


Getting Ready for the New Normal Way of Working: Using Business Simulation Projects to Foster Work-from-Anywhere Skills

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Abstract: While entering the post-COVID-19 pandemic phase, to define a *new normal* way of working, some companies are transitioning toward a permanent WFX model, while others are combining WFX with colocated work (i.e., hybrid work). Therefore, fostering WFX skills (usually classified as soft skills) in early-career students becomes crucial; additionally, it can help reduce early school leaving. This work aims at understanding how *business simulation projects* foster the WFX skills deemed crucial by industries. To this end, we conducted two case studies involving high school students. The final questionnaire revealed that most participants evaluate their WFX as *fair* or higher. Moreover, they believe that business simulation projects help in developing WFX skills. Based on our results, we highlight recommendations for educational practice.

1 INTRODUCTION


Work-From-Home (WFH) and Work-From-Anywhere (a.k.a. WFX or WFA) allow greater autonomy in selecting spaces, times, and tools (Choudhury et al., 2019; Sako, 2021). With the world entering the post-COVID-19 pandemic phase, WFH/WFX is becoming the “new normal” way of working. Software companies have shown that they can work remotely without significantly impacting productivity (Smite et al., 2021b); additionally, most software professionals would like to continue WFH/WFX (Terminal, 2021). Based on these considerations, some companies choose a permanent WFX model (Drera, 2021). Other major companies, such as Google and Apple, are pushing their employees to return to the office (Kaplan, 2021); however, they are going toward *hybrid work*, which is neither pure distributed nor pure co-located. Therefore, it is becoming clear that WFX will be integrated (at least to some extent, in the case of hybrid work) into the new normal way of working. Consequently, the job market of the next future will demand more and more WFX skills (Paasivaara et al., 2013; Prossack, 2020),


which are usually classified as soft skills (Matturro et al., 2019).


Research shows a gap between the software industry and software engineering education (Oguz and Oguz, 2019); for example, novices at Microsoft face problems related to their lack of soft skills, such as social and communication skills (Begel and Simon, 2008). Therefore, there is a need to train future software professionals by developing soft skills (Capretz and Ahmed, 2018) and, specifically, make future software professionals capable of confronting the challenges of WFX by thriving in the “new normal way of working”.


Working in a remote setting requires a combination of good collaboration infrastructure and several WFX skills, i.e., a complete mindset of autonomy, teamwork, collaboration, technological resources, and understanding of goals (Fronza et al., 2022b). Cultivating these traits early in their career will give students the skills they need for the new work environment. To this end, high school students must be provided with courses featuring authentic experiences: early exposure to WFX will let them embrace WFX practices, develop a good command of the enabling technology, and fine-tune the necessary skills (Fronza et al., 2022b).

Business simulation projects can enhance several skills, such as time and strategy management, nego-

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tiation, and decision-making (Asiri et al., 2017; Xu and Yang, 2010). Moreover, they can be used as a targeted intervention to prevent and counter explicit and implicit early school leaving because of their connection with real life (European Commission, 2020).

This paper explores how prepared students feel in the WFX skills deemed crucial by the industry representatives interviewed in (Fronza et al., 2022a). Moreover, we investigate the contribution (perceived by students) that business simulation projects make to developing WFX skills. To this end, we build on our previous work (Fronza et al., 2022a) by reporting the results of two case studies we conducted following the same approach. We distributed a questionnaire among the participants of the case studies presented in this work and the case study in (Fronza et al., 2022a). Results show that most students evaluate their WFX as fair or higher. Moreover, they believe that business simulation projects help in developing WFX skills.

The rest of this paper is structured as follows: Section 2 introduces related work and Section 3 details the research method. Results are reported in Section 4. Section 5 draws conclusions and suggests areas for future work.

2 RELATED WORK

After its inception in the 1970s (Choudhury, 2021), the advances in digital technology (e.g., desktop virtualization and video chat platforms) (Sako, 2021) and the collected evidence on performance benefits (e.g., (Bloom et al., 2015)) made Work-From-Home (WFH) spread in several sectors in the 2000s, with several companies moving toward greater geographic flexibility. Then, due to the COVID-19 pandemic, employees were given more flexibility and autonomy in choosing spaces, times, and tools; on the other hand, they started having greater responsibility for accomplishing objectives at the pre-established times (Softtek, 2020). This led to the introduction of WFX policies, which extend WFH (Softtek, 2020) in a way that workers can organize their activities by combining private and work life. WFX is based on trust between employer and collaborators (Stamenova, 2021; Softtek, 2020) and on employees' ability to understand the goal, select available resources (tools and time), collaborate with others, and deliver results (Smart Working Observatory, 2020).

