in a physical form. Hence, an

important decision to be made here is to know what data and information needs to be digitized. Without such an understanding, integrity of data and information that is digitized may be incomplete, irrelevant, or incorrect. Also, it is known that the process of digitization yields positive results only when digitization has occurred correctly.

Most organizations misdiagnose a knowledge sharing problem at the implicit knowledge level and they build an intranet or deploy a file sharing solution in an attempt to address their issues. However, these systems fall short when it comes to capturing the context and discussion around explicit knowledge because questions and discussion still have to take place in a siloed system. To ask questions and collaborate, employees/teams still need to rely on chat, e-mail, and shoulder taps – which are not recorded for everyone's benefit.

This silo issue becomes worse when employees/team members are working in different locations and do not have the option to walk over to their co-worker's desk to get additional context or clarification. While dispersed teams may be able to access explicit knowledge, such as a process document or report, in a traditional intranet, it is harder for them to tap into the tacit knowledge of the subject matter experts who produced that content. This creates a gap in organization's ability to retain the tacit knowledge of their subject matter experts. As capturing tacit knowledge has become more important to organizations, artificial intelligence (AI) enabled digital platforms can provide that transformations. The intervention of AI is so necessary, and it can readily serve by:

Connecting to various data sources

Organization relies on information flowing in through multiple data sources. These may include the company intranet, diverse knowledge portals and the interactions and so on. An AI-based knowledge management platform can be integrated with existing enterprise systems to create a single source of knowledge wealth. As a result, employees can access data and required knowledge no matter where it is housed, even from a remotely located device.

Update the organization's knowledge repository in dynamic manner

Governance of organization's knowledge is another area of concern. AI enabled knowledge-sharing platforms could ensure that every record residing in an enterprise system is up to date. Any alteration or addition to existing data is incorporated into the system without entering a new record. This could have a massive impact on employee experience and business success, as every stakeholder is equipped with the latest data at the right time.

Utilizing predictive capabilities to simplify knowledge search

In a large organization with several verticals and business units, qualifying a search query could be a cumbersome task. An AI enabled knowledge-sharing platform leverages the predictive capability of AI to contextualize every query and promptly arrive at the relevant input. Natural language processing (NLP) lets users search for knowledge using the spoken language, and

machine learning algorithms predict the intended search results based on previous documents accessed and shared.

Knowledge engagement platforms make it easy for users to create content, add rich media for additional context, and find anything through a keyword search. Employees can engage in the platform by asking questions, adding comments, or even tagging subject matter experts so that they get notified that they were mentioned. Integrations with existing communication platforms such as Microsoft Teams/Slack is possible so that the valuable knowledge that employees/team members exchange in chat conversations can become part of their company's knowledge base – and so that employees can easily access existing knowledge in real time.

Implications for organizations

To have a real impact of KM on the way businesses are carried out in organizations, then it has got to be about making radical changes in the way organizations utilise knowledge (Sawhney et al., 2020). Following are some key considerations:

- Make KM as an integral part of strategic decisions on profitability and competitiveness at all levels of the organization. The linkages between strategic management and human value need to carefully examine the role of a KM orientation as an effort to support adequately successful strategies.
- As part of knowledge development, it is important that knowledge workers (subject matter experts and other experienced people) are included in a dynamic KM process. Such KM processes and knowledge workers should promote productive relationships between the organization, project, and its environment.
- Determine appropriate mechanisms such as an AI-enabled platform/system for the effective capture, transfer and leveraging of knowledge. As mentioned, communication infrastructure needs to be established within and between the different departments and business units.
- Create an appropriate culture for effective KM. There is a need to encourage the employees' autonomy, so that they may express and share the knowledge they possess in a 'free environment'. Knowledge mechanisms should not limit the potential for creativity and the questioning abilities that are needed to understand the challenges in the wider environment and may be a source of new solutions to problems.
- Determine methods for measuring the extent of KM effectiveness. Audit the knowledge present at, or accessible to, the organization and manage adequately the inventory of 'knowledge repositories'.

Conclusion

In summary, the digital transformation process is an ongoing process and the process is facilitated to a large extent by knowledge management. The two basic aspects of KM lie in identifying what to digitize, and how to digitize optimally. As organizations increase their knowledge management maturity levels, they can develop knowledge management strategies as listed above. These strategies support digital transformation processes for desired results to

be achieved. Finally, there also needs to be more targeted education and training programmes, which should create awareness about knowledge management and digitization processes.

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Chapter Nine

Industry 4.0 technologies applied in teaching & learning

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Abstract

With COVID -19 pandemic, the whole world has put learning and teaching into online mode. This is only a tip of the iceberg. The infrastructural changes that are going to happen in the future, in the post COVID-19 scenario, is very phenomenal towards an emancipation of knowledge explosion, resulting in "know-what", "know-how", "know-why", and "know-where" is going to become widely visible, available and accessible to everyone. Knowledge is no more a latent resource that could be held hostage by an author or by a facilitator or by a user for claiming benefits. The recent online conduct of Teaching and Learning methodology through digital contents is going to gather mass by volume and will also get analysed for quality pruning. In addition, it would also get customised for various target group consumption. The ingredient of learning will change the quality of thinking, usage, and innovation possibility across the world. Industry 4.0 technologies are depending on such explored knowledge repositories and would get astonishing breakthroughs by artificial intelligence (AI) applications. With less of travel and more of virtual connection the world is expected to bloom with inclusivity in people for using a knowledge-cloud that will loom to remove geographical limitations.

Keywords: Industry 4.0, Learning, Teaching, Online, Artificial intelligence, Machine learning, Knowledge management

Introduction

Knowledge excellence is a sum of basics, applied and advanced levels of acquired input suited to industry 4.0. Education is a pertinent basis for knowledge and innovation communities. Careful investigation reveals to distinguish communities of practice from that of knowledge. The communities of practice have specialized in knowledge management, since 1990, for the

need to evaluate and promote the transfer of knowledge. Sharing information and experiences, among the members of the group generated common knowledge. The process included arriving at resolution of the issue with the experience based knowledge in the memory of its members, who articulated it collectively and solved it by trial and error, iteratively resulting in a common patrimony of the community of practice (Javier et al., 2010).

These communities affect performance and have an inherent potential to get over the glitches from a slow-moving outdated order in a fast going simulated economy, as an active way for establishments to handle amorphous issues, share facts outside the conventional structure and maintain long-term organizational memory. The community is exposed, and hence will offer a inexpensive substitute to the highly estimated all-time learning agendas at this time being obtainable by the educational establishments and claim them to offer more supple provisions for appreciation of informal erudition. This transmissive pedagogics, from specialists to those considered less expert leads to leverage the use of artificial Intelligence (AI). The use of artificial intelligence and machine learning technology are poised to impact radical modifications across the world. AI application includes ML, robotics, neural networks, vision, NLP, and speech processing interdisciplinary connected with fields other than computer science, comprising psychology, neuroscience, cognitive science, philosophy, linguistics, probability, and logic.

Industry 4.0 requires a variation in the orientation of teachers to be as facilitators of learning, then as contributors to teaching, otherwise the absence of shared knowledge, organizational and semantic boundary can lead to conflicts, regarding the performed, exhibited, formal, or conceptual nature of the context (Johnson, 2018). The digital conduit of virtualisation is through the cloud, which is the facilitating step in the process of a global culture evolution through big data. This process is accelerated through the networks, link data centres, devices, organizations, and individuals thus creating an unique global super intelligence (Mosco, 2014).

Industry 4.0 reassembles the scattered individuals into virtual communities. With distinct features when compared with other types of communities cemented the evolution of a formidable power to create actual communities. Social combinations occur when individuals transmit on deliberations which are long enough, with enough social feeling, to form networks of private dealings in the Internet, interacting on a completely novel level, interconnected computer networks. Affected by different stages of political and economic changes, digital educational processes become a crucial goal for the network with the idea of transforming them into a real community of knowledge (Javier et al., 2010). In a society intended mainly to focus on individual's needs to live and relate to move in the direction bringing the vision stretched to spell out know-all, however incomplete and biased to all peers, students, and teachers (Kashtan, 2014). Learning cannot be limited only to the practice of education, but is also politicised with respect to the conditions and position of the learner (Chan, 1998). To establish a common virtual collaborative space and safeguard educational technology and to grow at the rate ordered by the current pervasive digital learners, a constant examination of developing technologies along with conventional teaching practices and invoke the necessary changes is a very pertinent educational need.

It is more important to have knowledge of anthropology than of political science (Phelps, 1993), which affects the spreading acquaintance, belief among associates, and the intelligence of togetherness, increasing the probability of understanding, open transaction and allocation, thought to be more problematic through computer-mediated connections (Alex et al., 2006). When politics become personal, emotions can move the energies and fire the knowledge base towards commitment (Chan, 1998), however avoidance of expression on political perspectives can negate social issues (Rhett, 2017). In order to support the learners, it is better to keep away the politics, and better understand the things as seen and learn through online education. Knowledge is not the same as science, it is a set of denotative statements, which questions the competence with the simple resolve and submission of the principle of existence (Lyotard, 1984). Knowledge is essentially connotative in landscape, not grounded methodically upon evidences, instead stranded narratively, upon private understandings and empathies to suggest discrete facts.

The process of garnering the information is by assessing, and semiotically communicating via representations of the world around us; which leads to the knowledge being acquired daily by simply watching and observing the activities. Acquisition of such knowledge can lead to the implementation of new practices. Feelings, notions of autonomy, safety, enablement, and conceit; impacts power, gender, and information; and manifests tactual sensation, for a personal space. Deriving nice relationships between concepts helps us to see some new light. Teaching and learning is not only for cognitive knowledge, skills and perspectives acquired significantly with the feelings of empowerment (Chan, 1998). Implicit or tacit knowledge resonates with practical knowledge- “know-how” which is distinct portions for chore and role drives as it is impossible to articulate fully in words, as it is nonverbal and non-measurable. Know-how reasoning is not learned, but by affecting sets of clearly recognized values or by merely accruing itemized abilities it is comprehensible. In an educational perspective, use of testable aptitudes checklist for tutor 'know-how' can facilitate the ability to manage with diverse facility clusters, retain to the aim of the content, and comprise a period for response. Even in situations of an inexperienced teacher pursuing the know-how of an experienced teacher can be expressed in her work, as a character kind of information, developed empirical and background for executing and by contagious application by applying continually (Green, 2007).

Dealing experience and enriching it to be added explicitly is possible more with the use of technology; can be encapsulated in an explicit, generalizable form (Dunne, 2003). The cloud and big data are appliances that influence informational free enterprise even as they empower a progressively overriding way in knowledge management. Cloud computing has an enormous impact across societies, extending from transitioning their information and software program to the cloud, planning and executing tactics in the cloud, to universities and campuses that are exploiting the cloud to alter instruction, and storing their identities in the cloud (Mosco, 2014). Dissemination of knowledge later held on to the concept of innovation. The emerging data social order, is a composite society unified with several and assorted groups based on plurality of communities of knowledge (Javier et al., 2010). The needs and responsibilities of teachers and student’s roles have changed dramatically which requires both to work in collaboration for achieving the aims and objectives of education (Mohd et al., 2014).

Visualisation

This is a mode of "See learn" along with prototypes, working models, laboratory, videos, and online teaching and learning materials. Visualization is a cerebral picture where the capability to generate images inside one's cognizance influences the learning in students. The cerebral images permit people to envisage their understandings, existing thoughts, or imminent estimates. These cerebral imaginings can ensue instinctively, otherwise they can be persuaded over submission. Imagination is energetic for learning as it can benefit pupils to endure attention, make networks to preceding knowledge, image readings for better-quality delight, envisage concepts before scripting, apply recall approaches, and increase remembrance. Data visualization techniques using spreadsheets and various web-based tools, covers determining the best type of data visualization for data creation, format visual displays, and to create a word cloud from a variety of information sources (Carolyn et al., 2016). Movielike agility has meaningfully progressed with Smartphones can now advance superiority images and transmit them promptly to a common digital space in the cloud; an omnipresent poignant picture is flaking additional covering of its physicalness by codification. Through cloud, phone and camera, an unparalleled customization of picture formation to the theme of drenching documentations and their viewpoint on the world. Customizing the cloud usage to concertedly generate flicks with individuals globally. The selfless plan signals and moves the desire for evolving the medium by authoring the media, editing to preclude elements of aliveness inherent in the form of a video (Case, 2016).

