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Digitalisation to Support Competences Acquisition: Experiences at the Faculty of Business Administration and Management

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Abstract

This work presents the design of tasks in two courses at the Faculty of Business Administration and Management between 2020–2021. Because on-campus learning was limited, the tasks were designed to enable students to use digital tools. The learning outcomes were defined to ensure that students acquired both STEAM and soft competences. The STEAM competences in these subjects focused on developing curiosity (S: science), using technology (T), solving problems (E: engineering) and communicating in a visual manner (A: arts).

In the first course, the task, which was implemented across two lessons, required the students to review a service. The students used digital tools to trace the customer journey, including pain points (negative opinions about the experience) users indicated, solutions to address those pain points and the main challenges involved in the solutions' implementation. The use of digital tools added the technology competence to the competences students had already acquired in previous years (science, engineering, arts).

In the second course, students worked on their bachelor's degree theses, which they will be required to present both orally and in writing to three professors of the faculty. The task designed in this subject involved a screencast video produced by each student. Each student's video was required to follow the format of the actual presentation of his or her thesis. This task added the technology and arts competences to the competences they had acquired in previous courses (science and engineering).

This paper presents the results obtained from the two courses. These include the evaluation of learning outcomes in relation to previous years, the advantages and disadvantages of the tools selected in each subject and improvements to be incorporated in future years.

Keywords: *Digitalisation, competences, STEAM, visual communication.*

Introduction

On a daily basis, both individuals and firms rely on essential digital skills to use software, applications and devices connected to the Internet. COVID-19 compelled people in all professions to evaluate their skill mismatches and revealed the need for schools and universities to encourage the development of digital skills in students and teachers. According to Eurostat (2020), the digitalisation of the European Union means that, currently, 72% of people aged 25–34 years use online banking while 79% use the Internet to order goods or services. Moreover, online interactions between citizens and public authorities have also increased, and approximately 53% of the adult population (ages 16–74 years) interacts in this way. This environment incentivises students to become involved in digital society and requires a nurturing environment in which they can expand their skills.

STEAM (science, technology, engineering, arts and mathematics) strategies can be an effective way to encourage students' digital skills through subjects that combine diverse competences. Examples of these competences are curiosity (B. De-Miguel-Molina et al., 2020), creativity (Santamarina et al., 2020), decision-making (Segarra-Oña et al., 2020) and evaluating alternatives (Peiró-Signes et al., 2020). This paper presents two tasks designed to enable the simultaneous acquisition of digital skills and STEAM competences (M. de-Miguel-Molina et al., 2020; Van Laar et al., 2020). The paper seeks to answer the following research question: What competences are more likely to correlate with each other? To answer this question, the paper examines two example tasks in two courses.

The structure of the paper is as follows. Following this introduction, the second section defines the main STEAM and digital skills identified by previous works. Then, the third section describes the activities' design process, and the fourth section analyses the results. The last section discusses the main conclusions.

STEAM strategies and digital skills in business education

STEAM competencies enable the acquisition of skills, such as creativity, problem-solving and critical thinking (B. de-Miguel-Molina et al., 2020), that modern firms require. Because these competences involve multiple disciplines, they facilitate the analysis of complex problems from different viewpoints. Vuorikari et al. (2016) define five competence areas for digital skills: information, communication, creation, safety and problem-solving. The authors then connect these competence areas with the five cognitive domains: remembering,

understanding, applying, evaluating and creating. Furthermore, they contend that this last domain, creating, suggests that a person is able to resolve complex problems and propose new ideas. The capability to solve complex problems is also at the centre of STEAM strategies.

Van Laar et al. (2020) define six digital skills, which they apply to information and communication technology (ICT) tasks. Meanwhile, M. de-Miguel-Molina et al. (2020) apply STEAM skills to different fields in the social sciences and humanities. For example, they link science skills with encouraging curiosity (B. De-Miguel-Molina et al., 2020) while they assert that arts and design skills promote creativity (Santamarina et al., 2020). The engineering strategy applies decision-making methods to enable students to evaluate various alternatives to solve a problem (Segarra-Oña et al., 2020), and mathematics allows students to evaluate the costs and future benefits of the solution proposed (Peiró-Signes et al., 2020). According to the authors, STEAM skills nurture the development of soft skills, including teamwork, communication and critical thinking. These soft skills are likewise evident in Van Laar et al.'s (2020) list of digital skills, which includes skills necessary 'to use software or operate a digital device'. Therefore, STEAM strategies can be designed in combination with digital skills.

