



## Research paper

# Pre-service teachers' conceptions of online learning in emergency distance education: How is it defined and what self-regulated learning skills are associated with it?



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## HIGHLIGHTS

- The COVID-19 crisis has brought several changes in higher education settings.
- Students' self-regulated learning skills are challenged in online learning.
- Students' conceptions of online learning were investigated in Italy, Sweden, Iran.
- Students' conceptions of online learning were limited to the use of technology.
- Conceptions of online learning differed between learning environments.

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## ABSTRACT

We investigated pre-service teachers' conceptions of online learning during the transition from face-to-face to emergency distance education in Italy, Sweden and Iran. Conceptions of online learning were conceptualised based on how pre-service teachers defined online learning, the self-regulated learning (SRL) skills associated with it and how they compared it to face-to-face education. The participants were asked about the characteristics of their online courses, yielding information about the online learning conditions and experiences. Conceptions of online learning were found to be underdeveloped. Pre-service teachers should develop a flexible approach to SRL that takes into consideration the demands of the specific educational setting.

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## 1. Introduction

In the first months of 2020, the COVID-19 crisis brought about several changes in higher education settings by rapidly accelerating the transformation towards digital and online learning. While this digital turn has destabilised curricula across the world, it has provided a unique opportunity to train pre-service teachers for the ever-changing reality of modern classrooms. In teacher education programmes, online learning is increasingly used as an effective way to prepare pre-service teachers for future teaching in online

educational environments (Archambault et al., 2014). However, the efficacy of online learning in pre-service teachers' education seems to be mediated by students' attitudes towards and engagement with online learning (Sutherland et al., 2010) and their SRL skills (Kara et al., 2021).

Conceptions of online learning include not only how one defines it but also how the skills and processes associated with it are conceptualised through a comparison with an alternative learning environment, such as a face-to-face classroom. It is important to find answers to questions regarding whether people's perspectives on online learning are aligned with the existing scientific frameworks (that is, how online learning should be in order to be effective) and whether there are any differences between the way individuals conceive of online learning in different learning environments. Conceptions can be considered idiosyncratic and

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relational-activated and can potentially be altered by the specific context (Entwistle et al., 2010). Existing conceptions (specifically those associated with individuals' personal and cultural backgrounds) are said to influence the way individuals explain a particular phenomenon in a given context (Entwistle et al., 2010). Conceptions are also associated with the processes and behaviours students decide to activate in a specific context, which potentially leads to the achievement of learning goals.

In 2020, pre-service student teachers received an immersive experience in online learning, which has potentially created long-term effects on how they conceptualise learning. The scenario is more interesting if we focus on pre-service teachers, as their conceptions of (online) learning (including its definition, the skills associated with it and its differences from face-to-face learning) are likely to shape their future actions as teachers in online learning environments. Learning experiences (i.e. how online courses are offered and designed) are greatly influenced by contextual factors, including the digital readiness of a society and its citizens. As countries differ by digital readiness, we can expect differences in the way online learning is provided, which, in turn, will create differences in students' emerging conceptions of online learning. The pandemic further complicated this already complex phenomenon in two ways: i) the change to online learning was sudden, not giving enough time to less advanced societies to adapt to this scenario; ii) the level of social restriction imposed varied across societies, which, in turn, influenced the distance between online and face-to-face learning (from a fully distant learning environment to a hybrid learning environment).

Pre-service teachers' academic performance may depend on either contextual-level variables, such as how online courses are organised, or individual-level variables, such as how pre-service teachers conceptualise learning (Vettori et al., 2018). Indeed, beliefs and conceptions about learning can influence the learning strategies implemented by pre-service teachers (Nelson & Hawk, 2020), as well as their ability to regulate their own learning (i.e. SRL) when it takes place in a temporary and unstable setting such as emergency distance education.

Research has found that conceptions and perceptions of online environments may vary among contexts (Luyt, 2013). Moreover, past studies have demonstrated that SRL is socially oriented and, as such, it may be context-dependent (Purdie et al., 1996; Shi et al., 2013). The globalisation of online learning, accelerated by the COVID-19 pandemic, creates unique challenges in online courses in terms of how dominant pedagogical structures impact learners' SRL in different socio-educational contexts (Luyt, 2013). Cross-country research can help establish a socio-contextual theory regarding conceptions of SRL in online educational environments.

Understanding pre-service teachers' conceptions of a phenomenon such as online learning is a significant line of research, since pre-service teachers will soon be active decision-makers formulating their own personal context-specific theories of learning and thus will have a prominent impact on the implementation of pedagogical innovations within future online classrooms. Moreover, studies of teachers' conceptions provide worthwhile insights into how online learning has worked in actual learning contexts and thus can be considered as a complement to observational and experimental studies related to the same topic. To this end, the purpose of the present study is to investigate pre-service teachers' conceptions of online learning during the transition from face-to-face to emergency distance education in different countries. In other words, we investigated conceptions of online learning in emergency distance education (OL\_EDE) and conceptualise it as how OL\_EDE is defined, what skills are associated with it and how it is compared to face-to-face education. We analyse how pre-service teachers define OL\_EDE, which abilities they associate with OL\_EDE

and the differences between OL\_EDE and face-to-face learning.

The study was conducted in three countries (Italy, Sweden and Iran). The purpose of conducting this cross-country study was to analyse how a universal event (the COVID-19 pandemic) could foster culturally specific adaptations. In particular, we were interested in two contextual variables: i) the digital readiness of a society and its citizens and ii) the social restrictions implemented, as they contributed to the gap between face-to-face and online learning. Regarding digital readiness, Italy and Sweden are characterised as enjoying a high level of digital readiness in society in general and in universities in particular. For instance, the two countries had been using forms of blended learning even before the pandemic. On the other hand, Iran is characterised as having a lower level of digital readiness in society, compared to Italy and Sweden. Concerning the second contextual variable, Italy and Iran were among the first countries severely hit by COVID-19 during the first wave and experienced a total lockdown, which contributed to significant differences between the learning environment before (mostly or completely face-to-face) and after the pandemic (completely online and distant). Conversely, Sweden did not impose a lockdown; courses were offered online, but students could go and meet in public spaces. Thus, they could activate face-to-face forms of studying, along with online practices.

