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The Management of Digital Transformation in Higher Education: An Assessment Proposal

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The impacts of the current digital era are growing more and more on the way in which higher education (HE) offers learning programs at every level. Smart learning (SL) represents the evolution of educational approaches and techniques that capitalizes on all the opportunities deriving from new digital ecosystems. This study argues that the usefulness of HE can benefit from rethinking the traditional active learning (AL) model to smart ones. Thus, this research aims at investigating how to adapt the performance evaluation when the operations of HE turn to digitalized models. Therefore, this paper designs a research approach that allows accounting for the effects that the adoption of some SL strategies and tools has on the engagement of students and the aggregate performance of HE programs that adopt AL. The results of this study would help academics and HE managers assess the effectiveness of SL initiatives they plan to adopt.

Keywords: higher education, active learning, smart education, smart learning environment, social learning theory, digital technologies, smart devices, digital student-centricity, on-line lectures, COVID-19

Introduction

Despite the research concerning smart education (SE) being rich and full of interesting experiences and contributions (Kankaanranta & Mäkelä, 2014; Zhu, Yu, & Riezebos, 2016), few studies refer to the effectiveness of smart learning (SL) adoption in higher education (HE). SL is an action-based and student-oriented educational paradigm that has its foundations in smart devices and intelligent technologies (Kim, Song, & Yoon, 2011).

There is no agreed-upon definition of SL so far, though Gwak (2010) proposed two essential components of SL: Firstly, SL is focused on learners and education objectives and contents; secondly, it is effective, intelligent, and tailored learning and teaching methodology. Thus, crafting and executing SL requires introducing learner-

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centered, service-oriented, and ubiquitous learning and teaching methodologies rather than just adopting smart devices or digital technologies (Kim, Cho, & Lee, 2012).

The core element of learner-centricity, indeed, has its origins in the so-called active learning (AL) methodologies that higher education (HE) has been using much earlier than digital technologies which could promote the development of SL. AL is a multifaceted pedagogical concept. It includes different dimensions such as student engagement and centrality, participation in knowledge discovery, construction and sharing of knowledge, interconnectedness between ideas and perspectives, learning by doing and reflecting, importance of feedback (Bowden & Marton, 1998; Illeris, 2013; Ambrose et al., 2010).

Given the ever-increasing popularity of SL and smart learning environment (SLE), especially in the aftermath of COVID-19 pandemics, it is of paramount importance to investigate the effectiveness of AL activities when they take place through the adoption of SL in HE institutions. Thus, this paper aims to define a methodology that permits to investigate how effectively AL based on SL is able to replace face-to-face interactions and help during uncertain and disruptive contingencies, like the ones caused by COVID-19, as well as to offer new tools and strategies to create value for HE institutions, when all the programs come back to normal face-to-face activities or in the case their business model switches, even only partially, to new digitalized models.

Active Learning

AL is a multifaceted pedagogical concept. It includes different dimensions such as student engagement and centrality, participation in knowledge discovery, construction and sharing of knowledge, interconnectedness between ideas and perspectives, learning by doing and reflecting, importance of feedback (Bowden & Marton, 1998; Illeris, 2013; Ambrose et al., 2010). AL is strictly related to transformative learning (Mezirow, 1991; Taylor & Cranton, 2012), and team-based learning (Michaelsen, Sweet, & Parmalee, 2009). Nevertheless, AL should not be considered as a set of activities that aim at involving students, but it is something between psychology, philosophy, and sociology that impacts both pedagogical practices and on the learning process through cognitive and emotional engagement (Di Napoli & Geertsema, 2020). Among all such factors, this study investigates the role played by the following dimensions of AL: student engagement, cooperative learning, and importance of feedback, identified by Bowden and Marton (1998), Illeris (2013), and Ambrose et al. (2010); team-based learning, identified by Michaelson et al. (2009).

Smart Education Framework

The adoption of SL approaches is increasingly considered to be an influential factor in supporting the improvement of any HE program or field of study. Despite the growing interest in SL, the way it can be developed, and the outcomes it can provide, there is still a lack of a widely accepted definition. Given these considerations, research about SL should also entail the pedagogical implications determined by the AL framework, and so focus on education for teaching how to develop and for whom (that goes beyond knowledge, attitudes, skills, and capabilities).

The SE framework is based on the three core elements identified by Zhu et al. (2016): SL environment (SLE), which covers the technological domain; smart pedagogies, which are focused on a methodological dimension; smart learners, which are supported by the previous two components.