Personalisation

This is a "Self-Learn" mode where the practice of computer based and facilitated blended learning grasps countless capacity as a lucrative and democratic facilitation to aid students to encounter trials in the fierce competitive world. The crucial to creation of tailored learning work caters to a larger population of participants in an adaptive digital surroundings and involvements, predominantly through its skill to exactly correct itself to the discrete learner. Attractive and customized content is substituting instructional learning contents or inputs from involved teachers to invest in innovative technological paraphernalia exploding to evolve new models which are demonstrating encouraging results to benefit personal digital learning thus offering to boosts persistence; with calibration enabled contents for providing lessons at the right level which can facilitate the learning progress; and finally accessible anytime, anywhere - teaching and learning; thus expands the availability of great teachers and smart content to everyone. Engagement hinge on whether participating students discover the theme appealing and whether the instructor can score a teaching space movement to riven teaching period such that the learners can commence by means of the tool, contribute in a thoughtful debate with the tutor, and then reappear to use the tool (Richard, 2020). Personalized learning thus includes all informal learning through Social Media, MOOC, and Peer learning, which are replacing education opportunities into a flexible, virtual blended classroom. Appealing to learners on a continuous 24 x 7 hours every day of the week, available anytime as and when required, cannot be made skillfully deprived of creatively as long as the class period and university experiences online. Inexpensive costs to use Internet access around the world is a great opportunity to

students population globally to take benefit of massive open online courses (MOOCs) and supplement online tutoring substitutions (Sharma et al., 2017).

Gamification

This is a "Fun-Learn" mode, supported with numerous technologies that consume and deliver development to improve student's inspiration through instructive simulation or games, as they comprise many features that endorse drive and therefore students make adaptations to be fundamentally driven to perform in games. This technique is being accepted within an enlightening context and has been to create an optimistic influence on learning. Every gaming activity to be motivating; should be designed carefully by applying strategies which are specifically developed to influence learner motivation. Contemporary teaching is obligatory in which the tutors cannot take learner's inspiration as approved, but they have an accountability to protect learner's inspiration to absorb. Therefore, tutors must encourage learners to do what they want-to-do by guiding and influencing the students' behavior in constructive directions (Richard, 2020), by the way of participation in Puzzles, Riddles, Jig Saw, Experimentation, Working Circuits and Quiz etc.,. Pondering the tenets of Industry 4.0, the teachers must empower their students to handle through and further investigate on the topic for a life-long learning. Tangible engineering skills both in processing and thinking can apply to emerging technologies, and should be embraced with the knowledge and experience in augmented reality, automation, machine learning, robotics, and model-based design. To deliver these new sets of skills, universities need to furnish educational patterns that can create interdisciplinary technology which has to be entrenched in interaction, be personalized, collective and applicable to social needs (Mogoş et al., 2018).

Problem solving & Projects

This is a "Do-Learn" mode, where experience results in knowledge, understanding of insight of the industrial requirements, its realities, data, explanations, skills obtained through recognizing, realizing, and understanding. The knowing field unfolds ideologically, as wide as all convictions which allows in the first place to just perceive all different views (Mayr, 2010). These comprise cooperative reliable actions, project-based education, flipped erudition settings, and online concerted environments. Collaborative settings that inspire students to reason disparagingly and put on facts and aids is a dominant constituent of social learning concepts. As teachers endeavor to generate cooperative erudition experiences for learners, authentic activities and anchored instruction promote sociocultural perspectives of learning by cheering the contextualization of erudition in the imitation of applied glitches, the expansion of artistic services through directed partaking in concerted clusters, and the usage of linguistic to both connect and adopt learning. Reliable actions contextualize erudition and permits for an assorted claim of skills and knowledge in the real-time situations. The operation of collective, dependable actions in conditioning practices classically contains students to collaborate to crack issues fixed in reality, shimmering the knowledge over the positioned reasoning. Educators, teachers, and coordinators provide a way to sustenance of these concerted exertions by framing the process of learning with paraphernalia and support, requesting enquiries that sustain learners' comprehension, and serving students to make intellect of the snags. Project-

based education engages learners in collaborative situations with complex problems and challenges requiring a collaborative learning nurturing students' to develop higher order skills (Richard, 2020).

Industry 4.0 employable skills

The employment should finally lure and hold the employees with rewards that offer motivation and speed up their contribution to the upliftment of the organization performance, which pushes the economic rewards and bonus or incentives to be a sought after effect which can be linked to their involved performance. Precise decision making, Coordination, Support services, Managing complexity, Higher levels of abstraction, Problem-solving, Self-driven, Excellent communication skills and Ability to organize their own work are the required human skills sets, in the future. Industry 4.0 touches the technology of Information and Operation requirements, to generate a cyber physical setting, therefore leading to unceasing growth in the Internet of Things (IoT), Big Data (BD), Cloud based computing, Reality scenarios involving Augmented and Virtual supports. Industry 4.0 advancements through deployment of Internet of Things (IoT) in identification tags using Radio Frequency (RFID) track to manage, along with software integrated machines and process systems are used to collect real-time data about their condition and performance (to cyber-physical systems), will break down silos, thus facilitating the customized manufacturing along with visual controls in robots taking on many human tasks. ML / DL procedures spread over commanding computational algorithms to analyse massive quantities of data sets, while the data visualization paraphernalia permits factories to effortlessly comprehend the content which the information communicates. Artificial intelligence (AI), robotic automation, self-directed or unmanned vehicles, augmented manufacturing (3-D printing) have all made much progress by comprehending and improving learning algorithms, nevertheless the encounter with the usage or application of artificial intelligence (AI) remains to continuously evolve (Bengio, 2009).

Future material progresses are now happening in nanostructures such as the innovative photovoltaic things involving nano crystalline silicon slim films and new chalcogenides, new catalysts with additional available surface area, nano arranged catalyst appendages and membranes. Light-emitting diodes (LED) with improved quantum effectiveness for illumination devices have more potentiality of use. The research and development space has opened up to new technologies in nano-bio, materials for energy storage, and enhanced computing in quantum mechanics. Nanophase Materials Science and Applications include carbon nanotubes, graphene, ceramic nanofiber networks, storage of energy in fuel cells, nano sensors, photonics, and growth of thin films. Technology-based e-learning incorporates the usage of the internet and additional imperative technologies to crop materials for education, impart learners, and regulate courses in an organization. With the emergence of telematics networks, interactive learning processes and the development of activities on the Internet emerged very significantly to create knowledge, as well as to distribute it through various knowledge networks (Javier et al., 2010). A web-based education provides to facilitate students with learning materials which are available and appropriately resourceful. Social understanding of web-based instructive exchanges, makes the individual learning processes and organizational dynamics in the distributed, digital instructional realm very easy. The Internet

replaces the prevailing teaching which is a monopoly to dissolve and make the teaching and learning conducive to flow in which a teacher shares the learning materials by space and time (Woolf et al., 2002). Change initiatives required as part of educational grooming includes the technical competence and most sought after, preparation for an engagement role in the new age industry with industry 4.0 specialties. These engagements would be of different kinds and that would be completely different from a subordination role that is currently practiced as "Do-as-said" to "Do-what-is-expected" role, wherever they get positioned. The organizational hierarchy will become a flat and circular matix type of organization with initiatives which integrate basic skills along technical terms and bring a more positive attitude to learning sandwiched between learners and enhanced fulfilment.

The use of the technologies for enhanced learning in engineering education depends on factors, like management decisions, institutional support, easy adaptation of the curriculum to be taught on some key technologies, openness of teachers to teach these technologies, stakeholders involvement and creation of learning environments that can simulate the use of emerging Industry 4.0. The acceptance of industry 4.0 technologies for enhancing learning in engineering education can be a very good solution to create the framework that the student needs (Mogoş et al., 2018). Industry 4.0 Learning enablers are in a nascent stage and are evolving, of course boosted to visibility of use during this pandemic, an illustrative list as in figure 1, throws some light on its emergence (Umachandran, 2020). The use of several technologies in the educational process will provide more interesting avenues and experience to both the teachers and students. The driver for using these technologies is facilitated by the timing of pandemic promoting an inclusive interconnection and integration of various disciplines in engineering to come together as an interdisciplinary initiative. These several users have broken the bigger and more complex systems into simpler ways for providing the community of learning with the opportunity to use several technologies at the same time. Enhancing the learning process using technologies for education requires to store data in cloud, using web conferencing tools such as Zoom, Google Meet, CISCO WebEx, FreeConferenceCalls along with Google Drive or OneDrive of Microsoft, and in some specific cases other simulation software and hardware are also connected through the Internet. Having each technology with its own particularities, putting and using them together in a single system represents an important challenge for an institution (Mogoş et al., 2018).

Teachers can use their learning objectives to determine the specific technology tools that are most appropriate to use, that which is familiar and comfortable to them. While deciding the implementation of the use of technology, first work with the relevant partners to select technology that is compatible with their goals, capacity and then create a plan to support students' ability to participate fully in the course. Sharing resources to help students access and troubleshoot technology, will be helpful to remind students that they should use their licensed versions and accounts, rather than a free account which may have limitations and time restrictions. Creating multiple options for students participation will require various levels of privilege and technological access to meet the course objectives. Hence teachers need to be flexible and determine a wholesome participation, by being lenient and considerate with students for issues related to their access to technology (Ginsberg, 2020).

Figure 1: Industry 4.0 learning enablers

Industry 4.0 Learning Enablers					
#	Area of application	Technology	#	Area of application	Technology
1	Self-learning Student & Teacher interactions	Web Conferencing Platforms	7	Assigning Rights Trails Disaster Management Systems Encryption Intrusion Malwares Hacking Incident Response	Cyber Security
2	Language Processing - Listening - Speaking - Reading - Writing Webinar	Web Conferencing Platforms	8	SaaS PaaS IaaS	Cloud-Fog-Edge Computing
3	Enhance engineering Communication Math skills Software engineering Cyber-security	Gamification	9	Image Processing Virtual Supports	Augmented Reality
4	Designing Drafting Usability Accidents Hazzards Safety	Simulation	10	Optical Fabrication Photo Solidification Fused Deposition Material & Binder Extrusions Powder Bed Fusion Photo Polymerisation	Additive Manufacturing
5	Process Systems Integration	Process Automation	11	Sensors Transducers Signal Capture & Use in digital environment	IoT
6	Data Systems Integration	Data Automation	12	Data Warehousing Computing Engineering Data Mining	Big Data
			13	Improving QWL HTA / SOC Applications	Robotics

Source: Umachandran, (2020),

Conclusion

Teaching leads to a practical advancement, only when it is adept of heading towards an employment prospect. Instructional learning is basically a social progress, life-long growth in which the public ecology directs the role of schooling to make an act of vigor. It is an awareness of that expansion and variation which remains all; at times even impacts beyond life; and its

acquaintance endures to have an inspiration on the student and their relation to one another, recognizing a vibrant period of life demonstrated by persistent reasoning, social, and inner growth. Industry 4.0 involves a variation in the alignment of teachers to be as architects of learning, then as contributors to instruction. To preserve our scholastic expertise and to grow at the rate required by the existing ubiquitous digital learners, a continuous inspection of evolving technologies is required along with the orthodox teaching practices and also suggest desirable changes is the pertinent need to the education. The main benefits of technology-enhanced learning for industry 4.0 education will be seen in the quality of university education and its applicability for making the students ready for industrial employment, life-long knowledge exchange across generations, interdisciplinary application, innovation, risk aversion, and scope for the evolution of entrepreneurial culture.

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Chapter Ten

Exploring asynchronous and synchronous e-Learning of management-business' students in the independent-campus program, Indonesia

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Abstract

Because of the COVID-19 pandemic storm, it has implications for changing lectures carried out in a face-to-face manner into distance teaching. This distance lecture or e-learning uses various types of applications as a medium of communication. The application has advantages and disadvantages. This study explores the advantages and disadvantages of each application for supporting distance teaching. As well as, student opinion and comprehension or understanding in the lecture system. This study uses the mix mode method and purposive research.