We also analysed the implementation practices of online learning to describe online learning conditions and to develop an understanding of pre-service teachers' experiences of OL\_EDE (within each of the three countries). Describing the implementation practices of online learning within Italy, Sweden and Iran allows the researchers to compare and contrast online learning conditions across contexts. The literature indicates that the divide in technological readiness, as well as the difference in pedagogical approaches between different countries, could affect the online learning experience of students (Berge, 2005; Yan et al., 2021) as well as the skills that they use (Kara et al., 2021).

Since the theme of OL\_EDE has started to attract the attention of scholars and institutions only recently, there is no consistent literature to reference. Thus, in what follows, we review the literature on online learning and distance education.

## 1.1. Theoretical background

### 1.1.1. Definitions of online learning

Several terms have been used to describe learning environments designed to address problems that appeared during the COVID-19 outbreak, including online learning/education, distance learning/education, and remote learning/education. Recently, Singh and Thurman (2019) published a systematic review of definitions of online learning and found 46 definitions. They conducted a content analysis to discover the common elements across all the collected definitions and found the following themes (listed in order of frequency): technology used to facilitate education/learning, reference to terms as synonymous with others, reference to the fact that the interaction is asynchronous, confusion caused by lack of agreement on definitions, reference to the interactive nature of the educational content, reference to the fact that the interaction is synchronous, reference to the physical/geographical distance between student and instructor and necessity of a formal online learning education programme.

Several factors are at play in online learning in higher education, including pre-service teacher's education. Learner characteristics (such as motivation or digital competence) and institutional support (such as characteristics of online courses) were examined (Lee & Choi, 2010). For instance, Lee and Choi (2013) tested a structural equation model of predictors of online learning retention and found that SRL emerged as one of the most important factors

mediating students' conceptions, experiences and outcomes in online learning environments (Broadbent & Poon, 2015; Wang et al., 2013).

### 1.1.2. SRL theory

SRL can be defined as one's ability to understand and control one's learning environment. It is a process that involves using cognitive, metacognitive, behavioural, motivational and affective processes to address a learning situation and persevere until successful (Alonso-Mencía et al., 2020). SRL is associated with learners' behaviour and academic achievement (Broadbent & Poon, 2015).

Several theoretical frameworks of SRL are available in the literature, with the models by Pintrich (2000) and Zimmerman (2000) being the most established. The former focuses on several kinds of SRL strategies, whereas the latter focuses on SRL phases (before, during and after the learning performance). This finding is similar to prior studies with comparable aims (Kizilcec et al., 2017). In the present study, we used the model by Pintrich (2000) to examine students' conceptions about the specific strategies associated with OL\_EDE. According to Pintrich (2000), SRL strategies can be categorised into cognitive (e.g. acquisition, elaboration and retrieval of information), metacognitive (e.g. planning, monitoring and self-evaluating) and resource management strategies (e.g. time management, space organisation and help-seeking).

Online learning (and OL\_EDE) places different (probably additional) demands on students compared to face-to-face learning, as online learners need to manage their own time, plan their behaviour and decide when and how to engage with the course content of their own accord (Kizilcec et al., 2017). It is important to investigate whether pre-service teachers can adapt their SRL approach to online learning in an emergency distance education setting, as in future they will need to apply a deep pedagogical reflection when shifting between learning environments. An adaptive SRL approach means better learning outcomes and more sophisticated conceptions of OL\_EDE, which, in turn, are associated with better competence in designing online learning environments.

This hypothesis is supported by the socially oriented approach to SRL. In social contexts of learning, participants interpret situations in relation to knowledge representations that provide them with resources for interpreting, acting and interacting appropriately within situational contexts (i.e. contextual frames) (Shi et al., 2013). The COVID-19 crisis provides a unique opportunity to investigate how learners' perspectives on learning and SRL shift across contexts (from a face-to-face to a distance learning environment) and between contexts (different countries reacting to the same emergency). The globalisation of online learning would require converging conceptions of how it functions and what SRL skills it needs, but socioeconomic differences between countries may put constraints on how online learning environments are designed and, in turn, conceptualised by learners.

## 1.2. Emergency distance education in COVID-19 times

The COVID-19 pandemic has had a disruptive influence on societies all over the world and higher education was particularly affected. Many universities around the world have rapidly shifted towards emergency distance education to allow students to continue their education without interruption. Some definitions of online learning have added the term "emergency" to stress the peculiar situation that occurred in 2020 (i.e. emergency distance/remote learning/education). Unlike traditional distance education, the term emergency stresses the necessity of a change in approach and attempting to produce temporary solutions for current needs and to rely on available resources (Hodges et al., 2020; Ulus, 2020). Indeed, while online learning in a distance education setting is a

relatively new or rare event in certain countries, other For example, the University of the South Pacific has more than 50 years of experience in distance education (Evans & Hazelman, 2006). Initially (in the 1970s), distance education was offered through print materials and was supported by audio teleconferencing, whereas current distance education courses use a range of media, including print materials, online learning management systems (LMSs), video broadcasting, audio/audiographic and video teleconferencing, audio/video tapes, CDRoms and DVDs (Evans & Hazelman, 2006).