Another interesting issue concerns the adoption of SL in a multidisciplinary environment (Rauch & Hulsin, 2015), since teaching values and capabilities belonging to the different professional fields to students from different fields of study require different approaches.

Smart Learning and Active Learning

Even though there have been many studies related to SL in the HE, the research is limited regarding the most common AL initiatives. Based on these considerations, this study will focus on the relationship between AL approaches based on SL. The research is limited only to those HE programs that are capable to embed AL methodologies and capture its positive effects, such as: the engagement of students in projects or activities (Pittaway & Edwards, 2012); the impact of practical teaching models based on problem-based, experiential, and action learning (Kassean, Vanevenhoven, Liguori, & Winkel, 2015); the impact of practical teaching models based on learning by doing (Rasmussen & Sørheim, 2006). More specifically, this proposal aims at investigating the effects that SL approaches might have on the effectiveness of Italian HE programs or courses adopting AL. Thus, this investigation will investigate whether and how the usage of smart technologies might affect the degree of efficacy and satisfaction perceived by students of HE institution. SL is one such framework that incorporates all these elements, thus making research in SL of profound importance.

Research Approach

Our study is in line with those research approaches in HE that emphasize the need to pay more attention to the actions and experiences (Kassean et al., 2015). For the purpose of this paper, a research framework to assess SL will be examined. We argue that smart education techniques are powerful tools and that they are particularly effective; regardless of the field of HE programs or single courses, the dissemination values related to entrepreneurship mindset is emphasized (Fayolle & Gailly, 2015; Maresch, Harms, Kailer, & Wimmer-Wurm, 2016).

Drawing on theories of human capital (Becker, 1994) and social learning (Bandura, 1977), when the suggested research methodology is put in practice the expected findings are that the SL has relevant positive impacts on AL in HE environment and that this impact can be fostered by multidisciplinarity. Thus, we argue that embracing the aforementioned AL methodologies leads students to develop stronger professional mindset and core self-evaluation. Consequently, this research aims to understand the extent to which the adoption of SL allows to improve the effectiveness in HE especially when AL is adopted. In light of this argument, we explore a possible research approach that can be executed to assess the introduction of SL initiatives in every HE program.

There is the need for practical teaching models based on smart AL. For this purpose, the aim of this study is to design an approach to explore whether the adoption of a SLE improves HE students perceived quality and effectiveness. Thus, it is crucial to rethink education and shift from traditional didactic models to digital ones.

The methodology of this paper is based on a survey that will be conducted at the University of Teramo (UNITE), Italy; it represents a research approach scalable in every other HE organization that has adopted or plans to adopt a set of SL strategies, similar to UNITE's ones.

Starting from 2013, UNITE has been experiencing years of deep changes based on a student-centered pedagogical approach (AL and SL) both on the teaching side and on the learning side. The teaching methodologies, from simply being a knowledge transfer, turned into the so-called inspired teaching and learning.

We will design a survey addressing to a sample of students that is a close representative of the whole students' population at UNITE which is made up of more than 6,100 students as of 2021, by taking into account the different educational levels (BSc and MSc) and by differentiating the cluster of students per field of study too.

Therefore, we will cover the courses within five departments: Communication Science, Political Science, Law, Veterinary Medicine, Bioscience and Agri-Food and Environmental Technology.

To assess the SL strategy adoption along with an entire HE institution, we plan to engage at least one class for each year of all BSc and MSc. All the instructors should be invited to propose to their students to fill out an online questionnaire. Therefore, students would be selected based on their attendance to the lectures. The data collection will be conducted online by sharing a link where students will find a questionnaire to be filled out. The size of the sample should be of a rate of at least 15% of the whole population to enhance the reliability of the collected data. The aim of the survey is to collect and explore the students' opinion about the experience they had during their current higher education career at UNITE about some smart learning/teaching activities and tools that were being offered.

In our framework we will ask students to share their opinion about their educational experience with smart learning in one of the following periods:

- before March 2020 (when COVID lockdown started in Italy; in this period the entire Italian HE system provided a smart learning environment but the digital tools, in most of academic institutions, have been used on a voluntary basis by instructors, making it a blended system where distance/online activities could not cover official lectures, but it could only cover additional seminars or other activities that played a supporting role to the compulsory face-to-face learning activities);
- from March 2020 to September 2022, and during COVID restrictions (in this period in the Italian HE system there were periods with complete restrictions during which only distance learning was admitted and periods in which there co-existed face-to-face and online lectures according to the specific weight that every university set. Most likely this allowed to improve the smart learning environments compared with the initial configurations adopted to fix the lockdown emergency. During this COVID restrictions period instructors were forced to use digital tools at least those required by their respective universities to give that percentage of total class hours online. Of course, instructors voluntarily continued using other digital technologies and tools to run online all the admitted activities, such as office hours, student team working, singles student, or teams supervising);
- starting from September 2022, when COVID restrictions should be suspended and distance/online activities once again come to play a supporting role, for sure wider compared with pre-COVID periods, to the compulsory face-to-face learning activities.