Table 1 presents a compilation of digital and STEAM skills, as defined by Van Laar et al. (2020) and M. de-Miguel-Molina et al. (2020). The table's organisation indicates potential connections between the two types of abilities.

Table 1. Digital and STEAM skills

Digital skills	Goals	STEAM skills	Goals
Van Laar et al., 2020		**M. de-Miguel-Molina et al., 2020**	
Information	Locate, evaluate and organise digital information	Technology	Use technology tools
Communication	Engage in social interactions through email, social networks and other means	Technology	Use technology tools
Collaboration	Use collaboration software	Maths	Evaluate a proposal's costs and future benefits
Critical thinking	Critically reflect about online information	Science	Exhibit curiosity
Creativity	Create content	Arts & Design	Propose creative solutions that could have a social impact
Problem-solving	Find solutions to problems	Engineering	Apply decision-making methods to compare different alternatives

Sources: Van Laar et al., 2020 and M. de-Miguel-Molina et al. 2020

Designing tasks combining STEAM and digital skills

This section presents example tasks designed for two courses. The first task required students to utilise the customer journey tool while the second required them to create a video.

3.1. Task: The customer journey map

The objective of the task required students to select a service from a company and locate users' opinions about the service. To organise the relevant information, the students employed the customer journey map, which "maps out the stages that customers go through when they use a service" (Reason et al., 2016) and describes customers' experiences at every point of their contact with the company (Villani, 2019). Thirty-nine students were enrolled in the course, which is offered in the eighth semester of the business administration and management degree programme. The task described here is the first task students present in a report during the course and accounts for 20% of their final grade. Evaluation of the students' work on the task includes the following: a) the objective of the report, b) the students' analysis of reviews uploaded by users on a webpage or social network, c) the completion of approximately 10 interviews with users and the students' analysis of the information collected, d) the customer journey map, including pros and cons of the customers' experiences, e) ideas to improve the customers' experiences and f) problems to consider in implementing the proposed improvements.

The first step for the students was to select a service and then analyse the positive and negative aspects of customers' experiences with it based on users' reviews. In completing this task, students were precluded from using methods that might raise ethical concerns, such as web scraping, because the collection of information was limited to only a few reviews and the aim was to identify myriad options to find information related to customers' experiences with a service. Students were required to organise the information they gathered into a table while considering whether each review indicated a positive or negative aspect of a customer's experience before, during or after the service. Next, they were required to use an application (e.g. miro.com, Piktochart) to create the customer journey map. A sample customer journey map, which the students received, appears in Figure 1. After including the pain points (negative opinions about the experience) and benefits (positive opinions) in the map, the students were asked to brainstorm solutions the service could apply to reduce or eliminate users' pain points. In completing this portion of the task, the students were encouraged to search for inspiration among competitors and substitutes.

Table 2, which connects the digital skills and STEAM strategies included in Table 1, identifies the competences students acquired via Task 1. It is important to consider that the course for this task was part of a business degree programme. Thus, the skills were adapted to the learning outcomes defined for this programme.

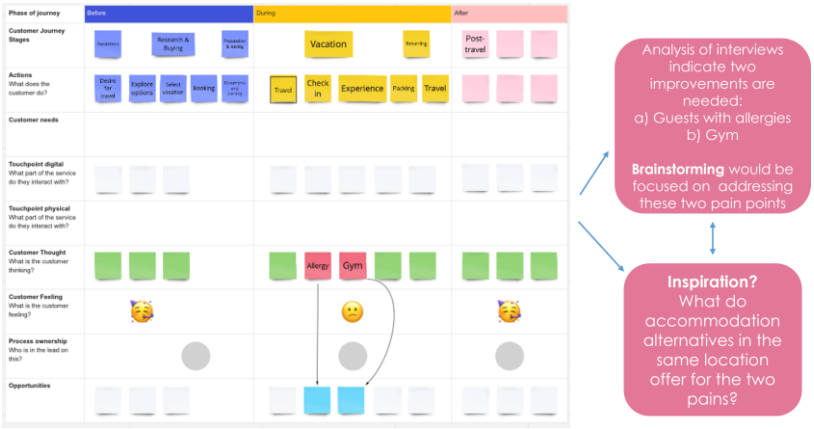

Figure 1. Customer journey map

Source: Elaborated with miro.com

Table 2. Digital and STEAM skills for the task "Customer Journey"