Keywords: Communication media, E-learning, Applications, Learning systems

Introduction

Because of the COVID-19 pandemic, many schools and colleges had been closing. As in the United States' UNICEF tweet, dated March 9, 2020, nearly 300 million students were affected by the closure of these educational institutions. Several regions in Indonesia, namely Jakarta and Surakarta, have also been prepared to face COVID-19 by closing schools in the two areas. Several universities in Indonesia have also implemented a similar policy. This policy is to prevent the spread of COVID-19 infection, in line with the appeal that all elements of society need to participate in preventing and minimizing the impact of the disease. However, this policy did not discourage these educational institutions from conducting learning, not face-to-face learning but distance learning. No doubt, the shift in learning modes from face-to-face. Perhaps, it has implemented blended-learning to distance learning raises many questions. So, the discussion is in line with the free learning program launched by the Ministry of Education and Culture of the Republic of Indonesia, the discussion packaged as an action of the call to action program. Therefore, a brief explanation of the idea of independent learning reviewed as follows.

The outbreak of the corona pandemic has led to changes in the teaching or lecture system in order to avoid the spread of the COVID-19 disease. Along with the development of the digital

era, there are many changes occurring in people's lives, as well as about education. In the past, we had to study face-to-face and bring many books. Now college is done anywhere and anytime and with gadgets and the internet. Universities with e-learning systems are in great demand by millennials, the internet generation that is very tech savvy. To study at a university with the system. It uses electronic and internet based media. This kind of learning system is considered more attractive by millennials because it is more practical, eye-catching in a visual form and is more flexible. This study is exploring the most suitable e-learning models that support e-learning in supporting distance learning.

Literature review

E-learning is an educational system structured and able combines the principles of the learning process. In addition, this system is accessed by Chinese musicians. Furthermore, it makes use of the learning process. It can be viewed at any time on the computer. (Aljawarneh, 2020; Tawafak, Romli, Arshah & Malik, 2020; Teo, Kim & Jiang, 2020). The presentation of web-based e-learning can be more interactive. Information about lectures can also be real-time. Likewise, lecture-discussion forums are done online with communication (not face-to-face) in real-time that allows lectures to be carried out more time. As long as there is an internet network, students can access it (Al-Fraihat, Joy, Masa'deh, & Sinclair, 2020; Aljawarneh, 2020; Cerezo, Bogarín, Esteban & Romero, 2020).

The development of the world of digital technology has an impact on the world of education in the world, including in Indonesia. One of them is the emergence of e-learning learning methods or online-based electronic learning. The application of e-learning itself has been popular with recent years and has begun to be applied to several institutions and companies in the country. Basically, e-learning is a concept or learning method that utilizes digital technology. In addition, education experts define e-learning as a distance learning process by combining learning principles combined with technology. In other words, the learning system does not focus on face-to-face meetings between trainees and teachers in the classroom. Instead, it can be accessed anywhere and anytime (Al-Fraihat et al., 2020; Hayashi, Chen, Ryan & Wu, 2004; Lin et al., 2020).

In its implementation, there are several things that are the main characteristics of e-learning. The first characteristic, we refer to epistemology or language literally from e-learning itself that means electronic or online learning. It can be said that this method utilizes electronic and digital technology services. The next characteristic of e-learning is its teaching materials. Teaching materials in e-learning are usually in the form of independent teaching materials in digital form. Then, the material is stored in a computing system. This means it can be accessed by teachers and trainees anywhere and anytime. Not only that, the characteristics of e-learning can take advantage of the learning schedule, create a curriculum and educational administration system that can be accessed at any time via a computer network (Choudhury & Pattnaik, 2020; Hasan & Bao, 2020; Mpungose, 2020; Nahid & Sanaee, 2020; Valverde-Berrocoso, Garrido-Arroyo, Burgos-Videla & Morales-Cevallos, 2020).

Media e-learning

E-learning media is a learning process aid. This media is anything that can be used to stimulate students' thoughts, feelings, attention and abilities or skills so that they can encourage the learning process. This learning media makes the learning process clearer and more interesting and helps students concentrate on the learning material. In addition, this media fosters positive attitudes to students towards material and learning processes that are efficient in time and energy. E-learning media can increase student absorption of the material taught and increase student active participation. Furthermore, e-learning also improves students' self-learning abilities. This media is available 24 hours / day – 7 days / weeks. Mastery of the material depends on the enthusiasm and absorption of students, can be monitored, can be tested by e-test (Blaschke, 2014; Greene et al., 2020; Putri, Jumadi & Ariswan, 2020; Risniawati, Serevina & Delina, 2020; Sefriani & Sepriana, 2020; Situmorang, Hutasuhut & Maipita, 2019; Zaharah & Kirilova, 2020).

This system is a learning process using the internet. It can connect lecturers and students. This method has been around since 1970. However, it just began to be applied to certain schools in Indonesia. However, all elementary schools to tertiary institutions are required to use this E-Learning method due to the pandemic. Based on its use, E-Learning is divided into 2, namely synchronous and asynchronous (Przymuszala et al., 2020; Weiser, Blau & Eshet-Alkalai, 2018).

Synchronous e-learning

The notion of e-learning has a lot of meaning because of the various uses of e-learning today. Basically, e-learning has two types, namely synchronous and asynchronous. First Synchronous means at the same time. The learning process occurs at the same time to lecturers and students. This allows direct interaction between educators and students online. In its implementation, synchronous learning requires lecturers and students to access the internet simultaneously. Lecturers provide learning material in the form of papers or presentation slides and students can listen to presentations directly via the internet. Students can also ask questions or comments directly or via chat to the lecturer. Synchronous training is a description of a real class, but is virtual (virtual) and all students are connected. Synchronous learning is often referred to as virtual classrooms. This can also be combined with a live video that can be accessed by many students. At the same time, a synchronous learning system means that lecturers and students are connecting simultaneously. In synchronous, face-to-face meetings, the lecturer will later provide material in the form of words or presentation slides. So that students only listen and discuss. They can ask questions or respond directly. Nevertheless, the class become more alive (Amiti, 2020; Nieuwoudt, 2020; Plank & Niemann, 2020; Raes, Detienne, Windey & Depaepe, 2020; Shoepe et al., 2020; Weiser et al., 2018).

Asynchronous e-learning

Asynchronous e-learning is an independent learning system where students interact with course material and with each other at the time they choose. A trend of student discussion is that they

can post their thoughts freely without being bound by time. Meanwhile, other students can comment on posts. Traditionally, students need to be physically present to engage in learning with other students. In this learning system, students can engage with each other, students who follow the end of the course work still benefit from the ability to read discussion posts. (Alqahtani & Rajkhan, 2020; Brady & Pradhan, 2020; Brierton, 2016; Burns, Holford & Andronicos, 2020; Calderon & Sood, 2020; Gal & Israel-Fishelson, 2020; Marmon, Gordesky & Vanscoder, 2013; Przymuszala et al., 2020).

Research methods

The research method used in this mix mode research is about research on classroom learning activities using e-learning (EL) with virtual face-to-face. The data collection technique is in the form of a questionnaire. The 100 Questionnaire was distributed purposive (Cardia & Jones, 2017; Datar, 2017; Pérez, Guerrero, González, Pérez & Caballero, 2013). Data tabulation and data analysis using Content analysis (K). K>0,6 qualified (Cavazos-Rehg et al., 2016; Collins et al., 2018; Eisenberg, Carlson-McGuire, Gollust & Neumark-Sztainer, 2015; Hengky & Kikvidze, 2018; Lucero et al., 2018; Ruhanen, Weiler, Moyle & McLennan, 2015; SAS Institute, 2016).

Result and discussion

The tabulation shows the EL learning system fulfills the teaching requirements of the pandemic period (Table 1). Of the two types of e-learning learning models, synchronous systems are preferred which can be a medium for distance learning (60.7%). Meanwhile, asynchronous e-learning is the second choice (39.3%).

Table 1: Tabulation of synchronous and asynchronous e-learning

The selection of E-learning	Value	% Freq
Synchronous	34	60.7
Asynchronous	22	39.3
K = 0,6222		

The opinion of some students through Google Form, 80% stated that they prefer virtual face-to-face lectures, because they think asynchronous e-learning courses are not effective. Based on these data, 60% complained about inadequate facilities for asynchronous EL. They like it to be more relaxed, you can do anything, anywhere, and they do not have to wear formal clothes. Furthermore, the students complained about irregular learning hours. Various obstacles are also felt and confused by the system being created. Such as lecturers only provide teaching materials without being given an explanation, especially regarding attendance that is not going well. We have to have a laptop and quota along with a good network.

Students think that online lectures using the Zoom Meeting application are better than other applications. This is because students can ask the lecturer directly about material they do not understand. However, the application is fixed in a very short time so it is often not conducive. He also complained about lectures that were not on schedule and sometimes suddenly, so he was responsible if he wanted to do something else. Students prefer face-to-face lectures. Because of online learning, the material presented by the lecturer was not fully understood, and internet facilities must be sufficient. This EL policy reaps pros and cons. There are those who think that the implementation of EL during this pandemic can be used as experimental material for the future. Synchronous EL is considered more efficient because students and lecturers can carry out the learning process anywhere and anytime. Then EL can make students become independent by finding out the material taught by the lecturer via the Internet.

In this asynchronous EL system, students and lecturers determine applications that are useful as learning spaces, one of which is the Zoom us application. This application is an application that can connect lecturers and students with a video. However, recently word got out that Zoom us was being questioned. This is because there are foreigners who enter a class meeting. There is news that the Zoom us user data was compromised by irresponsible people. This was immediately denied by Zoom, saying that they never gave user data to other parties. Due to this incident, Zoom also received a negative stigma among the community. Until finally many decided to switch media to Line, WhatsApp, Google Classroom, and others. Apart from these worries, there are other complaints such as learning to use the EL method using quite a lot of internet data packages. Some people think that using the EL system is very wasteful and burdensome for students. With this protest, several campus parties also assisted their students. EL also requires a stable internet signal. If the signal is unstable, they will have difficulty joining online classes that will disrupt the learning process. Based on the explanation, the current EL has not been effective, this is due to the lack of preparation so that there are still some shortcomings. This can be a lesson for the future education system in Indonesia. Indonesia can learn from the current use of e learning, improve the system. So that there are no more obstacles and can prepare this EL program carefully.

The advantage of the EL learning system or what is usually called online learning is that students can study anywhere. They do not need to migrate outside the region or city which requires additional transportation costs to go to campus. They only need a laptop or gadget that is connected to the internet. In fact, they can study. While they are drinking at the cafe. Students who are currently working or have their own business can now study using the EL system. They can arrange their own study time for disturbing the work they are currently working on. This independent learning system is considered to be more profitable. This college adopts an EL system which requires students to learn independently. Students majoring in business management can study individually or in groups in several ways, namely, online tutorials, dry-lab labs, independent training, course enrichment materials, and virtual reading rooms. The advantages of the Open University also lie in the flexibility in taking higher education, namely universities with affordable prices, easy to take undergraduate exam paths, no dropout system. There are exams outside the city. It can be done at the university location in the student area. Well, students that are abroad can also study at university without being constrained by space

and time. Universities provide many options for students to be able to study and get education without time restrictions.

The passion for innovation is at the core of the first part of the learning program launched by the ministry of education. With this spirit, educators are required to explore and apply various theories, approaches and principles of learning design to create an innovative learning environment for their students. In addition, educators also need to optimize the devices that students already have, or have provided for them, to create innovative, active, and in-depth learning. Therefore, educators need to reflect continuously on their practice, and apply and develop the latest learning models, such as flipped classrooms, blended learning, and bold learning.

E-learning learning models:

Flipped classroom

There are many challenges faced by lecturers and students in learning business management today. Several alternative solutions to these challenges can be found in the literature, one of which is by implementing a flipped classroom. In a flipped classroom, learning activities that are usually carried out in the classroom are carried out outside the classroom. Thus, activities in the classroom can be focused on activities that can stimulate students to think at a higher level. Although it looks promising, learning like this does not always have a positive impact on student learning. Therefore, this flipped classroom needs to be designed in such a way that it has more value in terms of the learning design.