The development of research about COVID-19 and its many impacts on work settings is an emergent topic that continues to evolve. With this reality in mind, we discuss a selection of works that walk us through the future of WFX after the pandemic, the

changes in working routines and practices that WFX has determined, and the skills needed to succeed in a WFX setting.

WFX. It is becoming clear that WFX will not disappear after the pandemic: employees express the desire to continue with remote work (Buffer, 2021) regardless of several factors (including age, education, gender, earnings, and family circumstances), even accepting sizable pay cuts (Barrero et al., 2021). As a result, some companies are choosing a permanent WFX model (Drera, 2021). In contrast, others (Kaplan, 2021) are going in the direction of *hybrid work* (i.e., a combination of remote and in-office working) (Sako, 2021), since offering customized working styles seems to be effective in attracting talents (Kelly, 2021).

WFH determined several changes and novelties in working routines and practices. Among the reported changes, the daily rhythm of WFX is more flexible and self-imposed (Smite et al., 2021a). Several issues have been reported concerning WFX, including a reduced ability to unplug, loneliness, complex collaboration and communication (Buffer, 2021; Adil et al., 2022). Moreover, maintaining an organizational culture represents one of the main issues; in this regard, one challenge is defining those activities that must happen in-the-office to help maintain the organizational culture (Smite et al., 2021a).

Skills Needed to Succeed in a WFX Setting. The existing literature in Global Software Engineering (for example, (Monasor et al., 2010; Casey et al., 2007; Swigger et al., 2010; Christensen and Paasivaara, 2022)) identified specific (soft) skills needed to succeed in WFX settings, such as strong written communication, adaptability, focus, time management, collaboration, working in culturally diverged teams, and using collaborative technologies (Paasivaara et al., 2013; Prossack, 2020). Several ideas for training have been proposed in the existing literature, but they are mainly dedicated to a university environment (Monasor et al., 2010). The focus is given to practical experiences through which students can learn by doing (Monasor et al., 2010; Christensen and Paasivaara, 2022).

In our previous work (Fronza et al., 2022a), we identified the following WFX skills deemed crucial by industry representatives:

- *Self-Motivation:* The ability to understand business goals, establish personal goals, and work toward them without being constantly driven.
- *Communication:* It is crucial to maintain a constant communication, collaboration, understand and share goals and progress toward achieving them, and maintain the team morale.

- *Autonomy*: The ability to learn autonomously, understand goals, and execute tasks without being constantly driven.
- *Time Management*: The ability to manage time and achieve goals regardless of the effort invested and the adopted schedule.
- *Curiosity*: Ability to initiate action, having an exploring attitude towards uncertain or ambiguous conditions.
- *Endurance (a.k.a. Resilience)*: Ability to overcome failure, deal with ambiguity and frustration, and be persistent and emotionally tempered to work in isolation.
- *Position Fit*: Ability to alignment personal goals with company goals.

This paper builds on (Fronza et al., 2022a) to understand whether high school students have WFX skills and if activities featuring authentic experiences (such as business simulation projects) can enhance WFX skills.

Skills to Prevent Early School Leaving. This multifactorial problem depends on social and economic difficulties, learning difficulties, and the educational environment. In Europe, the early school leaving rate is measured using the *Early Leaving from Education and Training (ELET)*, which considers students who have not been admitted to the next class and students regularly enrolled but not attending (Baldassarre and Sasanelli, 2020). The percentage of students who dropped out in 2019 was 9.7% (Eurostat, 2022), with a target set for 2030 of less than 9%.

Early school leaving has relevant social and economic implications and is directly related to the rate of unemployment and social exclusion. The European program foresees the monitoring of the education and training sector by collecting data and analyzing the phenomenon's trends across the EU and in individual member states. Thanks to the heavy investment and the monitoring network carried out in recent years, another similar early school leaving, which is primary for the students' adult life, has emerged: the so-called *implicit early school leaving*. This phenomenon concerns students who, even after finishing school, have not acquired the basic skills to undertake a professional career. Therefore, these students attended schools passively, wholly alienated from knowledge and skills. PISA, an OECD program for international student assessment (PISA, 2022), assesses basic skills achievement by measuring 15-year-olds' ability to use their reading, mathematics, and science knowledge and skills to tackle real-life challenges.