Dimension	Resource–STEAM strategy	Task	Skill to acquire
Information	Technology (T)	Identify the opinions of users on a website and extract information	Information + Technology
Critical thinking	Science (S)	Identify problems from users' opinions	Critical thinking + Science
Problem-solving	Engineering (E)	Evaluate causes for the problem and list potential solutions	Problem-solving + Engineering
Creative	Arts & Design (A)	Use a customer journey tool to propose ideas	Creative + Arts & Design
Communication	Technology (T)	Communicate ideas in a visual way	Communication + Technology
Collaboration	Maths (M)	Evaluate costs and benefits of solutions proposed	Collaboration + Maths

Source: Authors' elaboration

3.2. Task: Screencast video

The task was intended to improve the communication skills students employ while using digital technologies. More concretely, the students were instructed to create a video—in screencast format, including slides and voice along with student's image—summarising the work they had been preparing for their final thesis degrees. In completing this task, the students were required to select from and use various applications available at their university while following specific processes to upload the final video. The required duration of the video was 15 minutes. Slides supporting the video were to include an index, the objective, the method, the main results and the conclusions. Thirty-eight students were enrolled in the course, which is offered in the seventh semester of both the business administration and management and the public administration degree programmes. The task described here is

the last task students present in a video during the course and accounts for 30% of their final grade. Evaluation of the task considers the following: a) the content in the slides and oral presentation, b) the effectiveness of the student's communication, c) the student's use of time (near 15 minutes), d) the design of slides supporting the video, e) the structure of the slides and the student's oral communication and f) the digital skills employed in the design of the slides and video.

Table 3. Digital and STEAM skills for the Task "Screencast video"

Items	Dimension	Resource–STEAM strategy	Task	Skill to acquire
Content	Critical thinking	Science (S)	Apply critical thinking skills to content	Critical thinking + Science
Content	Problem-solving	Engineering (E)	Evaluate problems and give solutions	Problem-solving + Engineering
Digital & Design	Creative	Arts & Design (A)	Produce a video in screencast format	Creative + Arts & Design
Communication, Structure & Time	Communication	Technology (T)	Communicate ideas in a visual way	Communication + Technology

Source: Authors' elaboration

Results

This section presents the results obtained to answer this paper's research question. Table 4 shows the correlations among the competences for Task 1 while Table 5 shows the correlations among the competences for Task 2. As Table 4 indicates, the first task's design facilitated linkages among the skills. For example, a positive correlation exists between science and engineering and thus between critical thinking and problem-solving. In terms of the task design, this means that students whose documents included not just analyses of users' online reviews but also interviews offered more and better ideas than did students who documents included only analyses of users' reviews. With the exception of digital skills related to the use of applications to complete and upload the video, Table 5 likewise indicates high correlations among the skills graded in Task 2.

Table 4. Digital and STEAM skills acquired through Task "Customer journey"

Items	***Skills***	*Objective*	*Users' reviews*	*Interviews*	*Customer journey*	*Ideas*	*Implementation problems*
Objective			-0.182	0.227	-0.114	0.384*	0.205
Users' reviews	Information + T; Critical thinking + S			-0.077	0.653**	-0.173	-0.291
Interviews	Critical thinking + S				0.120	0.524**	0.630**
Customer journey	Creative + A; Communication + T					-0.035	-0.125
Ideas	Problem-solving + E						0.821**
Implementation problems	Collaboration + M						
* *Sig.* < 0.05; ** *Sig.* < 0.01							

Source: Pearson correlations obtained with SPSS 16 software

Table 5. Digital and STEAM skills acquired through Task "Screencast video"

Skill	Content	Communication	Time	Design	Structure	Digital
Content		0.781**	0.472**	0.670**	0.677**	0.410*
Communication			0.400*	0.535**	0.581**	0.201
Time				0.438**	0.586**	0.232
Design					0.818**	0.241
Structure						0.196
Digital						
** Sig. < 0.05; ** Sig. < 0.01*						

Source: Pearson correlations obtained with SPSS 16 software

Conclusions

This paper outlines the design and results of two tasks aimed to improve business school students' digital skills. The tasks required students to incorporate different applications to present a more effective visual result and to improve the qualitative of images that accompanied their oral presentation. Each case was different, but both tasks were designed to achieve the specific skills described above. The results from the analyses indicate that the skills in each task tended to correlate with each other. Thus, each task facilitated the development of more than one skill. However, the Task which required students to create a video, proved more challenging because it involved the combination of a greater number of digital and creative tasks. The results from the projects—directed by the university and business schools during the past two years—highlight the advances that students in two degree programmes made in terms of their soft skills. Nevertheless, additional efforts are essential to promote students' digital skills. For example, this study's results will help to increase the support and explanations related to Task 2 and to incorporate an even greater number of digital tasks in these subjects in the future.

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