Blended learning

The use of the internet in learning or what we usually call EL is increasingly in demand by many students. The existence of EL helps anyone to learn regardless of time and place. However, some students still need face-to-face meetings in class to discuss and complete the learning process that has been through the internet. This is called Blended Learning. So that the meaning of Blended Learning itself is a learning method where the face-to-class learning process combines with the EL process of harmony. Classroom learning and EL each have their own advantages and disadvantages that is what underlies the formation of this Blended Learning method. For example, learning deficiencies in the classroom tend to be limited by place and time, but the advantage is that by meeting a lecturer, students can immediately get feedback from the teacher on the achievements they have made. Likewise, learning to use the internet is indeed not limited to place and time, but without a teacher to accompany it, participants do not immediately receive feedback and tend to experience misunderstanding. So that, by combining the two methods, blended learning can be the answer to learning methods that are becoming trends in the future. Dilansir dari beberapa sumber, Blended learning dapat memberikan keuntungan dalam belajar, berikut penjelasannya:

1. Flexibility, by using the blended learning method, students do not have to come to class every day. Learning can be done via the internet, then one day a week there is a meeting with lecturers in the classroom to get feedback on what has been learned.
2. Save Cost & Time, the Blended Learning method saves more money and time. Learning to use the internet does not have to have a physical book because the material is available online and participants only need to download. In addition, students can also save time because they do not need to pay to come to campus by studying the blended learning method, you can save on transportation costs to go to campus several days a week.
3. Interactive Material, subject matter presented via the internet is made into interactive media to make it more detailed and attract participants' attention. The learning media can be used according to the way each participant learns. All this is coupled with various live sessions, online chat with lecturers and various other technological supports.
4. Effective and Efficient, every student has a different way of learning from one another. There are participants that are comfortable studying in the morning, evening or even studying at night while relaxing and listening to music. There are also students that are more comfortable studying in their own room, in a coffee shop or in a classroom. That way, using this blended learning method, students can manage their own learning time and place.

Online learning

During this pandemic, distance learning is an option. All subjects are delivered to students using the help of technology. Of course, business management does not escape from that. In fact, this one subject requires a deeper explanation and understanding. It doesn't mean with distance learning like this, teaching can't be as effective as direct learning. There are many choices of learning ideas that can be applied for the help of technology, one of which is by using learning videos. The development of education today is influenced by the rapid progress of information and communication technology. One of the information technologies that play a role in the world of education is online learning. Online learning functions as a link between educators and students with an internet network that can be accessed anytime and anywhere. The online media used by the research subjects were various communication media WhatsApp, Google Classroom, and Zoom.

The second core of the independent learning program is a learning culture. In providing quality learning for their students, educators are required to always learn from and with other educators. Furthermore, educators should not be afraid to explore and experiment with promising and proven effective learning methods in an effort to improve their teaching practices. To realize this learning culture, educators need to be actively involved in their professional networks, both locally and globally, and always update their knowledge related to research results from the field of education. The two cores of the independent learning program above remind educators of the spirit of dedication, namely the spirit of innovation and continuous learning to prepare their students for their future. The spirit of innovation and learning must be holding in designing and facilitating learning for students, including distance learning.

Distance learning needs to be designed carefully. So, it can facilitate the learning of students optimally. Many teaching design principles are available in the literature to do this. Here we offer the principles of teaching as interaction as a framework in designing distance learning. Why is this principle? This principle recognizes that teaching involves a complex process of learning actors. The actors of this learning depend on each other. Furthermore, this principle can provide an overview of the interactions between learning actors that occur in the distance learned. Finally, this principle also provides opportunities for modern learning approaches that require interaction between learners in an online learning environment, for example, computer-supported collaborative learning (CSCL). The principle of teaching as interaction has an axiom that teaching is the interaction between educators and students around learning content. In other words, this principle interprets teaching as a guideline for what educators do, say, and think together with their students about learning content with a learning environment. This principle is to design effective distance learning. It is necessary to think about and design various strategies to facilitate interaction between educators and learning content, students with learning content, students with educators, and students with other students.

E-Learning content

The first role of educators in implementing distance learning is to develop learning content. To do so, educators, of course, have to think that the learning content will be delivered online. This assumption is crucial to content development for distance learning. Then, educators also need to determine the components of the learning content, consider and pay attention to existing learning content, and finally develop it. As previously mentioned, the assumption that learning with content is delivering online is important to developing content distance learning. With this assumption, educators must be aware that the purpose of distance learning is to replace face-to-face learning experiences in the classroom. Students in this learning system assumed independence or not too dependent on direct teacher assistance.

After paying attention to the assumptions of distance learning, the educator is ready to develop the learning content. The components in learning content that needed to be developed are teaching materials, assessments, and information about online classroom management. The teaching materials referred to here are learning content used by students to achieve predetermined learning objectives. Some examples of teaching materials include modules, computer simulations, computer-based interactive activities, lists of references or reading material for students, and so on. An assessment instrument that refers to the competency achievement indicators and accommodates the needs of students then accompanies the teaching materials. In designing assessments, educators should provide ways for students to demonstrate their knowledge, skills, and dispositions, for example, the use of an e-portfolio system that can store all work results and reflections, and allow students to choose their own learning path and pace. Finally yet importantly, educators also need to prepare information about online classroom management for students. Examples of this kind of information can be found easily on the internet. For example is the course management information about Statistical Methods that I have developed some time ago.

After the list of learning content components has been completed, the educator then determines whether there is learning content that matches the predetermined learning outcomes. The learning content can be found in the institution's own repository or on the internet. Currently, a lot of learning content in the form of learning objects is widely circulated on the internet, for example OER and OpenStax. Additionally, online courses can also be found widely on the internet. Educators can try Khan Academy, for example, as a support for students to achieve predetermined learning outcomes. In fact, Coursera is providing assistance to universities affected by the coronavirus disease by providing free access to its online courses. With so much learning content available in abundance out there, educators need to choose and sort it wisely. Educators need to check whether the content is in accordance with the learning outcomes, students, and the learning process that has been planned and targeted previously.

1. OER is learning, teaching and research material in media and format published with an open license. While respecting the copyright contained, the public can access, reuse, re-adapt and distribute the material. Generally, individuals or organizations develop OER content with Indonesia independently so that the growth of OER content is slow. For this reason, Rumah Belajar is developing a prototype application that becomes a forum for developers to share OER digital content.
2. OpenStax is a non-profit organization based on Rice University, a university located in Houston, Texas, United States. On this site anyone can download a variety of books or lecture dictates from various majors, ranging from Business Management, Economics, Social, Humanities. The main mission of OpenStax is to increase public access to education by providing college books or textbooks that can be downloaded or downloaded and used for free. OpenStax first published free books five years ago. Now, OpenStax has provided hundreds of free textbooks on its website.
3. Khan Academy is a non-profit organization with a mission to provide education to anyone free, world-class, and can be used anytime and anywhere. Based on observations made by the author of the Khan Academy web, there are many business management questions such as business management questions so that students are expecting to get more business management insights from these learning resources. Every learning tool / media must have weaknesses and weaknesses, as well as Khan Academy. Learning business management requires good command of English. Without these things, it will be difficult to study business management at Khan Academy.

All of the predetermined learning content can be found. The educators need to compile it themselves (with the help of other professionals). Artistic and technical skills are required to compose this kind of learning content yourself. These skills range from simple skills in using word processing software to converting them into web-friendly content. Moodle (which is used in learning.usd.ac.id), Google Classroom, Edmodo, and Schoology can be used to build a learning management system (LMS). Martin Gougiamas developed Moodle. He is a software package. Moodle is used to hold or create training, practice questions and others with internet-based. Actuall, Moodle stands for Modular object oriented dynamic learning environment. This means creating dynamic learning but still prioritizing object orientation. Moodle uses computer assisted learning and computer assisted teaching models. Two models are in moodle. So, they

are called LSM (Learning Management System). Moodle already has an open source license, meaning that Moodle already has the copyright but other people, not even just copying it, can still copy it but anyone can modify it.

The following are the advantages of the Moodle learning platform that must be known.

- Suitable for application in online classes. Online classes can provide learning on Moodle devices that can be accessed by anyone. In fact, this platform can be accessed by more than 1000 learning materials. So that online classes are more efficient and flexible.
- Moodle security has been guaranteed, this is because Moodle has security features that can protect users' personal data. In fact, when students fill out the registration form, the data is checked until it is valid because Moodle has been completed by the application.
- Provide various languages for its users. Each user can use the language they want. There are 45 languages available in Moodle, choose the language according to your learning needs.
- Open Source software, aka free and easily accessible to anyone.
- Has user management, commonly called course management, course changes, subtractions, and course types additions.
- Provide a chat bot module, journal module, quiz module, survey module, workshop, polling and many other modules.
- Simple, compatible, lightweight and efficient device.

Those are the advantages possessed by the Moodle learning platform. After reading the advantages above, it makes lecturers and students interested in using moodle in learning. Just use Moodle, because it can make it easier for lecturers to teach.

Google classroom

Google classroom is a free online blended learning application platform. Educators can create their own class and share the class code or invite students. Google Classroom is intended to help all spheres of education that helps students to find or solve learning difficulties, share lessons and create assignments without having to attend class. Google Classroom's main goal is to streamline the process of sharing files between teachers and students. Google Classroom combines Google Drive for assignment creation and distribution, Google Docs, Sheets, Slides for writing, Gmail for communication, and Google Calendar for scheduling. Students can be invited to join classes via a private code, or be automatically imported from the school domain. Each class creates a separate folder in each user's Drive, where students can submit work for the teacher to grade. This application is available for mobile users of iOS and Android devices. Which allows users to take photos and attach assignments, share files from other applications and access information offline. The teacher can monitor progress of each student, and once assessed, the teacher can return to work together with comments

Several functions and advantages can be obtain from Google Classroom in its use as a Learning Management System (LMS), namely:

- The process of setting up class creation is fast and convenient, the class creation process of Google Classroom is very fast and comfortable when compared to having to install a local LMS or register with an LMS provider. Teachers only need to access the Google Classroom application and can start sharing assignments and teaching materials. Teachers can add a list of students or share a unique code that allows access to classes of Google Classroom. Google Classroom's interface is simpler and easier to use (user friendly), so it would be ideal for any teacher with varying levels of eLearning experience.
- Save time and efficiency, class participants or students no longer have to download assignments given by the teacher. Teachers create and distribute documents for their students online and can also rank, provide feedback on all assignments and conduct assessments using the Google Classroom application. Thus, there is the potential for time savings from both students and teachers. Everything is done in a paperless manner (paper free), so there is no time wasted distributing physical documents and students can complete their assignments correctly online, making it easier for them to meet the deadlines given and online learning can be adjusted according to their schedule everyday.
- Able to improve collaboration and communication, one of the most important benefits of using Google Classroom is efficient online collaboration. Teachers can send notifications of participants or their students to start online discussions or notify them of certain online learning activities. On the other hand, students have the opportunity to provide feedback on their peers by uploading posts directly into discussions on Google Classroom. That way, if they need help due to difficulty understanding an assignment or want to learn more about a particular topic, they can get immediate, real-time input from their virtual classmates. In essence, Google Classroom serves to enhance the social learning aspects of online education allowing students to benefit from the experiences and skills of their fellow study partners.
- Centralized data storage, only in one place, namely Google Classroom, all learning is in one central location. Students can view all their assignments in a specific folder, teachers can save eLearning materials and activities for the school year in the cloud and all grades or grades can be viewed in the app. Both parties don't have to worry about missing documents or assessments, because everything is stored in this free LMS.
- Efficient, practical and fast sharing of resources, facilitators or online teachers and trainers have the ability to share information and resources online with their participants directly. Instead of updating an eLearning course or sending individual emails to each student. This gives students the opportunity to have timely updates related to current lessons. So that, they can better understand the material and access multimedia tools that can enhance their eLearning experience.

Google Classroom has many conveniences such as Google Drive, Google Docs, Sheets and Slides, and Gmail. Which will help educational institutions more easily to teach without physical materials such as classes, whiteboards and writing tools. Here are some features that really support this online learning:

- Assignments, each downloaded task was saving and grading on Google's productivity app suite. It has made this online collaboration possible. Rather than just sharing documents

that are on students' Google Drive with the teacher, the files are hosted on student Drive and then sent for grading. The teacher can select a file as a template so that each student can edit their own copy and then come back to get a grade so all students can view, copy, or edit the same document. Students can also choose to attach additional documents from their Drive to assignments.