In this context, the acquisition of soft skills allows

students not only to enter the world of work more effectively but also to attend university with greater success (Piacentini and Pacileo, 2019). Promoting WFX (soft) skills at school leads to a twofold benefit. On the one hand, it would make students more prepared for the current job market, and on the other hand, it would help reduce early school leaving.

3 METHOD

In this study, we will answer the following questions:

- **RQ1.** What WFX skills do students have?
- **RQ2.** Do business simulation projects contribute to developing WFX skills?

To answer these research questions, we conducted two case studies following our approach in (Fronza et al., 2022a) (Section 3.1). Then, we distributed a questionnaire among all the students who participated in the case studies presented in this work and the case study presented in our previous work (Fronza et al., 2022a) (Section 3.2).

3.1 Case Studies

The study context consists of the following two *business simulation projects* (Asiri et al., 2017; Xu and Yang, 2010) conducted in February 2022 in two fourth-year classes of a CS high school in Bolzano, Italy.

- The **first business simulation project** involved nine students (8 M, 1 F). The project simulated seven working days in a financial services company. Teams had to develop an application that monitors NASDAQ financial stocks through the Yahoo finance API. Then, collected data were processed by a telegram bot and sent to the company clients.
- The **second business simulation project** involved 11 (M) students. The project simulated seven professional working days to implement a client-server application to monitor a hardware system and ensure remote maintenance, imagining instruments underwater or in inaccessible places.

Both the business simulation projects followed the approach of (Fronza et al., 2022a), i.e., they emulated, methodologically and practically, the typical software industry environment (Corral and Fronza, 2018). Similarly to (Fronza et al., 2022a), students were divided into two major areas: the technical and the communication area (i.e., focusing on documentation, communication, and graphic/web layout). Each

area was coordinated by a leader and, when possible, was divided into smaller groups based on tasks. As suggested in (Bacon et al., 1999) students worked in self-selected teams that chose their leader. Each leader interacted with others and the area leaders. Together with the teacher, each team defined short-term goals that the teacher and leaders regularly verified. Based on weaknesses and threats reported by students in the SWOT analysis in our previous work (Fronza et al., 2022a), we have introduced the following adjustments:

- smaller working groups and fewer working days to improve communication and individual workers management;
- the teacher focused on planning effective and attractive short-term goals;
- better organized WFX activities, with more defined slots of co-located work (usually 3-4 hours in the morning);
- more autonomy for WFX activities.

Similarly to the case study in (Fronza et al., 2022a), we distributed the following online questionnaire throughout the process to monitor the WFX experience:

1. Did you (or your team) achieve the goals? [y/n]
2. Did you find it difficult to achieve the goals? [y/n]
3. Did you achieve the goals on time? [y/n]
4. Did you work better alone or with your team? [alone; with my team]
5. Indicate the time slots of the day in which you worked in remote way (WFX).

The questionnaire is slightly different with respect to the one we used in the previous case study (Fronza et al., 2022a). Indeed, in these two case studies, on-site working hours were pre-defined; moreover, as suggested by the SWOT in (Fronza et al., 2022a), we focused on the timely achievement of goals.

3.2 Questionnaire

We distributed a final questionnaire among all the students participating in the case studies presented in this paper. Moreover, we distributed the same questionnaire among the participants of our previous case study (Fronza et al., 2022a). The questionnaire aimed to assess 1) how prepared students feel they are regarding the WFX skills and 2) the contribution (perceived by students) that business simulation projects make to developing WFX skills. In particular, we focused on the WFX skills deemed crucial by the industry representatives interviewed in (Fronza et al.,

2022a) (see Section 2). For each of these WFX skills (except *position fit*, which was disregarded as it is unlikely to be applicable in the context of a short-term project), students were asked to answer the following two questions using a five-point scale (from *very poor* to *very good*):

1. How good is this skill in your case? [very poor, poor, fair, good, very good]
2. How good was the business simulation project in helping you develop this skill? [very poor, poor, fair, good, very good]

At the end of the questionnaire, students could leave comments and feedback in an open question. We followed legal requirements and ethical codes of conduct for child participation in research, such as informed consent, voluntary participation, and confidential data treatment (EU Agency for Fundamental Rights, 2014).