Countries differed in the anti-COVID-19 measures they adopted and their digital "readiness". Next, we will present the way each country reacted to the COVID-19 pandemic (with a focus on the first wave and universities), the specific digital agenda and the digital context. We will discuss what types of restrictions were implemented within each country from March to May 2020 and the technological readiness of universities and households for OL\_EDE (e.g. bandwidth, devices, software).

### 1.2.1. Italy

**Reaction to the COVID-19 Pandemic.** The first wave of COVID-19 occurred in the middle of the spring semester (January–June), when most courses had already begun. Students were forced to undergo a rapid shift from regular to distance education. Meanwhile, the Italian government imposed a national lockdown, restricting the movement of the population except for necessity, work (only if included in the list of essential activities) and health circumstances. Italian universities relied on two main tools to deliver online classes: videoconferencing tools (mainly Google Meet and Zoom) and LMSs (mainly Moodle).

**Digital Agenda and Social Context Relevant for Higher Education.** In 2012, the Italian Ministry of Education (MIUR) released a series of guidelines for the digitalisation of universities (the so-called e-Gov 2012 plan). These guidelines neglected to focus on improving teaching through information-communication technologies. In 2015, the Italian government adopted the Strategy for Digital Growth 2014–2020 (*Strategia per la crescita Digitale 2014–2020*), but this document did not include any specific objectives for higher education systems. Most Italian universities have adopted Moodle as a learning management system, but its use is still limited. The rest of the teaching is face-to-face, with only a few local exceptions offering blended or online courses.

Concerning the social context, the Organisation for Economic Co-operation and Development (OECD) *Skills Strategy Diagnostic Report Italy 2017* revealed a digital skills mismatch, which caused Italy to struggle to make a transition towards a dynamic skills-based society. According to The Digital Economy and Society Index (DESI) 2019, Italy ranks 24th among the 28 member states in digital technology and digital skills. According to a recent survey conducted by the National Institute of Statistics (ISTAT) in Italy in 2018–2019, 33.8% of families did not have a computer or tablet at home. According to the *Autorità per le garanzie nelle comunicazioni*, Authority for Communications Guarantees (AGCOM), in June 2018, 9% did not have access to an Asymmetric digital subscriber line (ADSL) connection or had a connection with a bandwidth of 2 Mbps or less.

### 1.2.2. Sweden

**Reaction to the COVID-19 Pandemic.** The governing system in Sweden made it problematic for the government to impose a general and total lockdown of society during spring 2020. Instead, Sweden's strategy for COVID-19 was, and still is, best characterised by authorities providing the public with information about the virus and recommendations on how to prevent oneself from becoming infected.

During the first COVID-19 wave, all upper secondary (or high) schools and universities switched to OL\_EDE, while lower school grades (lower-secondary and primary) and preschools stayed open. Universities relied on LMSs, such as Canvas and videoconferencing systems, such as Zoom, to deliver education. All courses already had digital platforms; the main shift was to start using video conferences for teaching sessions. It was still possible for students to meet at libraries and use facilities such as computer rooms at the university.

**Digital Agenda and Social Context Relevant for Higher Education.** In 2012, the Swedish government appointed a digitalisation commission that published a manifesto aimed at promoting a changed approach to digitalisation at universities and colleges in 2016. The goal was for Sweden to be a leader in the digital transformation of higher education and to impart high-quality digital competence for lifelong learning in all areas. One of the proposals referred to increasing flexibility to make education relevant and adaptable for all individuals, regardless of life situation; Sweden is a sparsely populated country and universities can be geographically very distant.<sup>1</sup> The digitalisation of education is thus viewed as a way to enable all citizens to enrol in higher education. To achieve this goal, in 2018, the government appointed funds for projects that aimed to further expand distance education (*Näringsdepartementet & Utbildningsdepartementet, 2018*) and improve citizens' digital competence. The focus of the government was on access to education and the internet; the focus did not concern how educational systems would best be pedagogically organised to benefit from digitalisation. The learning management system Canvas is currently used by most Swedish universities for contact, assignments, discussions, etc. If not explicitly advertised as distance education, students expect teaching to be face-to-face (on campus).

According to the annual report *The Swedes and the Internet* (*Andersson, 2019*), 98% of all Swedish households in 2019 had access to the internet (of these, 57% via fibre). As much as 91% of the population over 16 years old used the internet. According to the 2020 Network Readiness Index (*Portulans Institute, 2020*) published in collaboration with the United Nations Educational, Scientific and Cultural Organization, Sweden ranked first in terms of possibilities to take advantage of affordances based on the digitalisation of society.

### 1.2.3. Iran

**Reaction to the COVID-19 Pandemic.** During the first wave, from early March 2020, all educational institutions shifted from face-to-face instruction to online instruction, and this continues to be the case. This sudden shift in the delivery platform led to the temporary disruption of education within some universities due to the lack of technological infrastructure. Universities mainly coped with this problem by adopting WhatsApp and Telegram as the main tools for instruction, until the authorities quickly adopted initiatives to address these technological deficiencies.

**Digital Agenda and Social Context Relevant for Higher Education.** Iran does not have any official or detailed guidelines or documents regarding the digitalisation of schools or higher education institutions. The reason for this lack of attention might be that the Iranian government is in its primary stage of offering its administrative and management services online—the Iran e-government services project, which officially started to operate under the name Mobile Government in early 2018 (*Tehran Times, 2018*). Concerning higher education institutions, the government plan

mainly focused on administrative and management aspects, but it did not focus on the promotion of learning and teaching using technology.