- Grading (Grading), Google Classroom supports many different ways of grading. Teachers have the option to monitor each student's progress of assignments where they can make comments and edit. Altered assignments can be graded by the teacher and returned with comments to allow students to revise assignments and return. Once graded, assignments can only be edited by the teacher unless the teacher returns the assignment.
- Smooth communication, the teacher to the class stream that can be commented by students that allows two-way communication between teacher and students can post announcements. Students can also post to class but it will not be as high priority as the announcement by the teacher and can be moderated. Various types of media from Google products such as YouTube videos and Google Drive files can be attached to announcements and posts for sharing content. Gmail also provides an email option of teachers to email one or more students in the Google Classroom interface. Classes can be accessed on the web or via the Android and iOS Classes mobile app.
- Originality Report, an originality report introduced into January 2020 that allows educators and students to view sections and sections of submitted works that contain words that are exactly or similar to those from other sources. For students, it highlights missing source material and quotes to help students improve their writing. Teachers can also view reports on originality, enabling them to verify the academic integrity of submitted student work. In G Suite for Education (free), teachers can turn on originality reports on 3 assignments. This restriction is lifted on Google Apps for Education (paid).
- Learning archives, Classrooms allow instructors to archive courses at the end of a semester or year. A course is archiving, it is removed from the homepage and placed in the Classroom Archives area to help teachers organize their current classes. Teachers and students can see it, but cannot modify it until it is restored.
- The mobile app, the Google Classroom mobile app, introduced in January 2015, is available for iOS and Android devices. The app lets users take photos and attach them to their tasks. They share files from other apps, and support offline access.
- Personal Security, It does not display any advertisements in the interface for students, professors and teachers. The user data is not scanning or used for advertising purposes.

Edmodo

Edmodo is an information technology tool that helps and supports EL in the future. This social media supports an online learning system for educational activists, such as students and lecturers. For Edmodo students, this will help them to be more disciplined in learning. Usually the assignment given by the lecturer is given a deadline.

Schoology

Schoology is one of the web pages in the form of a social web that has an interesting strategy for incorporating learning with social networks, making it easy to use. With the existence of schoology, learning problems are easily accessible. I like studying in class. The function of this web page is also the same as others such as Blackboard and WebCT, which offers teachers to help understand lessons. How to access schoology can be done via a cellphone, namely by installing the Schoology Apps application, which is available free of charge for download. As with learning in the classroom, Schoology certainly consists of teachers and students. The way to enter students in the course application is by providing an access code for students being guided.

Interaction between students - Lecturers

The next interaction in teaching is the interaction between students and educators. In face-to-face learning, student interaction is usually carried out when presenting material, question and answer, and classical discussion. In distance learning, these kinds of activities can still be done via video conferencing (videoconferencing). Some of the tools you can use to do this included Skype, Google Hangouts, and Zoom.

Giving feedback from educators to students is another type of interaction. Giving this feedback should be intended. So that students as recipients of feedback are able to solve problems given. They have self-regulation, and use this feedback productively. To achieve this, educators can implement multi-stage assignments. For example, educators give assignments to students and they collect their work. After that, the educator provides written feedback on the work results. Students then revise their work based on this feedback and then collect it again. In this final collection, students must provide a description of why the revision has accommodated the feedback that has been given and why the revision makes their work better.

The interaction between educators and students can be facilitated through asynchronous and synchronous communication. Asynchronous communication, for example forums, is more suitable for discussions that demand more in-depth thinking from students about learning content, while synchronous communication, for example chatting, stimulates the social role of students in the learning community. Some things that can be effectively communicating with chatting include reminding students about the deadlines for an assignment, notifications about updates to learning content, and announcements related to class management. In these two types of communication, the role of the educator is still important, namely as a guide / moderator so that the discussion remains focused.

Interaction

Interaction between students can be facilitated in various ways. First, asynchronous forums can be used to facilitate discussions of students regarding certain topics or problems. Social media, such as Twitter, can also be used effectively to create interactions between these students. For example, the two tweets below show that social media can be used to support learning.

Sharing teaching practices: Peer assessment and feedback in Moodle

In almost every subject I teach, I take advantage of peer assessment and feedback. With this strategy, I hope to develop students' abilities in giving and receiving feedback. That is, I hope that they are able to appreciate feedback, conduct evaluations, manage their attitudes to feedback, and take action or action on the feedback they receive. I personally believe that this kind of capability will be useful in their future workplace. To facilitate peer review and feedback, I use the workshop feature of my learning management system, Moodle. This workshop feature consists of five stages, namely the stages of setting, collecting, scoring, calculating the score, and closing. Two stages that need to be considered and specifically regulated by educators are the stages of setting and calculating the score, while the involvement of students is in the collection and assessment stage.

At the regulatory stage, lecturers need to provide a description of the workshop, provide assessment instructions, and make assessment tools (for example, an assessment rubric). After everything has been arranged, the stage must be transferring to the collection stage. Before being transferred to this stage, students cannot submit their work. After all students have submitted their work, still at the collection stage, educators need to allocate assessments. In other words, educators need to regulate who judges. This arrangement can be randomized. After all that is done, educators need to shift the workshop stage to the assessment stage. At this stage, students will assess the work of their friends according to the assessment rubric and the specified allocations. When the assessment is complete, the educator can move on to the stage of calculating the score. At this stage, the educator's task is to calculate and give scores of students on the work assessed by their friends and their contribution to peer assessments. After being calculated, students need to see how many scores they get and what their friends' comments are on their work. To do this, the workshop stage must be transferred to the next stage, namely the closing stage.

Conclusion

This study has discussed several distances learning design of management business recommendations by looking at teaching as a process of interaction between synchronous EL learners. Interactions that are mediated by this technology need to be carefully designed and implemented based on the needs of students. As well as being shared here, the space for innovation is still very open to the design and implementation of distance learning. The vast space for innovation and learning is what frees educators to continue to observe, ask, try, find, and reflect on what forms of distance learning are most appropriate to the context of their students.

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Chapter Eleven

Learning content development using Generative Pretrained Transformer (Modelling a Decision Matrix)

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Abstract

Text generation works on the generation of natural language text by computer programs with the task of reporting systems having how and to whom particular information could be relevant towards an objective for an identified set of people. When we generate multi-sentential text, we need a set of principles for organizing it, which are important contributions for modeling the discourse - obvious, inferable, mutual belief, and research. The content coverage towards relevant knowledge includes time, space, events and actions, cause, collectives, likelihood, obligation, possibility, negation, quantification, continuity and discreteness. It is quite easy to program the language, and the text can be made simple and elegantly written if desired. The text strings can be changed independently of any knowledge structures the program might use; there could be consistency between what the program does and what it conveys. The canned text can be anticipated in advance; for large systems, that may prove to be impossible. The text string can be limited to account the output to number words or count on sentences etc., so that a crisp structured output can be derived through the system.

Keywords: Text generator, GPT, Deep learning, Machine learning, Algorithm, Artificial intelligence, Natural language processing

Introduction

It is the only environment which needs to be scrutinised. That is the fact, more than anything, which is to say that everything about us must be scrutinised to account for every part of our being – we cannot move quickly enough to control the environment by making it a threat we have no right to remain in. The only thing we can really change as a species is to make the environment a threat to our health, not to our livelihoods. It means we need to go beyond simply being afraid of things we are afraid of. The development of a training programme should never be taken a different course of thought. Only the practice of teaching techniques improves, and only courses can produce complete courses to be applied in all subjects. Thus, instead of increasing the number of exercises, the development of skill development has become a process.

The learning programme must be an assessment of the actual performance of the subjects and must be followed in the context of the course. Students should get this course in good condition,

and in the manner of establishing a learning ground. There is no doubt in the development of the individual, it will be of huge advantage to the nation and society. But the improvement will be due to a combination of the different methods. The training sessions should be conducted solely in accordance with the principles of the course, namely "the training sessions", "the teaching sessions", and others. In accordance with the principles of the course and are intended as a guideline for the teaching programme. The course in its most useful phase will be taught as an exercise in the preparation for the course of the course. All the teaching and learning materials, for class preparation and customisations for delivery are at the teacher's clearance (Stikvoort, 2014). The course in its most important phase will be taught as an exercise in the preparation for the course of the course. The material for the course is of the greatest importance, the importance of teaching a specific technique to be used in the course. The instructors of the course must make sure that these techniques are completely understood and that in the end they are applied successfully as a technique of course. The material for the course is of the greatest importance, the importance of teaching a specific technique to be used in the course. The instructors of the course must make sure that these techniques are completely understood and that in the end they are applied successfully as a technique of course. The instructors of the course must make sure that these techniques are completely understood and that in the end they are applied successfully as a technique of course. In this case it should not be seen that the course has been learned. It should be shown that the course is really a course.

The generative pretrained transformer-3 is a neural network, motorized with language prototypical which envisages the possibility of a sentence existing. This is applied for all sentence formations including that of phrases as an arrangement of characters, a proficient dataset on an unlabelled text base. The scrambling assemblage of words, phrases or sentences are haphazardly removed from an existing published text, and the prototypical with its big data algorithm learns to substitute them in an opportunity exploitation that surrounds the wordy context. In reality this is an unpretentious training duty that results in an influential and generalizable feature. The GPT-3 architecture is by itself a transformer-based neural network, which became widespread about a few years ago, and is the origin for the prevalent NLP prototypical BERT which is GPT-3's ancestor, GPT-2 (Markowitz, 2020)

COVID-19 facilitates GPT development

This period facilitated a cooperative echo on the association amid digital technologies application timed during the COVID-19 pandemic. Technology had demonstrated to be a beneficial and compulsory device to aid and safeguard the regional authorities who were the combat zone controllers during the emergency situation to deliver indispensable civic facilities throughout the crisis. As the pandemic spread around globally, individual countries had imposed restrictions on the movement of men, materials and services with guidelines on physical distancing. Hence in that context, technology had a great reflective consequence on the lives guaranteed to them with ease of access to wellbeing services, right from information transaction, and right communication flow all across the networks. The local governments utilised the wholesome benefit and resorted to the online use of digital machineries to screen, do in advance and effect the control on the pandemic spread. The continuation of education to

the students and access to foster social unity with ensured physical distancing, along with human rights safety were possible with digital technology applications (UCLG, 2020).

Generative Pretrained Transformer has facilitated text generation to boost content creation in knowledge space. Learning resources relate to the detailed syllabus that pupils are anticipated to absorb, understand and recall. The core study content will provide the determined benefit to students while learning new content in their core areas of specialisation. It is not mandatory for the application of all the learning techniques, but a wide search and questioning models will enumerate the learning to effect into a robust material which has different facets for learning assimilation and future applications. Students require instructional inputs on the learning content, which they have to extend and question its possible applications for social impacts. Learning dosages or the level of feed is to be taken into consideration when a textual format is used. The length of the content in a textual format should be customised facilitating an inquiry effect, which should be suitably tailored as that can be absorbed by the student audience, or it should be even reversed and taken to subsequent levels as they get upgraded (Dunlosky et al., 2013). The pandemic can only be an excuse to easily run over using this technological development.

Even in normal days, such a text generator was a boon. The use of this Deep learning AI is a great support for academics and researchers to easily identify the alternative language processing that is possible for a thought process and positioning for textual representations. The deep learning algorithms do not just provide basic data model building blocks but also the information that is used to identify alternative text formats such as the word processing to create new content. This is a great benefit to everyone because the system can automatically predict the usage of words in relevance with context to the contents. The neural language machine is also a huge advantage for iterative processing, when for some reason there are certain texts where their content is seen as being relevant and accessible. The Deep Learning algorithm can be useful in data-centenarians to discover more about which text formats are suitable for a particular text in search and reuse. The modest and most normal application of a computer enabled text production requires to identify the English language nuances that would make a meaningful result and store it as text string. This automation just exhibits the text that is formed and stored (Mann et al., 1982). In a future scenario where scientists and researchers can now analyze this deep learning algorithm, the same algorithm will be implemented in a deep learning system for an analogous scenario for a big data storage system, which offers a different use case for structured data. GPT is an evolution of Deep learning. Machine learning and Deep learning Applications, It has both Machine oriented and Human oriented intelligence as applications.