Therefore, we will ask students to specify whether, during the period they reported for in the questionnaire, they attended classes or activities that were: blended—before March 2020; blended—from March 2020 to September 2022; taught online only—from March 2020 to September 2022; taught face-to-face only. In addition, we will ask them to specify also whether their own degree of attendance has been high, low, or I did not attend the classes.

Students will be invited to express their degree of agreement or disagreement with respect to specific learning/teaching activities and tools students may have respectively experienced during the higher education program they are enrolled in when submitting the questionnaire. We will ask them to express their agreement or disagreement by choosing one of the numbers for each statement associated with SL activities. The answer they can choose is from 1 to 5 according to the following Likert scale: 1—strongly disagree; 2—slightly disagree, 3—neither agree nor disagree; 4—slightly agree; 5—strongly agree.

Such activities are oriented to develop technology, computer-supported collaborative learning (CSCL). They belong to the wider category of group-based collaborative learning activities (Dillenbourg, 1999) with two

or more people learning or attempting to learn something together. Moreover, CSCL is experienced in a digitalized environment, where intelligent technologies are used to support interactions and cooperation between groups of students to improve learning (Stahl, Koschmann, & Suthers, 2006). We have distinguished the following CSCL categories in: during class hours activities and outside class hours activities (without concurrent instructor supervision).

CSCL during class hours:

1. To join brainstorming sessions.
2. To share thoughts and answers with the class.
3. To join a focus group.
4. To attend teamwork sessions with the aim of achieving the required goal under the guidance of the professor.
5. To take part in simulated companies in business games.
6. To give team presentations about the analysis of scientific papers, case studies, team works, or other topics.
7. To attend other role-playing games.
8. To experience peer evaluation about the within-group activities.
9. To experience peer evaluation about the activities and class presentations of other students or groups, as a discussant.
10. To experience peer evaluation about essays and project works by other students and works.
11. To experience a debriefing about the effectiveness of one's own study/learning approach/progress before the exams.
12. To experience a debriefing about the effectiveness of the instructors' teaching methodology before the exams.

CSCL outside class hours:

1. To join brainstorming sessions.
2. To share thoughts and answers with other students.
3. To attend teamwork sessions with the aim of achieving the required goal.
4. To take part in simulated companies in business games.
5. To give team presentations about the analysis of scientific papers, case studies, team works, or other topics.
6. To attend other role-playing games.
7. To experience a debriefing about the effectiveness of the instructors' teaching methodology before the exams.

In order to emphasize what students think and perceive about their SL experience, we will include at the end the following items that students will have to rate according to the same Likert scale.

- Usefulness—The learning activities I have attended on-line have been more interesting and useful than traditional face-to-face ones.
- Entrepreneurship—The learning activities I have attended online increased my interest in entrepreneurship.
- Uncertainty—The learning activities I have attended online have improved my ability to deal with changes and to manage uncertainty.

Finally, students will be invited to add comments and thoughts in one open-ended question concerning the ways they experienced AL and SL, and to show what they believe about the respective impact on their attitudes and skills.

Conclusions and Expected Implications

This study emphasizes the need to optimize the digital transformation in HE and the managerial need of feedback from the users (the students) of AL initiatives, when designed in SLEs and offered with the support of digital technologies. AL offers an ideal learning ecosystem where students can have a leading role. So, it becomes crucial to develop and drive learning and training paths towards AL in a smart education perspective, required to prepare the students acquiring the skills the next generation of talents (World Economic Forum, 2020).

To test whether efficient and effective SL strategies are adopted and executed, this study designs a research approach that could validly be adopted to empirically explore the managerial effectiveness of University of Teramo.

The results of this study may serve, however, as a new tool for academics and managers from other HE institutions to plan and monitor the digital student-centricity in the curriculum design. Moreover, it will help instructors too, to self-assess their teaching approach with particular attention to AL and SL respective frameworks.

When it comes to the perspectives of potential students, the findings after the research is run in its completeness could help in the choice of the HE alternatives.

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