Based on the United Nations E-Government Development Index (*Department of Economic and Social Affairs, 2020*), Iran ranked high in terms of the scope and quality of online services and telecommunications infrastructure. However, its ranking dropped from 71 in the world in 2018 to 88 in 2020. This might have been due to the reimposing of sanctions on Iran's economy. Based on the last survey conducted by the Statistical Centre of Iran in the winter of 2018, only 72.8% of Iranian families had internet access. This report also showed that 64% of Iranians above the age of six were internet users (*Statistical Center of Iran, 2018*). Furthermore, the average mobile internet speed in Iran was 26.93 Mbps and the country was ranked 78 in the world for internet speed (*OOKLA, 2021*).

Internet censorship within Iran has significant ramifications for education and training in schools and higher education institutions within the country. Many popular websites or software that can be used for learning and teaching purposes (e.g. Facebook, YouTube, Zoom, Skype, Twitter and Telegram) were blocked in Iran. This created an obstacle for both teachers and students that prevented them from enjoying their OL\_EDE experience. To overcome this, teachers and students tend to use virtual private networks (VPNs) to obtain access to such websites if needed. However, using VPNs, in turn, further decreases internet speed, which is an important factor in the online delivery of materials.

### 1.3. Research questions

In the present study, we explored pre-service teachers' conceptions of online learning in emergency distance education settings across three different countries: Italy, Sweden and Iran. Given the exceptionality of the events characterising 2020, it is important to analyse the effects of the changes within people, particularly among pre-service teachers, as their conceptions of online learning will influence their teaching practices in future. Indeed, the scientific literature suggests that students' SRL skills do not automatically transfer across contexts, for instance, from a regular to an online course (*Broadbent & Poon, 2015*).

Several studies have investigated SRL in online environments, and the diversity of learning contexts in which these studies took place makes it difficult to generalise conclusions (*Alonso-Mencia et al., 2020*), calling for more transnational studies that can identify context-general versus context-specific aspects. A cross-country comparison would increase our understanding of the relationship between adopted measures and students' SRL, similar to prior studies on related topics (e.g. conceptions of digital literacy) (*List et al., 2020*). In this study, participants were pre-service teachers, and their actual conceptions about OL\_EDE were very likely to influence their future teaching practices if they were teaching in a distance education setting (*Ertmer et al., 2012*). The present study investigated the following research questions.

Exploring perceived online learning conditions in each country:

RQ1. How did pre-service teachers conceive of the organisation of their OL\_EDE learning environment?

RQ2. What are pre-service teachers' perceived utilities of online activities within Italy, Sweden and Iran?

Exploring perceived definitions of online learning:

RQ3. How did pre-service teachers define OL\_EDE?

Exploring SRL skills associated with online learning:

<sup>1</sup> In 2019, Sweden had 25.4 ind/sq km compared to the EU average of 117.7 ind/sq km.

RQ4. What are pre-service teachers' conceptions regarding the essential SRL skills and strategies associated with OL\_EDE?

Exploring the differences in conceptions of online and face-to-face learning:

RQ5. What were the cross-country differences in pre-service teachers' conceptions of OL\_EDE when compared to face-to-face learning?

Through RQ1 and RQ2, we investigated cross-country differences in how the learning environment was organised and perceived by students included in emergency distance education. This allowed us to map existing differences across countries to the way emergency distance education was delivered.

For RQ3, we investigated how OL\_EDE is conceptualised by pre-service teachers. As pre-service teachers' conceptions of learning depend on context, the results from RQ1 and RQ2 can support our interpretation of cross-country differences in RQ3.

For RQ4 and RQ5, we investigated the effect of contextual differences (social and digital differences characterising the three countries as well as differences in how OL\_EDE was delivered that emerged from RQ1 and RQ2) on students' conceptualisation of SRL.

This exploratory study will provide indications of how differences in the learning environment and conceptions of online learning co-occur, suggesting future lines of research on how contextual characteristics can impact students' SRL in online environments.

## 2. Methodology

### 2.1. Participants

All participants were university students enrolled in a course that qualifies them for teaching in secondary schools. The total number of participants was 218 (mean age =  $24.50 \pm 7.01$  years; 128 females, 97 males and 3 preferred not to declare their gender). The sample included 83 Italian students (mean age =  $22.41 \pm 5.15$  years; 63 females, 19 males and 1 preferred not to declare their gender), 41 Swedish students (mean age =  $29.58 \pm 7.57$  years; 38 females, 1 male and 2 preferred not to declare their gender), and 104 Iranian students (mean age =  $24.12 \pm 7.14$  years; 77 females, 27 males). The three subsamples differed significantly in age [ $F(2, 215) = 16.16, p < 0.001, \eta^2 = 0.13$ ], with the Swedish participants being significantly older than the Italian participants [ $p < 0.001$ ] and Iranian participants [ $p < 0.001$ ]. All three subsamples included more females than males [ $\chi^2 = 85.01, p < 0.001$ ]. All participants gave their informed consent to participate in the study. The data were collected and held anonymously. The study was approved by the ethical committee of the University of Florence (Italy), which is the coordinating institution of the research project.

### 2.2. Research setting

The Italian pre-service teachers were contacted during a course on educational psychology offered within a bachelor's degree in literature. The course was selected by students who wanted to earn a qualification to teach literature in secondary schools.

The Swedish pre-service teachers were contacted during two parallel courses in L1 (Swedish as an academic subject). The courses were mandatory and were part of the teacher education programme they were studying. The students will earn a qualification to teach L1 in school years one through six once they finish their training.

The Iranian pre-service teachers taking part in the study were

from three different universities in Iran. The participants were studying either teaching English as a foreign language or mathematics education. All participants received training to become primary or secondary school teachers.

Overall, the universities involved are considered to be representatives of the general population of pre-service teachers in each country for digital readiness and COVID-19-related consequences. None of the participating universities had implemented a specific pedagogical approach to online learning before the pandemic, nor were they characterised by a significantly greater level of technology advancement compared to other universities in their national territory. Of course, each country is characterised by internal variability in terms of digitalisation and teaching practices for OL\_EDE, but the participating universities can be considered representatives of the majority of universities (in each country) and not an exception regarding the way online learning was included in teaching practices.