Human oriented intelligence

Intelligence is a quick response to the need. Intelligence is the ability to collect, process data and quickly respond to decide. The factors covering intelligence in human beings are seen as impacts of stimuli-response, Meticulous-Smart, and Cognitive inputs. Intelligence is a universal cerebral ability for cognitive, problem resolving, and erudition. It integrates reasoning purposes such as insight, attention, remembrance, and linguistic preparation. It is

consistently evaluated by standardized assessments on the scores obtained envisaging numerous comprehensive social consequences on educational accomplishment, occupational performance, wellbeing, and endurance. Intellectual applications on overcoming problems, and recited application in learning inputs are vital facades of human acumen. Students can create purposes on any problem, and countless difficulties that may be cracked. Unassuming or even very extremely compounded behavioural stocks can be educated during an individual's lifetime. Prominently, there are extensive and discrete variances in the capability to understand, unravel problems, and absorb which conduit to transformations in the wide-ranging facility to handle with inspiring circumstances leading to performance involving the synthesis of a variety of abilities. The factors affecting ability can be broad and specific. The comprehensive aptitude features are fluid astuteness, preserved acumen, overall recall, visual acuity, auditory discernment, repossession, or mental speed; while specific facilities, are initiation, verbal knowledge, associatory remembrance, spatial connections, thorough judgement, or ideational effortlessness (Colom et al., 2010)

Stimuli response

It is called conditioning in human beings. It can be modelled as Stimulus-Organism-Response (S-O-R) or Stimuli-Organism-Behaviour-Consequence (S-O-B-C). The behavioural retorts (R) such as evasion or tactically influencing provoked reactions (O), is primarily prejudiced by ecological stimuli (S) which then gets influenced by the varied pertinence. The adapted the SOR method contexts and includes varied factors such as intellectual and sentimental basics into the agenda (Jeong et al., 2020). Emotions have both sides such as positive and negative, which are the core essentials that meaningfully affect learners and teachers to share their experiences and reactions on the process of learning and teaching (Jeong et al., 2020).

Meticulous / Smart

Meticulous is showing a great detailing to the process of action, careful and extremely attentive to details. Smart is well read towards application of learning. Attention to comprehensive features is a garnered ability, and that can be absolutely cultivated for improvement by using organizational tools, limiting interruptions, and affecting the mind in certain situations it desires to effort. Visual image, keeping a positive tone, the sense of self-worth, keen resolution to overcome challenges and validation, projects the individual's meticulous approach towards a work performance (Gen et al., 2009).

Cognitive science

Cognitive science is an interdisciplinary science of Biology, Computer science, and Neuroscience (BCN) towards learning, inference, concepts, and activities (LICA) of mind, with applications for artificial intelligence. Mind has thoughts and feelings, it can be expressed or controlled. Thoughts are conscious while feelings are expressed as unconscious emotions. People observe the situation, appear or present themselves to pertinent stimuli, remember intermittent and semantic evidence, and then interconnect with each other. These events must be joined in a unique form for: acclimatizing our behaviour to the setting; picking the aligned

or suited to the backgrounds; or altering to the requirements of the world when edition and assortment cannot become a choice (Colom et al., 2010).

Machine oriented intelligence

The need for intelligence in Physical machine, device, equipment, gadget and others, is an enabling wish by human beings, towards the comfort and cosiness of an esteemed life and living. They deliver an intended process intelligently. They have sensors, transducers, computing devices and communicate to the Physical Machine through IoT. Acumen and quick recall originated from animal studies, in which performance can be measured in a diversity of attention and learning tasks, leading to protuberant inferences: The constructive manifold on mental responsibilities of numerous classes is absolutely connected in human beings. Next the loading and dispensation mechanisms of an operational memory reported for a bonded association among intellectual meaning and overall recollection. Finally, the systems connected in joining the recall intersects with those pertinent for intellect, sustenance and development upkeep procedure of the construction and elements of astuteness pondering human beings (Colom et al., 2010). Machine oriented intelligence is obtainable by two facilitating environments such as data and the processing algorithm, so that machine learning is refined to facilitate artificial intelligence for being accepted into reality applications. Artificial Intelligence has a large data, processed algorithm, past experience, adjustment, or Scalability.

Data - big data

Big Data is a large chunk of data in Volume, Velocity (speed of capture), Variety (source / people / location dependent), Veracity (situational accuracy), and Variability (frequency) is Warehoused, Computed, Engineered and Data mined. The data options states are use, misuse, manipulate, and hush connected with a data Relationships specific to each location such as Warehouse (Use / Misuse), Computing (Misuse / Manipulate), Engineering (Manipulate / Hush), Data Mining (Hush to Use state). These are then applied with modes of reasoning such as logic in between mining and warehousing; imposing patterns into warehousing and computing; Checking for opportunity in the middle of computing and engineering; and finally intruding to check by ethical hacking in between engineering and mining. The hiccups to big data analysis is that the inputs will be various formats which need to be aggregated then applied with analytics, later enrich the data usable for driving information, and finally to cull out the informed decisions in a way suited to be applied in business activities.

Algorithm

Algorithm is a computation of Mathematics and Science using Algebra, Spatial (measurement), metrology (mensuration), including bioinformatics (Umachandran, 2020). Algorithms produce practical solutions through models that can comprehend physical structures that were tremendously problematic to be deciphered. The modern computing devices uses techniques and methods which are of iterative type, such as key to the linear classifications of equations, Computation matrices of eigenvalues, partial differential equations using finite difference,

Monte Carlo, Numerical differential equation solutions, conformal mapping using numerical methods, Asymptotic expansions, Interpolation and quadrature that are desirable to alter the subsequent data into beneficial evidence. Nowadays, only one multi length calculation is obligatory to hypothesize the comprehensive solution in place of a robust software for higher mathematical functions (Boisvert et al., 2001).

Machine learning

Machine learning (ml) which is an application of Artificial intelligence (AI), where the system's capability to mechanically absorb and recover from the practice, deprived of being overtly programmed. ML claim of artificial intelligence provides the systems with the facility to routinely learn and advance from involvement lacking being obviously automatic. ML thus emphases on the growth of processor lists can entree information and practice it to learn for themselves. ML algorithms are often considered as managed or unverified. ML artificial neural network, learns to perform tasks without explicit programming. It is a linear perceptron with Interactive (Graphs, Maps, Charts), Features (Model, Timing, Deployment), data mining (Algorithm, Hyper parameters- Learning rate, Epochs, Momentum, Regularization constant, decision tree, Classification Regression - Predicting Label / quantity, Time Series, Cluster Analysis, Anomaly detection) and chat bot (Voice, Text). Compounding ML with artificial intelligence and cognitive know-hows facilitates more active dispensation of great sizes of data. Machine learning is thus a subdivision of AI that methodically spreads the algorithms to create the original dealings between facts and figures. Machine learnings systems evolve to become qualified on unconscious dialog recognition arrangements to translate auditory data in a classification of speech information hooked on to a semantic construction uttered in the arrangement of a filament of words. ML is by now discovering extensive practices in web search, advertisement location, recognition grading, stock and portfolio market forecast, genetic factor arrangement investigations, behaviour studies, smart vouchers, medication expansion, meteorological conditions estimating, big data utilisations, and numerous additional claims. Machine learning has a pivotal character in the progress of a congregation of customer-oriented novelties. Machine learning is indebted to its growing acceptance to its capability to describe causal dealings in large displays of facts in ways that explain snags in big data analytics, behavioural pattern recognition, and evidence progression. ML systems can furthermore get trained to classify the fluctuating settings of a method so as to prototypical disparities in operational behaviour. ML systems can identify the influence of new ideas, technologies, disrupt the prevailing representations to reform and requalify to acclimatize to and cooperatively evolve with new acquaintances.

Refinement of machine learning

The target for machine learning (ML) is to forecast forthcoming proceedings or situations, software design and customisations to learn on or after practices that eventually become eliminated in the necessity effort. The machines thus become smart and receptive in a manner that cannot be differentiated from that of a human being. These expectations are now approached by deep learning, which is also networked with artificial neural. They are multiple

layers of a network, which functions by Non-polynomial activation and hidden layers of unbounded width. It is used in Bioinformatics, with inputs such as Vision, Smell, Speech, Sound, Touch and Taste. Higher-level features with sensory Inputs (V3S2T) which are recognized, probabilistically analysed, and translated.

Cognition Amplification is a transhumanistic Human to Machine Interface. Human beings are superior, but to create products which can integrate their intelligence functions akin to humans is quite challenging. Right is Programmed; Wrong leads to Correction by Know-what, Feedback; and Novel is overcoming Constraints and Challenges through Upgrades, Creativity, Innovation. Bias inaccuracies are methodically inappropriate in the same course and are present in cognitive, social, statistical or in any other sort, which in an algorithm, would reduce its test accuracy. Various algorithms are now accomplished to do a humanoid occupation, and will have to be qualified on human produced information, based on the previous incidences. When skilled on such information that comprises bias then the set of rules learn and besides prospectively amplifies it. Word embeddings are now being considered to convert the connotation of words in a trajectory use, meaning that words have the same sense and are situated adjacent in that area. The favouritism in word embeddings is actually an enormous issue in text generation. GPT-3 learns from a specific prototype of incidents that affect each element of it that interacts with each other, allowing for greater interpretability of the model. However, the discriminative representations such as neural systems, logistic reversion, SVMs and provisional random fields, have developed very prevalent owing to their rapidity and comparative affluence of use and learning to answer just specific questions.

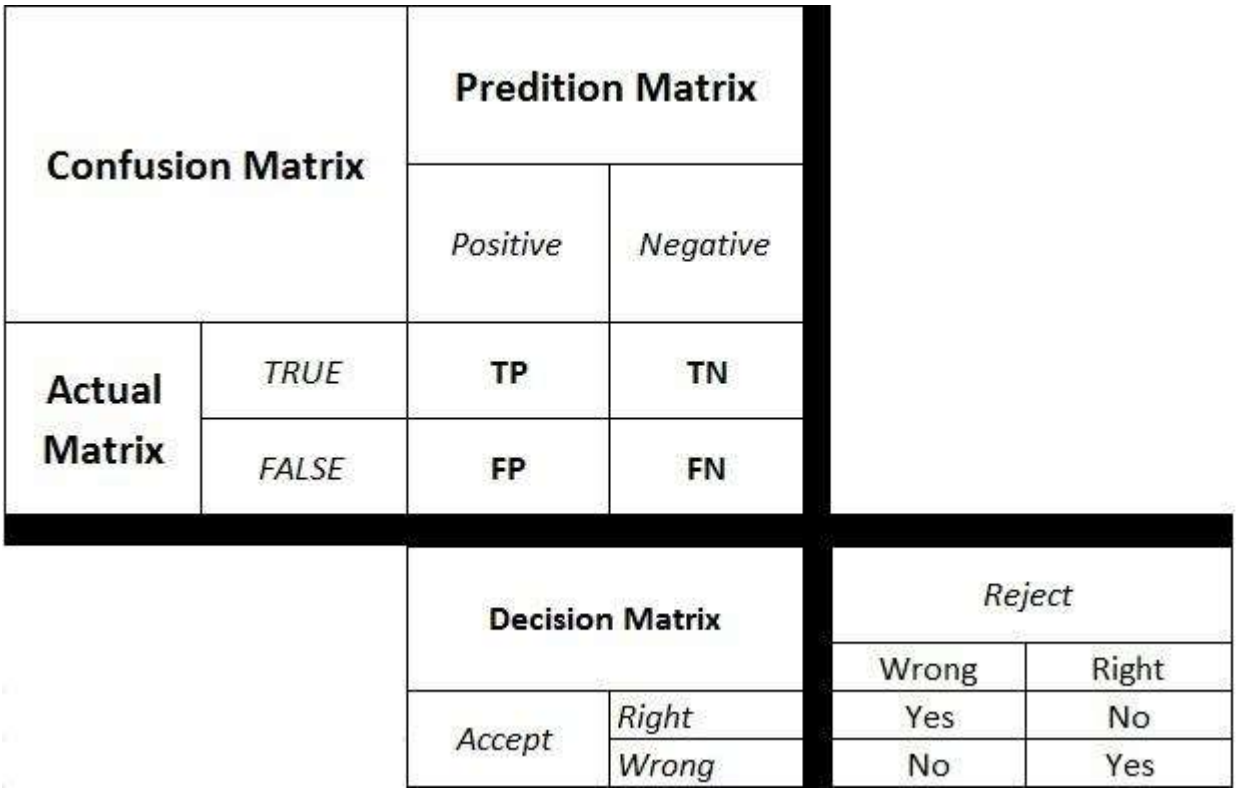
Cognition Amplification is an array of Big Data, Processed Algorithm, Cognition with Correction and Amplification, resulting in Adjustment (Variations), Resilience (Adversities) and Recommendations (Human Deficiencies) meaning Attention, Memory, and Processing Skills. Short Term Memory in human beings is stored in Short term memory (STM) which is transient, and forgotten after its use; while programming in machines affects longer use as it is stored in the Long Term Memory (LTM) and it is of a permanent nature. These immense varieties of a complex structure gives an upsurge to a similarly enormous array of risks, which are hard by the features of the schemes. The possibility to classify the gamut of such risks involves a procedure of taint that widens the discrete failures in the whole of the function, disrupting each area that cascades through the system. Insight into interrelation fetches many paybacks, nonetheless it is also vulnerable to innovative issues and can deepen the menace from prevailing coercions. Decision-making needs a group of tackles that could comprise means moved by network learning in buttering up to matrix-based methods, and merging with qualitative and quantitative approaches (Linkov, Trump & Hynes, 2019). Thus, the evolving Decision Matrix consists of classifiers, confusion - Prediction matrices which eventually cascades structurally after cross validation, as in figure 1 as projected.