4 RESULTS

All the objectives proposed at the beginning of both case studies have been achieved; the proposed solutions have been tested and work correctly. Similarly to what we reported in (Fronza et al., 2022a), Figure 1 shows that in both our case studies, most students reported that they achieved daily objectives, mostly on time, even though they encountered some difficulties. Teamwork was appreciated, especially in the initial and final parts of the projects; in the main phase of the activities (i.e., once the main tasks and roles were clear), students preferred to work independently.

The daily questionnaire also collected information regarding the preferred time slots for WFX. As expected, in both case studies, there is limited WFX in the morning (Figure 2); indeed, co-located work has been encouraged in that part of the day. Conversely, when they could choose the working arrangement (i.e., in the afternoon), students preferred WFX.

In the remainder of this section, we answer the RQs by analyzing the data collected from the questionnaire distributed among the students participating in the case studies presented in this paper and (Fronza et al., 2022a). We collected 34/43 answers (79%), 23 from our previous case study (Fronza et al., 2022a), and 20 from the case studies presented in this work.

RQ1. What WFX Skills Do Students Have? Figure 3 shows that most students evaluate fair or higher their self-motivation (82.3%), communication (79.4%), autonomy (88.2%), time management (73.5%), and curiosity (79.4%).

In particular, nearly half of the students (44.1%) consider their communication skills to be good, while