In Italy and Sweden, students were accustomed to LMSs, as courses included them prior to the pandemic. Students were provided with online tutorials on how to use the specific LMS adopted by their home university. Conversely, videoconferencing software was not included in the course offerings, nor were students trained in how to use it. When the university shifted to online learning in early 2020, students were provided with short information sheets and online tutorials on LMS and videoconferencing software. In Iran, LMS or videoconferencing tools were rarely used before the pandemic; if they were, they were for management purposes only, not for instruction delivery. None of the participating universities offered specific training on how to learn online (i.e. SRL).

### 2.3. Procedure

The data were collected using a questionnaire that included both multiple-choice and open-ended questions. The questionnaire was developed in English by the first and second authors of the present study. It was then translated into Italian (first author), Swedish (second author) and Farsi (third and fourth authors of the present study) and back-translated for cross-language validation purposes. No adjustments were made to the questionnaire after the back-translation process. The questionnaire was administered online via Google Forms to the participants in May 2020.

### 2.4. Measures

The questionnaire included several sections. However, in this study, we focused on the following questions: close-ended questions about the course characteristics, one open-ended question about definitions (and associated abilities) of OL\_EDE and open-ended questions about the comparison between online and face-to-face education.

#### 2.4.1. Course characteristics

The section about course characteristics asked one question about the class size of the online course attended and two questions about the activities that were included in the online courses that the students were attending at the time of the study. These questions were designed to elicit students' perceptions of the conditions of their online learning environments. The educational environment (whether online or offline) has an influence on learners' behaviour, course satisfaction and academic outcomes (Lizzio et al., 2002).

Participants were asked to select the class size of the online courses that they attended from the following options: less than 25 students, 25–50 students, 50–75 students, 75–100 students or more than 100 students. Moreover, we asked the participants to

rate whether several activities were included. “Think about an online course in which you are currently enrolled. Which of the following elements does the courses include?”: online readings, forums (online discussion boards), synchronous lectures (i.e. with live professors), full-length asynchronous lectures (i.e. recorded videos), online quizzes (i.e. with open pop-up quizzes during class time), online exams (more complex assessments through multiple-choice and open-ended questions), online individual assignments (such as the submission of reports), professor online “office hours”, synchronous small group work (e.g. break-out rooms) or asynchronous group work. Following this, we provided the participants with the same list of activities, asking them to rate each of the items in terms of utility on a 1–5 point Likert scale. “Think about the online courses in which you are currently enrolled; please rate the extent to which you consider these course elements to be helpful for your learning, rated from 1 (not at all helpful) to 5 (very helpful)”.

2.4.2. Definition of OL\_EDE

Participants were asked the following open-ended question regarding their current context: How do you define online learning? What skills do you consider necessary for online learning?

2.4.3. Comparison between OL\_EDE and face-to-face education

The following three questions were asked of the participants:

1. Please compare and contrast face-to-face education (such as that which you received in the fall semester) and online learning (such as the one you are receiving now). What are the similarities and what are the differences? What are the strengths and what are the weaknesses of each modality?
2. Do you think you behave differently as a student in an online classroom compared to a face-to-face course? Please elaborate on your answer.
3. How does your relationship with your professor differ when learning in person versus online? Please elaborate on your answer.

2.5. Coding systems

The grounded theory approach was used to structure the codes for the open questions (Charmaz, 2014). This approach allowed us to gain exposure to the relevant literature during the analysis, leading us to gain theoretical sensitivity towards the topics investigated while engaging with the data (Charmaz, 2014; Gilgun, 2014). The authors engaged with the previous literature (both theoretical and empirical) to determine how the data could be

explained. The process continued until the analysis reached a point of theoretical saturation (Carmichael & Cunningham, 2017).

Drawing on abductive analysis (which is at the core of Charmaz’s version of grounded theory), the researchers created a coding structure for each open-ended question. While engaging with the data, the researchers constantly interacted with prior literature to identify the main codes and concepts. That is, the prior literature provided the researchers with the necessary sensitising concepts to inform the formulation of the coding structure for each of the open-ended questions (Gilgun, 2014).

All open-ended questions were coded by a trained researcher for each subsample; 30% of each open-ended protocol was coded by a second trained researcher for inter-rater agreement purposes.

2.5.1. Definition of OL\_EDE

To analyse the data regarding the conceptions of the definition of online learning, the researchers used the notions presented in Singh and Thurman’s study (2019), as initial sensitising concepts, which further informed the structure of the codes and concepts. The dimensions are identified in Table 1.

There was an acceptable agreement between the two raters’ judgements (Cohen’s  $k = 0.71$  for the Italian subsample, Cohen’s  $k = 0.75$  for the Swedish subsample and Cohen’s  $k = 0.74$  for the Iranian subsample).

2.5.2. Abilities associated with OL\_EDE

Notions introduced by Kizilcec et al. (2017) were used as initial sensitising concepts during the data analysis, helping the researchers formulate and refine the final coding structure for this open-ended question. In the study, they considered the following metacognitive strategies and resource and task management strategies (see Table 2).

There was an acceptable agreement between the two raters’ judgements (Cohen’s  $k = 0.71$  for the Italian subsample, Cohen’s  $k = 0.70$  for the Swedish subsample and Cohen’s  $k = 0.74$  for the Iranian subsample).