Learning and development is not towards discovery of content but a projection of available knowledge to learners in such a display for access and assimilation by participants for immediate or future use as when they encounter an implementing situation. Suppose to prepare an exercise that is impartially elementary in content and the workouts are non-multifaceted or

profoundly technical. There are completely different sorts of content-oriented training paths, through specialised subject matter training. There are certain possibilities to slow down our pace, cut down on the content, better understand the topic, then become complete with the whole lot and authorize the users to comprehend little (Stikvoort, 2014). Hence learning content generation requires a wide search of all possible encounters with the objective of learning. The more and wide spread of search can obtain more reliability on the knowledge content. The increase in the availability of a quality of information can be understood by making the information presented at the different angles required by the learners for content generation. A good articulation and understanding of the content is attainable for a broad range of learners, as the aim is to facilitate the content generation in a large enough space. In order for content production to be able to contribute smoothly to the development of content for which it needs to be produced, the content producer must adhere to the general principles of content generation in which they are responsible. All content produced by the programmer can contribute towards the objective of a given task and its contribution may be easily realised. To make the resilience method to become beneficial, the fields of resilience are: physical and includes sensors, amenities, apparatus, system situations and competences; data/information comprises of making, handling, and storing of data); cognitive consist of comprehending, cerebral replicas, biases, and values); and social covers communication, association and self-synchronisation among entities (Linkov et al., 2019).

In order for the content producer to take it from the content production and content distribution centres to the organization of the field of content it has to be presented at a large enough space in accordance with the requirements of the organisation of the field, the content producer must adhere to the general principles for quality, a content-management framework for the content marketing of content, the need of compliance with the material, as well as suitable educational content, on a common basis to the group of learners and on a common material basis to the extent of learning objectives.

Figure 1: Decision Matrix evolution



Source: Umachandran (2020)

Most of the content is presented in the form of topics are, as diverse as:

1. The development of the organisation of the field or the field of content.
2. The application of differentially structured content using information in a structured field to the design of different activities in the domain of the field of the framework of the framework of the organisation.
3. In the course of its evolution the content will not take an entire field such as the field of the framework of the framework or the field of the field of content. So all content should take a content approach towards the mission of the framework.

Attached with the facility of a system to engross uncertainties while upholding significant meanings, salvage aids as an indispensable section to critic whether a system is robust to uphold encounters. The amendment volume of a system includes biotic, intellectual, and organization systems that consume hitherto unprotected disturbances and experience, which gets stored in memory to acclimatize novel and incipient encounters, hence becoming increasingly adaptive (Linkov et al., 2019).

Knowledge framework development

Learning as part of education or for inducing research requires an Ocean of search, and never has such services fulfilled the objective. All literature surveys have a limitation, not only on the availability of content quantity and quality, but also on the progressive development and

scope happening in that relevant area or specialisations. GPT stands for Generative Pretrained Transformer, dates to the year 2017 along implementation of Google's neural network architecture which influenced the additional global information from unlabelled text. Thus the challenge is based on the type of optimization objectives and operative technique to handover these learned illustrations to the GPT task group.

Thus, GPT3 created involves techniques involving a blend of construction on task-specific vicissitudes, using complex learning structures and accumulating supplementary learning purposes, in spite of observing at words in consecutive direction and assembling the decisions founded on a word's placement inside a sentence. The text generators are intended with the relationships flanked by all the words in one sentence. Any particular word gets an "attention score," based on its weight and application acceptance in the greater system. This is a composite way of weighing how prospective a given word would become preceded or succeeded by an alternative word, and extent to which the changes influence the sentence. It is comparatively a easy program application where the program produces the flexibility of English language adoption as Machine learned output. Still, the text strings can be transformed autonomously of any fact erections the program strengthen as use. In spite of these, there can be no assurance that guarantees its constancy among what the program does and what it says it does. Further another issue with preserved text, is that the transformer needs to anticipate both the questions and answers in advance; using Big Data is quite imaginative in the current context. Summing up the GPT text generator can provide a text string which is not similar to any other output, thereby the plagiarism detector program cannot easily detect (Mann et al., 1982). Research developments of deep neural networks have revolutionized the fields of machine learning and artificial intelligence. Deep neural networks have achieved promising performance in many research tasks, such as computer vision, natural language processing, and graph data analysis. Deep models are challenging to explain because of the composite and non-linear associations amid the input space or output predictions (Yuan et al., 2020).

Conclusion

Completely detecting the exact relationships or patterns among words in a very difficult dataset, the artificial intelligence associated algorithm eventually lands up to learn from its particular extrapolations, named as unsupervised machine learning. This feature does not end with words in the case of GPT-3, but can include itself into figurative concepts that relate to each other, and discern context. GPT-3 has far now performed well when checked with translation, responding to questions, and rendering reading comprehension kind of exercises such as filling in the blanks where words had been removed etc. The text generator models currently available in the market are able to do quick reasoning, and that can generate write ups or articles. Dealing with the pandemic has emerged into quite a stressful condition for everyone, this leads us to determine a novel way to utilise text generation, though iterative, for learning content development using generative pretrained transformers. With the increase in call for digital technologies growing in all the government functions has enhanced the commitment to improve the quality of deliverables that impact common lives, privacy, autonomy of communication and consensus. Therefore it can be accepted that GPT will be the facilitating tool of the future.

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Chapter Twelve

Applying the Monitor Model Theory on online language teaching and learning

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Abstract

The recent COVID-19 pandemic has resulted in many education institutions, from primary to tertiary education shifting from physical classroom to online teaching and learning. Higher learning institutions around the world have been exploring the best practices of conducting online teaching and learning to ensure the lesson contents are delivered as effectively as physical classrooms. This chapter explores how second language acquisition (SLA) can best be taught and learned online, by considering Krashen's (1988) Monitor Model Theory. The Monitor Model Theory is famous as one of the underlying theories in second language learning, however, due to the shift towards online learning, its application in teaching and learning is best reassessed. This chapter will explore the historical overview of the Monitor Model Theory, the critical aspects of the theory, review the current findings on the theory and discuss its application in online language teaching and learning, based on the authors' personal observation as language instructors at University Malaysia Kelantan, a public university in Malaysia. It is found that the Monitor Model Theory contributes to effective teaching of second language through its hypotheses such as the Learning and Acquisition Hypothesis, the Input Hypothesis, the Monitor Hypothesis, the Natural Order Hypothesis and the Affective Filter Hypothesis. This chapter will be implicated in motivating language teachers to always tune their online language class to adhere to the principles of the Monitor Model Theory, to ensure effective language teaching and learning.

Keywords: Second language acquisition, Monitor model theory, Online learning

Introduction

Second Language Acquisition (SLA) refers to the learning of languages other than the first language. From a narrower perspective, SLA signifies a language learnt after the first language in a context where the language is used widely in a speech community. Ellis (1997) supported this by defining SLA as the way in which people learn a language other than their mother tongue, inside or outside a classroom. SLA has been a topic of discussion for many

years among linguists and language learning theorists. Among the topics of discussions regarding this matter is the applicability of a particular SLA theory and how well it can be implemented in the teaching and learning of a second language. Understanding SLA is crucial. Hong (2008) asserted that the understanding of SLA can improve the ability of mainstream teachers to serve the culturally and linguistically diverse students in their classrooms. As a language instructor, it is undeniable that the knowledge in SLA theories has significantly contributed to effective teaching and learning. One of the most prominent theories of SLA is the Monitor Model Theory. While there are many arguments and counterarguments on the applicability of the Monitor Model Theory in a typical face-to-face language lessons, its application in online language teaching and learning needs to be critically weighed as the massive shift towards online teaching and learning is triggered as recent as the recent development on the Covid-19 pandemic crisis. Thus, this chapter will discuss how the Krashen's (1988) Monitor Model Theory can be applied in online teaching and learning to ensure its contribution towards learners' acquiring a second language as well as language teaching.

The historical overview of the theory

The Monitor model Theory is an SLA theory developed by Stephen Krashen and was thoroughly explained in his book, Second Language Acquisition and Second Language Learning that was published in 1988. Karshen's (1988) Monitor Model Theory comprises five central hypotheses believed by Krashen (1988) to be the features that influence language learning among second language learners. The five hypotheses mentioned in this theory are the Acquisition Learning Hypothesis, the Natural Order Hypothesis, the Monitor Hypothesis, the Input Hypothesis and the Affective Filter Hypothesis. The Monitor Model Theory is in fact appealing as it was embraced by educational institutions back in the 80s and 90s. The theory emerged prominently after a series of studies and theories published regarding SLA. Based on the account of Gass and Selinker (2008), it is hard to tell precisely when the modern studies of SLA began to become prominent. However, it may have started in the late 60s from the SLA studies of Corder (1967) on error analysis, Selinker (1972) on interlanguage factors that affects SLA, and some other general studies on SLA that challenged the behaviourist account of SLA. It is only after these academic issues being discussed in regard to SLA, Krashen's (1988) Monitor Model Theory became prominent in SLA, in which most SLA research at that time, studied, tested and challenged the theory.

Though The Monitor Model Theory was highly regarded in the SLA paradigm in the 80s and 90s, according to Zafar (2009), the theory has generated substantial debate and controversy. As noted by Zafar (2009), Krashen's hypotheses are arguable due to the rather inflexible standards being set, and to some SLA scholars, the model is not as persuasive as claimed. McLaughlin (1987) gave a hint that the learning by acquisition idea is difficult to accept as the concept of Language Acquisition Device (LAD) among adult second language learners is widely criticized when Chomsky (1975) asserted that the accessibility to LAD among adults declines with age. McLaughlin as cited in Zafar (2009) stated that what Krashen's (1988) meant by learning and acquisition is also broad and not well defined.

Other than that, the monitor hypothesis, one of the hypotheses under The Monitor Model Theory is also fired with criticism by SLA scholars. Gregg (1984) for instance did not agree with Krashen's idea of positioning acquisition higher than learning, as if learning is being undermined. McLaughlin (1987) added that speech is governed by rule, and if speech is solely produced through acquisition without proper learning, this would result in second language learners uttering words without being able to make meaning. McLaughlin (1987) extended that in communication, the frequency of the learned system-activated utterances cannot be denied which indirectly challenges Krashen's assertion that kids, due to their lower filter, are superior to adults in terms of second language acquisition. The other three hypotheses proposed were also argued by SLA scholars with studies conducted to put the theory into application and tried to fill in possible gaps. Therefore, historically, Krashen's (1988) Monitor Model Theory can be considered as equally prominent and criticized in the field of SLA and discussing the theory would be substantial for any second language instructors.

The critical aspects of the theory

The first hypothesis proposed by Krashen (1988) is the Learning and Acquisition Hypothesis. This hypothesis proposes that second language performance is a result of two processes of what he called learning and acquisition. According to him, learning occurs through formal teaching and learners are conscious of the process. Meanwhile, acquisition is a subconscious process where learners acquire the language through meaningful communication. The next hypothesis on SLA proposed by Krashen is the Monitor Hypothesis. The acquisition system is where the speech originated, while the learning system performs the role of the 'monitor' or the 'editor' of the speech produced. The 'monitor' acts in a planning, editing and correcting function (Krashen, 1977). In contrast to post-method theories of language learning that see grammar correction as something that should not be emphasized, I somehow agree with the idea that correcting mistakes is an important part of learning. The monitor hypothesis somehow balances approaches to language learning that heavily focus on grammar correction and the one that opposes.