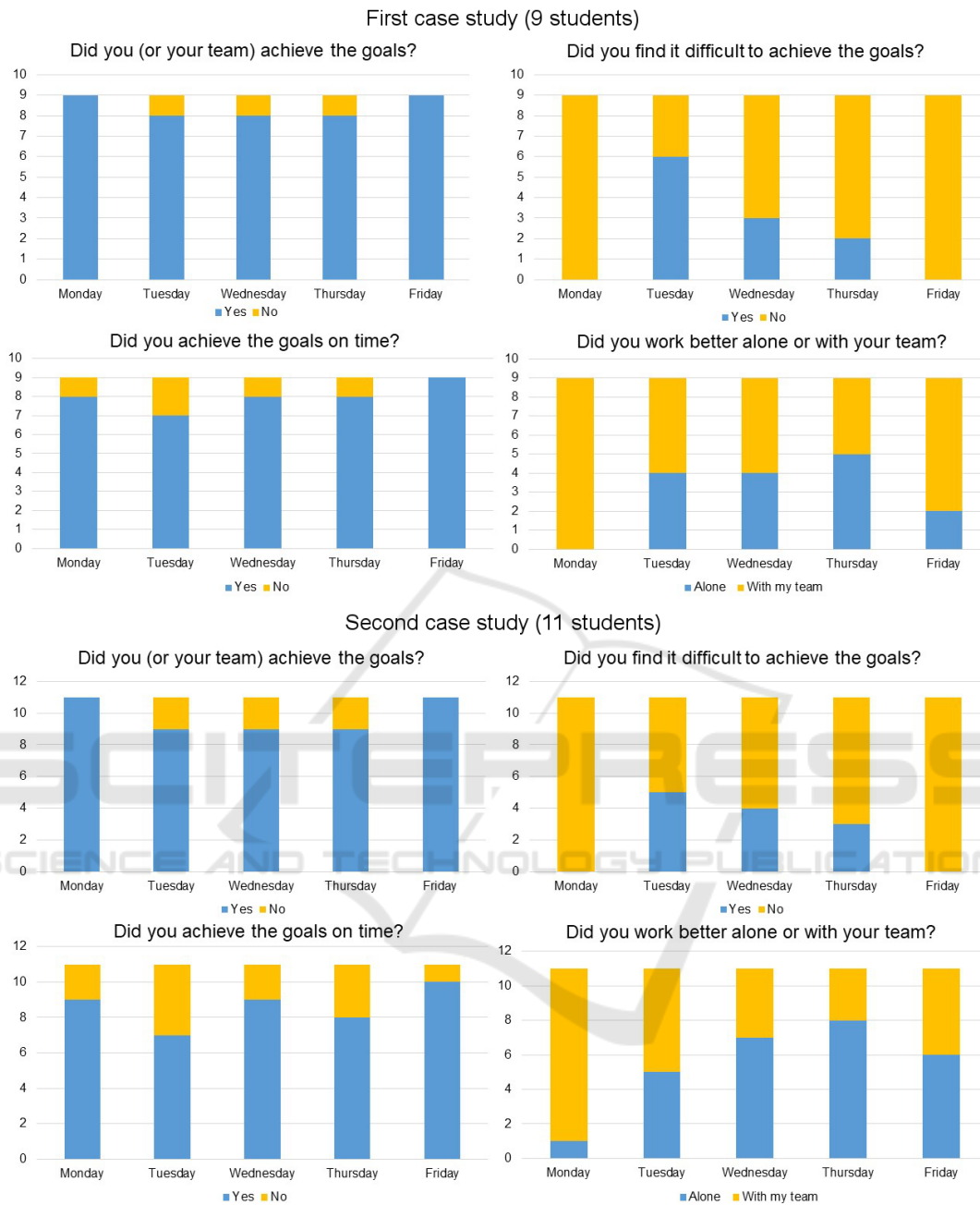


Figure 1: Daily questionnaire of both case studies.

curiosity is the skill that gets the highest number of preferences for “very good” (23.5%). Instead, most students consider themselves weak on *endurance*.

RQ2. Do Business Simulation Projects Contribute to Developing WFX Skills? According to the students who participated in the case studies, business simulation projects foster WFX skills. Indeed, most students answered fair or above for most skills (i.e., self-motivation 82%, communication 76.5%, autonomy 76.5%, time management 79.4%, curiosity

73.5%). Only for *endurance*, 58.8% of students believe that the business simulation projects do not help to acquire that skill. The analysis of the answers to the open-ended question reveals that the length of the business simulation project is considered too short to acquire a complex skill, such as endurance/resilience.

The answers to the open-ended question offer interesting insights. Students highlighted the pros and cons of the business simulation projects, which sometimes seem to be curiously symmetrical regarding

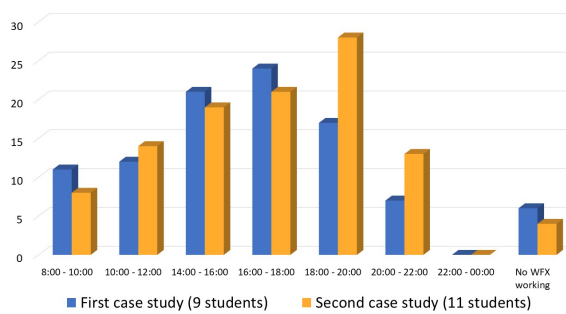


Figure 2: Preferred time slots for WFX.

the same aspect. For example, several students emphasized that the activity effectively simulated a real company/business context, allowing them to glimpse the “real world” dynamics. Conversely, an almost equal number of students remarked that the activity would have been much more effective if carried out in a company and not at school. This observation highlights that, even though carefully designed, a simulation might still be perceived as a “fake workplace” devoid of problems such as timing, relationships, envy, and rewards.

Another relevant point regards the relationship and communication between the various members of the group. As a positive aspect, participants remarked that business simulation projects enhance individual talents in a team and foster management skills. On the other hand, several students highlighted that some team members’ lack of involvement/interest affected the final result. However, everyone agrees on the characteristics needed for successful teamwork (i.e., good motivation, correct division of tasks, and attention to roles), which should reflect everyone’s inclinations. One student, in particular, highlighted the need for a leader, “*a charismatic person who brought the lazy ones back to the right path. Without this figure, the group sank quickly, groping in the dark without clear objectives*”.

As a positive aspect, students defined business simulation projects as “*stimulating and constructive*” and highlighted their ability to foster new skills with respect to those required by “normal school practice”, i.e., skills that “*will be useful in the context of university studies, as well as in the future world of work*” (e.g., problem-solving, autonomy, time management, and communication). Nevertheless, negative aspects of business simulation projects are reported as well. For example, difficulties emerged in communication and collaboration within the groups. In addition, the activity should have been longer.

The following comment probably summarizes the core characteristics of a business simulation project: “*It is an important activity for students; it brings*

them closer to the world of work and challenges them. It helps them develop new skills and collaborate to reach a solution. Leaving students in complete autonomy is, in my opinion, the best way to let them grow”.

5 CONCLUSION AND FUTURE WORK

In this paper, we shed light on whether high school students have WFX skills and if activities featuring authentic experiences (such as business simulation projects) can enhance WFX skills. Most of the students who participated in our case studies (two in this paper and one in (Fronza et al., 2022a)) evaluated as fair or higher the majority of the WFX skills that are deemed crucial by industries (e.g., self-motivation, autonomy, curiosity). Moreover, they believe that business simulation projects help in developing WFX skills. On the other hand, students feel weaker in terms of *endurance* and consider business simulation projects too short to foster this skill.