2.5.3. Comparison between OL\_EDE and face-to-face learning

The coding structure for this open-ended question was abductively created through a data-driven approach. Based on a grounded theory approach (Charmaz, 2014), the protocols were analysed to identify emerging themes. These themes were then tagged with codes. To facilitate the discussion, we clustered the codes into three macro-categories: context-level codes, individual-level codes and relationship-level codes. Each code was included twice to capture whether the participants mentioned it as an advantage of OL\_EDE or as an advantage of face-to-face learning (see Table 3).

Note. Some codes were included to seek evidence of categories

Table 1  
Codes for the definition of online learning.

Code	Definition	Anchor examples
Technology	Using technology to facilitate learning	Online learning is learning through the help of technology
Synonymous terms	Using synonymous terms	Online learning is a form of distance education
Time - asynchronous	Activities done asynchronously	We can watch videos when it suits us
Time - synchronous	Activities done synchronously	It is possible to follow lectures from home
Problems in the field	Issues defining the term	Online learning does not have a clear definition
Interactivity	Interactive nature of the educational content	The student is interacting with the instructor, other students; assignments have automated feedback or videos
Physical distance	Physical/geographical distance	Online learning is similar to distance education
Educational context	The necessity of a specific education programme	It is important to adapt the curriculum and teaching methods when learning online
Comparison	Compare/contrast with face-to-face learning	Online learning is different from traditional lectures because ...
Modernity*	Sign of modernity	Online learning is an advanced approach to education that is suitable for this modern world

Note. \*The code “Modernity” was included, as it frequently emerged from the protocols of the Iranian sample and may account for relevant cross-country differences.

**Table 2**  
Codes for the abilities associated with online learning.

Code	Definition	Anchor examples
Goal setting	Setting the educational goals or sub-goals	<i>Creating realistic deadlines</i>
Strategic planning	Planning the sequence, timing and completion of activities	<i>Trying to organise the daily schedule to have time to study</i>
Self-evaluation	Setting quality standards and criteria for progress	<i>I reflect on what I have just studied</i>
Task strategy	Organising, planning and transforming one's own study time and tasks	<i>I take notes while I am studying to organise my thoughts</i>
Elaboration	Combining new knowledge with prior knowledge and constructing meaning	<i>I try to create links between what I am studying and my prior knowledge</i>
Help-seeking	Asking other people for help	<i>I always ask for help when there is something that I do not understand</i>
Motivation	Initiating and sustaining learning engagement	<i>You need to be very motivated</i>
Basic competencies	Reference to foundational learning competences	<i>You need basic technological competencies</i>
Advanced competencies	Reference to high-level competencies	<i>You need advanced technological competencies</i>
Teachers' skills*	Reference to skills that teachers should have	<i>Teachers need to know how to use technologies appropriately</i>

Note. \*The code "Teachers' skills" was included, as it frequently emerged from the protocols of the Iranian sample and may account for relevant cross-country differences.

**Table 3**  
Codes for the comparison between online and face-to-face (F2F) learning.

Code	Definition	Anchor examples
Compare-contrast: CONTEXT		
Comfort F2F	Environmental features such as quietness or comfort that provide an advantage to face-to-face learning	<i>It is comfortable not to have a mandatory attendance policy, especially if you are a working student</i>
Comfort OL_EDE	See above, advantage to OL_EDE	<i>A weak point of traditional lectures is that it is often uncomfortable to sit there for hours</i>
Environment F2F	Environmental inputs that make someone feel situated in a certain framework of rules when learning face-to-face	<i>Going to classes helps you to experience the university dimension as a physical space—a meeting place with several moments of exchange and interaction</i>
Environment OL_EDE	See above, advantage to OL_EDE	<i>Very often the number of students is greater than is the number of available seats, which represents a big inconvenience for many students</i>
Technology F2F	Less reliance on the availability of well-functioning technology gives an advantage to face-to-face learning	<i>Not necessarily everyone owns a personal computer, tablet or high-speed connection that allows them to attend online classes or exams, creating a digital divide</i>
Technology OL_EDE	See above, advantage to OL_EDE	<i>NOT AVAILABLE</i>
Practice F2F	Possibility to participate in practical activities or hands-on workshops is better in face-to-face learning environments	<i>We experience fewer concrete exercises that you can bring with you into your professional career now that the course is online</i>
Practice OL_EDE	See above, advantage to OL_EDE	<i>NOT AVAILABLE</i>
Compare-contrast: INDIVIDUAL		
Management F2F	Time spent planning and attending lectures and the ability to regulate time is increased in face-to-face learning	<i>Online classes may be comfortable, but they also tend to take more time in a day because teachers do not always respect the class hours, causing classes to overlap</i>
Management OL_EDE	See above, advantage to OL_EDE	<i>I have more time to do other things as I can listen to a lecture anywhere and not have to commute to school</i>
Studying F2F	More availability of materials and lectures, easier to take and study notes and easier manage lecture contents in face-to-face learning	<i>I have had a hard time getting started with assignments as it is more difficult to understand what is expected in the exams</i>
Studying OL_EDE	See above, advantage to OL_EDE	<i>Being able to attend registered classes is extremely useful to review</i>
Attention F2F	The ability to stay focused is enhanced in face-to-face learning	<i>Online classes allow you to study in a more comfortable environment, which is also a weakness as it is easier to get distracted at home</i>
Attention OL_EDE	See above, advantage to OL_EDE	<i>During online classes, I tend to get distracted far less than in face-to-face classes</i>
Motivation F2F	Feeling more motivated in face-to-face learning	<i>You lose focus and motivation when staying at home by yourself</i>
Motivation OL_EDE	See above, advantage to OL_EDE	<i>Attending online classes is much more motivating than face-to-face classes</i>
Emotion F2F	More eye contact, easier relationship, more empathy, more engagement, more interaction with the teacher in face-to-face learning than online learning	<i>Face-to-face interactions with the teacher are more spontaneous and real than it happens in online learning environments</i>
Emotion OL_EDE	See above, advantage to OL_EDE	<i>The relationship with professors at the university has always been detached, in my experience. Maybe during online learning, I feel as if the professor is speaking directly to me, rather than just to the students sitting in the first row</i>
Compare-contrast: RELATIONSHIP		
Group F2F	Easier relationship and more emotional sharing with classmates in face-to-face learning	<i>In face-to-face learning environments you have interpersonal encounters, you see facial expressions and posture in a completely different way than at meetings that happen via computers. We need to be seen in real life in order to live</i>
Group OL_EDE	See above, advantage to OL_EDE	<i>Online classes are more open than face-to-face classes, which means that you talk to students you usually do not talk to.</i>
Discussion F2F	Easier to talk with peers and the teacher about something related to the lesson during face-to-face learning	<i>Discussions in class are not as spontaneous as they are when face-to-face</i>
Discussion OL_EDE	See above, advantage to OL_EDE	<i>During discussion it is easier to pay attention to non-verbal cues</i>
Communication F2F	Exchange of information with teachers and peers in face-to-face learning	<i>I find it very difficult to communicate and get information from the teacher when we are online</i>
Communication OL_EDE	See above, advantage to OL_EDE	<i>Now that we are online, the professors are more available via email and they reply more promptly to our questions as compared to face-to-face learning</i>
Shyness F2F	Easier to open up when communicating with teachers and peers (personal trait) in face-to-face learning	<i>As I am a shy person, I am more inclined to talk and ask questions in class when face-to-face, whereas I find it more difficult to talk over a microphone on the PC</i>
Shyness OL_EDE	See above, advantage to OL_EDE	<i>When talking online it is impossible to feel judged as I can turn off the video, thus it is easier for me to talk and be less shy as compared to face-to-face learning</i>