The other SLA approach would be the Affective Filter Hypothesis. Krashen (1988) reiterated that certain aspects like anxiety, motivation and self-confidence are the determining aspects in facilitating acquisition of a second language. This notion of belief is indeed approved by Dornyei and Otto (1998) who identified motivation as the fundamental cause that inspires the success rate of second language learning. The idea behind the affective filter hypothesis is language learners who possess high levels of motivation, self-confidence and lesser anxiety will have lower affective filters that will enable them to acquire a particular language quicker. In contrast, those who possess lower levels of motivation, self-confidence and more anxiety will have higher affective filters that will impede the learning of language. Not just in language learning, but in education in general, creating a welcoming and safe place where learners can learn is central. Bilash (2011) stressed that for language learning to happen, it

is important for the learners to know that they can actually make mistakes, take risks, and learn from the mistakes.

Another aspect of Krashen's (1988) Monitor Model Theory is the Input Hypothesis. This hypothesis stresses the learning process occurs when the learners obtain 'input' that is slightly higher than their existing stage of competence. For example, as cited from Schutz (2014), if a learner is at a stage 'i', then acquisition will happen when the learner is provided with an input that is slightly higher than the existing knowledge. Krashen (1988) described this as 'i+1' where 'i' is the existing knowledge and '1' is the knowledge that they acquire. The last hypothesis proposed in The Monitor Model Theory is the Natural Order hypothesis. This hypothesis suggested that learners' gain grammatical structures in a natural order from easy to a more complex structure. However, this varies between learners as for some learners, they acquire grammatical structures quicker while for some others, the acquisition is rather late. According to Schutz (2014), this order is independent of the learners' age, their mother tongue as well as exposure to the second language. It is also interesting to note that Krashen himself is opposed to the idea of forming a grammar syllabus based on the Natural Order Hypothesis when the stress of SLA is language acquisition.

Adapting the Monitor Model Theory to online language teaching and learning

The Monitor Model theory is widely applicable in the context of online language teaching and learning. While there are criticisms of the Monitor Model theory in terms of its methodology and testability, Lai and Wei (2019) concluded that Krashen's Monitor Model is a very systematic and comprehensive theory. Kiymazarslan (2000) in revision of prominent SLA theories had uttered mainly positive judgments on The Monitor Model Theory. The Acquisition-Learning Hypothesis as according to Kiymazarslan (2000) had somehow presented the idea among language scholars that learning a second language could actually be separated into learning and acquisition, where learning happens consciously while acquisition subconsciously. In accordance with the notion of understanding, Kiymazarslan (2000) believed that language instructors should equilibrate the lessons between activities resulting in acquisition and activities resulting in learning. In contrast to Kiymazarslan (2000) and Zafar (2009) asserted that acquisition is not resulted by learning and he deems that acquisition can be excellently comprehended when depicted as a process enhanced by the learned system. Therefore, according to him, instead of separating learning and acquisition, the two aspects should be integrated and acknowledged.

However, based on the result of his study, Kiymazarslan (2000) stated that there is a clear distinction between learning and acquisition that even a fluent speaker would commit language mistakes when speaking unconsciously despite knowing the underlying rules learned. In this regard, an online language teaching and learning should consider the distinction between learning and acquisition. While most of the learning materials uploaded to the Learning Management System (LMS) are for the purpose of learning, a language instructor of an online lesson, according to the Monitor Model theory, has to ensure acquisition happens. While in a physical class acquisition happens through live

communications, in an online class, a language instructor can initiate a live online communication via usable applications such as the LMS itself, WhatsApp, Telegram, Google Meet or Zoom platforms. To cater to low bandwidth learners, recorded videos on YouTube can be used to expose learners to native speakers' language use to ensure acquisition. Online language teaching and learning has to also consider the Monitor Model's Input Hypothesis. It is important however to first note language scholars' divided opinions regarding the Input Hypothesis. Kiymazarslan (2000) believed that the Input Hypothesis could be useful and for it to be effective in second language lessons, teachers can put more emphasis on listening and reading comprehension activities that provide added values to the learners' 'comprehensible input'. As opposed to that, Zafar (2009) stated that the effectiveness of the Input Hypothesis is hard to be proven. This is because according to him, Krashen and Terrell (1988) did not provide considerable proof to support the (i+1) argument but by only relying on certain phenomena. It is also hard to know how much input can be considered as comprehensible, and this makes the theory even more vague as stated by Zafar (2009). Gass and Selinker (2008) in the same understanding added that the input hypothesis emphases exclusively on the importance of 'comprehensible input' to the neglect of the output factor. Without considering the output, it is hard to observe the gaps made by learners between the input they received and the output they produced. For online language teaching and learning, a language instructor has to make sure that any input given to the learners has to be tested so that the output produced can be measured to see the effectiveness of the lesson. The weekly rows of the LMS platform have to contain at least an input, in forms of videos, audios or notes, and output, in forms of practices or quizzes. It is also crucial that the input given in an online lesson is comprehensible as suggested by the Monitor Model's Input Hypothesis and this can be done by knowing learners' proficiency level. Learners' proficiency level can be evaluated from the pre-tests or from their mastery of the previous topics. Different proficiency levels would require different input given and this has to be carefully crafted on the LMS to avoid 'one size fits all'.

The Affective Filter Hypothesis is another hypothesis of the Monitor Model that can be considered in online teaching and learning of language. It is imperative however to first note language scholars' divided opinions regarding the hypothesis as it is criticised by Zafar (2009) who asked questions such as in what way does the affective filter define which portions of language are to be selected and rejected? And how can fossilisation and inter-language development be determined by the filter? This is because according to Zafar (2009) there are cases of children who are affected by the thoughts of timidity, nervousness and lack of self-assurance but still succeed to learn their first language successfully. Despite the critics, Kiymazarslan (2000) believed that the Affective Filter Hypothesis can be useful in a second language classroom. In contrast to what is mentioned by Zafar (2009), though learners are anxious, they are able to master the first language as that is the language they speak at home, a place where they are secured. However, when talking about a second language environment, learners can always revert back to their first language when they are too anxious to use the second language. In this situation, the Affective Filter Hypothesis is relevant and as cited by Kiymazarslan (2000), the teaching and learning goal of language

learning must not only comprise comprehensible input but it has to also produce a surrounding that nurtures a low affective filter. In an online class therefore, a language instructor has to ensure a low affective filter through online lectures or other activities conducted. An online conversation between instructor and learners, and between learners, has to cater to all learners and be supportive, where low proficiency learners will find it fine to make mistakes. Online practices and quizzes have to consider the i+1 factor to lower the affective filter, where they must not be too difficult, but slightly challenging for learning to happen.

Suggestions for adapting the Monitor Model Theory on online language teaching and learning

This section is based on the authors' personal observation of the implementation of the Monitor Model Theory on online language teaching and learning in Universiti Malaysia Kelantan, Malaysia. Among the theories and approaches of SLA, Krashen's (1988) Monitor Model Theory has given a major impact in Malaysian language teachers' understanding of English as a second language teaching and learning.

Despite the notion of the learning-acquisition hypothesis, a rather common understanding among language instructors is that learners should thoroughly learn language through formal in class lessons. However, it has to be noted that learners learn more from their formal and non-formal communication than syllabus-based topics from the textbook and repetition of grammar rules that they have in class. This is clearly observed from learners who came from a background of family that practices English at home and learners who are exposed to English language through television programs. In fact, the view on this matter is supported by Merritt (2012) who said that social media like television, songs and videos accelerate the acquisition of English language as compared to grammar books. Thus, it is believed that English language teachers should always keep in mind to provide an online classroom environment that has a mixture of 'learning' and 'acquisition'. While they have to follow the syllabus for students' 'learning', they also have to provide an environment of 'acquisition' in class. In fact, referring to the hypothesis, Krashen (1988) also added that learning is actually less important than acquisition. Hence, promoting acquisition in an online classroom should be a priority among teachers and this can be done by having group works that enhance communication between learners, storytelling, thematic listening and speaking activities as well as incorporating social media for more exposure towards English language.

The next hypothesis on SLA proposed by Krashen (1988) that can contribute to effective online teaching of a second language is the monitor hypothesis. For English language teachers, this understanding helps in teaching as in not to neglect error correction. Though post-method theorists suggest approaches such as a communicative approach that pays less attention to error correction, error correction should go hand in hand with meaningful language learning. When learners are not corrected for the language mistakes they have made, they tend to repeat the same mistakes repeatedly in the future until they figure the right way the mistakes should be. This is indeed time consuming and the mistakes might

form a habit after a series of uncorrected repetition. Although learning a second language is done subconsciously and the action of correcting errors in oral reading as well as writing will not result in acquisition, the correction of errors by language instructors may trigger conscious second language learning. Nevertheless, it is also important for a teacher to be aware that instant error correction might affect learners' motivation to learn. Zhiping and Paramasivam (2013) asserted that teacher's instant correction might affect learners' affective filter in a way that it might develop fear of mockery among classmates. Zhiping and Paramasivam (2013) continued by suggesting that it is possible for teachers to correct learners' errors, but it has to be done indirectly or by consulting the learners individually about the error. One way to indirectly correct language errors would be by collecting all errors made by the learners and addressing them after the lesson. Another way that is possible is also by praising the learners first for their participation before commenting on the errors with positive facial expression and body language. However, error correction should not be excessively done and it is highly important to note what Krashen (1977) implied as error correction should only be used to assist learners to be aware of particular points. Thus, it is convinced that the applying the monitor model could contribute to an effective teaching of second language.

The other SLA approach that contributes to effective online second language teaching is the affective filter hypothesis. The affective filter hypothesis is the first thing that should be comprehended by language instructors when developing and executing lessons in an online classroom. By considering the idea of the affective filter, language teachers could increase learners' self-confidence and lessen their anxiety that would lead to better classroom participation. According to a study conducted by Zhiping and Paramasivam (2013), keeping learners' affective filter low can be done by showing positive gestures while teaching, making jokes, telling stories and appreciating their answers. Plenty of research that is based on the framework of the affective filter hypothesis also noted that materials selection play a crucial role in lowering learners' affective filter. For instance, Wachob (2006) said that learners' motivation depends on a variety of factors, one of them would be teaching materials and what they do in class. As Gardner et. al. (1989) proposed, engaging learners' interest in class can be done by using authentic materials that relate to their daily lives. As an example, when it comes to writing activity, it is best for teachers to select writing topics that relate to learners' life and about something that they have experienced instead of topics they hardly talked about. By this way, their self-confidence would increase thus lowering their affective filter. This of course would increase learners' participation that will consequently lead to effective language teaching.

Conclusion

To summarize, the Monitor Model Theory is a noteworthy set of five hypotheses that were developed by Stephen Krashen in the late 1970s beginning with individual hypotheses. Studying the Monitor Model Theory can be said as fascinating as although the theory was popular in the 80s and 90s and adopted by educational systems, the theory has also been questioned and challenged by some language scholars. Despite the challenges, it does not

mean that this theory is unworkable for language instructors, but as Ridgway (2000) mentioned, what is taken from the theory and applied to the online classroom must be weighted accordingly. If a language instructor needs to adapt the language approaches in a classroom, it is always crucial to consider how he or she would adopt them (Ridgway, 2000).

The Monitor Model Theory has its own potential impact on SLA, and it is very much relevant to be adopted and adapted notwithstanding the complaints made by language scholars. This is because most complaints regarding the theory are based on the perception that the theory is hardly proven, and the terms used such as 'comprehensible input' and 'acquisition' are too vague and not specific making it hard to define. However, it is somehow better to be a bit abstract as this will give the language instructors, who are involved in applying the theory in classrooms, to adapt and adjust the theory based on their understanding. Taking 'comprehensible input' for instance, language instructors may define how much input they think is comprehensible for the learners. Other than that, based on the disapproving comments that say acquisition and learning should not be separated, despite following the hypothesis straightforwardly, language instructors can always tie learning and acquisition together by providing the learners with conscious learning in the online classroom as well as subconscious learning interchangeably. Based on this idea of adapting the theory, language instructors in the future can always conduct a simple action research in their classrooms to see in what way the hypotheses can work effectively with the learners.

All in all, understanding SLA will undeniably contribute to effective online teaching of a second language. This has indeed been proven from a number of research as well as my own experience as a language teacher. The most significant would be the aforementioned hypotheses such as the Learning and Acquisition Hypothesis, the Input Hypothesis, the Monitor Hypothesis, the Natural Order Hypothesis and the Affective Filter Hypothesis. Based on the discussion above, it is very well convincing that understanding SLA theories in depth must be a priority among second language teachers as Charlemagne said, 'to have a second language is to possess a second soul'.

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