Based on these results, business simulation projects in high schools seem promising for promoting the WFX skills deemed crucial by industries. Our study cannot inform whether students’ good WFX skills are mainly due to the business simulation project (i.e., we did not collect data on the entry level). However, students clearly stated that the project contributed to acquiring WFX skills.

Educators can use our results as a baseline to provide students with courses featuring authentic experiences to prepare them for the “new normal way of working”. Based on the results of this work, the main suggestion emerging from this work is that business simulation projects should be longer in time to allow for the development of endurance. Second, educators should focus on increasing the authenticity of these experiences as much as possible so that students perceive them as more similar to the professional setting.

We acknowledge that the work presented in this paper may have limitations. In the following, we discuss them and propose directions for further research to address these limitations. In this paper, we asked students to self-assess their WFX skills. An objective and validated tool for evaluating these skills would strengthen the results. Therefore, we plan to focus on this objective in the future. Larger samples are needed to confirm and generalize the results and limit the validity threats connected with the reliability and validity of our instruments. Moreover, students’ backgrounds might impact the results. Therefore, the experience should be repeated in other school contexts. Finally, we plan to use these results and student com-

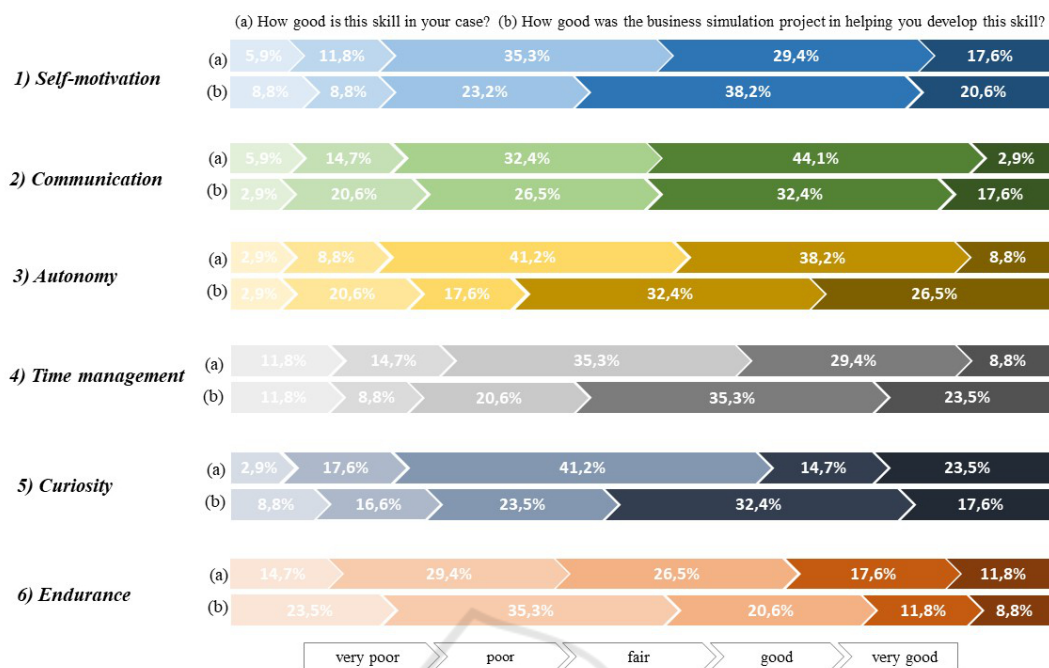


Figure 3: Summary of the results of the questionnaire (34 respondents).

ments to make business simulation projects increasingly similar to a professional context.

Preventing and countering explicit and implicit early school leaving is a necessary priority. An effective way to do this is based on the configuration of inclusive tools capable of welcoming, supporting, and guiding the learning process of a plurality of students (Baldassarre and Sasanelli, 2020). Based on the activities presented in this paper, the teachers among the authors agree that business simulation projects (with WFX skills) can contribute to contrast implicit early school leaving. Indeed, these projects make school a permanent laboratory where skills are conveyed by using practical activities similar to reality. In these new educational contexts, students are encouraged to express themselves, find solutions, and participate with their abilities. In future work, we intend to investigate and measure the effectiveness of business simulation projects on contrasting implicit dispersion.

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