across educational contexts. For example, if a participant mentioned “technology” as an advantage for face-to-face contexts, we also included a code for technology as an advantage for online contexts. As a result, some codes were not associated with any clauses.

There was an acceptable agreement between the two raters' judgements (Cohen's  $k = 0.75$  for the Italian subsample, Cohen's  $k = 0.76$  for the Swedish subsample and Cohen's  $k = 0.79$  for the Iranian subsample).

### 3. Results

#### 3.1. Components of courses attended online (RQ1)

Table 4 presents information regarding the distribution of class sizes for the online courses attended by the participants in the three countries.

Italian participants were mostly included in online courses of 75–100 students, Swedish participants were mostly included in online courses of 25–50 students and Iranians were mostly included in online courses with less than 25 students.

In Fig. 1, we report the frequencies of the components included in the online courses attended by the participants in this study.

Overall, the top three activities that were included in the online courses attended by the participants were exams, streamed lectures and assignments. This ranking was similar in the Italian and Swedish samples (>90%), whereas the percentages were lower in the Iranian sample, as there was a more balanced distribution across activities. The bottom three activities included in the online courses were forums, asynchronous group work and quizzes. This ranking was similar in the Italian and Iranian samples but not in the Swedish sample, in which forum activities were included by 90% of the subjects.

We conducted a chi-square test on the interaction between countries and the presence of activities in online courses. Since multiple analyses were conducted, we adjusted the threshold for

**Table 4**  
Distribution of class sizes of the online courses attended by the participants in the three samples.

	<25	25–50	50–75	75–100	>100
Italy	4.8%	8.4%	24.1%	86.7%	37.3%
Sweden	7.3%	85.4%	22.0%	4.9%	0.0%
Iran	62.5%	28.8%	4.8%	1.0%	4.8%
Total	31.6%	31.6%	14.9%	32.9%	15.8%

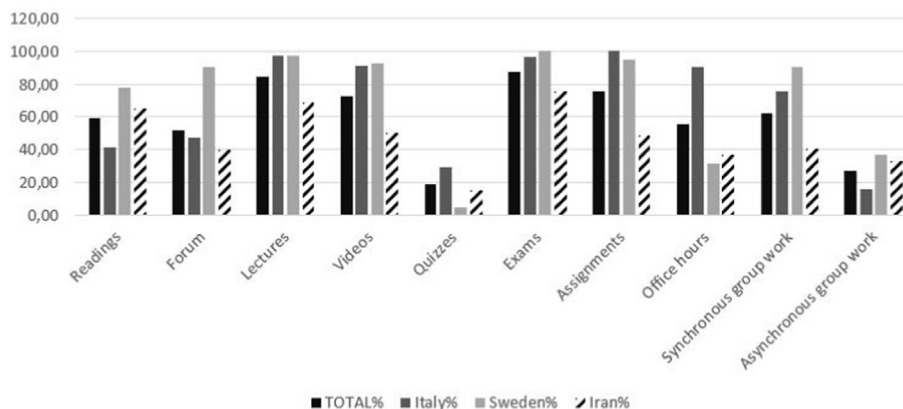


Fig. 1. Percentages of components in online courses attended.

**Table 5**  
Results of the cross-country comparison on the presence of activities (chi-square test on frequencies) and utility ratings (ANOVAs on means) in online courses.

DV	Presence		Utility		
	$\chi^2$	p	F	p	$\eta^2$
Readings	19.03	<0.001	3.88	0.02	0.03
Forum	31.38	<0.001	1.27	0.28	0.01
Lectures	34.98	<0.001	7.89	<0.001	0.07
Video	39.98	<0.001	0.22	0.80	0.002
Quiz	11.73	0.003	30.30	<0.001	0.21
Exam	24.87	<0.001	1.21	0.30	0.01
Assignment	75.61	<0.001	1.27	0.28	0.01
Office hours	65.31	<0.001	24.82	<0.001	0.18
Group synch	41.43	<0.001	4.87	0.01	0.04
Group asynch	8.99	0.01	11.03	<0.001	0.09

statistical significance (Adjusted  $p = 0.006$ , derived by dividing 0.05 by 9). See Table 5 for the results. Overall, the data suggest that Sweden's and Iran's online courses included more readings than did Italy's [ $\chi^2 = 19.03, p < 0.001$ ]. Sweden had more forum activities than did the other countries [ $\chi^2 = 31.38, p < 0.001$ ]. All countries had more online lectures [ $\chi^2 = 34.98, p < 0.001$ ] and exams than the expected distribution [ $\chi^2 = 24.87, p < 0.001$ ]. Italy and Sweden had more recorded lectures than Iran [ $\chi^2 = 39.98, p < 0.001$ ]. Quizzes were, overall, low and lower than expected for Italy and Sweden [ $\chi^2 = 11.73, p < 0.01$ ]. Italy and Sweden had more online assignments than Iran [ $\chi^2 = 75.61, p < 0.001$ ]. Italy had more teachers' office hours than Sweden and Iran [ $\chi^2 = 65.31, p < 0.001$ ]. Italy and Sweden had more online synchronous group work than Iran [ $\chi^2 = 41.43, p < 0.001$ ]. Asynchronous group work was equivalently low in all three countries [ $\chi^2 = 8.99, p > 0.05$ ].

In Fig. 2, we report the utility ratings of the online components that can be offered in online courses.

Overall, the three most useful activities were streamed lectures, online assignments and teachers' office hours. This ranking was more or less similar in the Italian and Iranian samples but only partially comparable to the Swedish sample, as office hours were ranked lower than other activities, such as exams. The three least useful activities were asynchronous and synchronous group work and online quizzes. The three subsamples agreed that quizzes and asynchronous groupwork are less useful than the other activities.

We conducted a chi-square test of the interaction between countries and the perceived utility of activities in online courses. Since multiple analyses were conducted, we adjusted the threshold for statistical significance (Adjusted  $p = 0.05/9 = 0.006$ ). See Table 5 for the results.



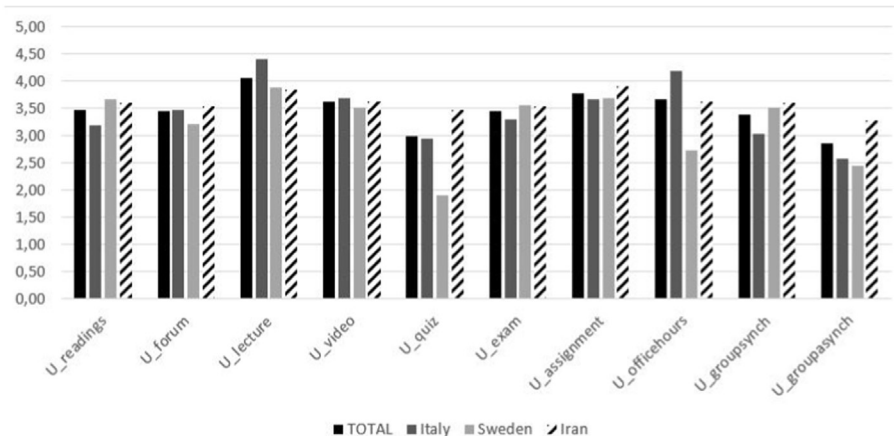


Fig. 2. Utility ratings of components in online courses attended.

Among the significant differences (Bonferroni post hoc tests), Italy considered online lectures to be more useful than Sweden [ $p = 0.02$ ] and Iran [ $p = 0.001$ ]. Iran considered online quizzes to be more useful than Italy [ $p = 0.002$ ] and Sweden [ $p < 0.001$ ] and Italy considered quizzes to be more useful than Sweden [ $p < 0.001$ ]. Italy considered office hours to be more useful than both the other two countries [Sweden,  $p < 0.001$ , Iran  $p = 0.001$ ], and Iran rated them as more useful than Sweden [ $p < 0.001$ ]. Iran rated asynchronous group work as more useful than the other two countries [Italy  $p < 0.001$ , Sweden  $p = 0.001$ ].

3.2. Cross-country differences in the definition of OL\_EDE (RQ2)

In Fig. 3, we report the cross-country differences in the way OL\_EDE was defined.

Overall, technology was the component most used to define OL\_EDE. It was referred to by the majority of participants in the Italian and Swedish sample (>50%) and by the largest percentage of the Iranian sample. The second most cited component to define OL\_EDE was physical distance. Conversely, none of the participants referred to the fact that multiple and overlapping definitions of OL\_EDE exist (i.e. problems in the field). Only Iranian students referred to OL\_EDE as a sign of modernity.

We conducted a chi-square test on the interaction between countries and the definition of OL\_EDE given in the open question

Table 6 Results of the chi-square test on the definition of OL\_EDE.

DV	$\chi^2$	p
Technology	25.20	<0.001
Synonymous	1.20	0.55
Asynchronous	6.73	0.04
Synchronous	2.17	0.34
Problems	NA	NA
Interactivity	2.52	0.28
Physical distance	0.51	0.78
Educational context	5.01	0.08
Comparison	24.90	<0.001
Modernity	NA	NA

and analysed the standardised residuals. Since multiple analyses were conducted, we adjusted the threshold for statistical significance (Adjusted  $p = 0.05/10 = 0.005$ ). The results of these analyses can be found in Table 6.

Only two statistically significant results emerged from the data concerning the technology and comparison codes. More Italians than Swedes and Iranians defined OL\_EDE through the use of technology and by comparing it to face-to-face learning. Conversely, fewer Iranians than Italians and Swedes used technology and comparison with face-to-face learning to define OL\_EDE.

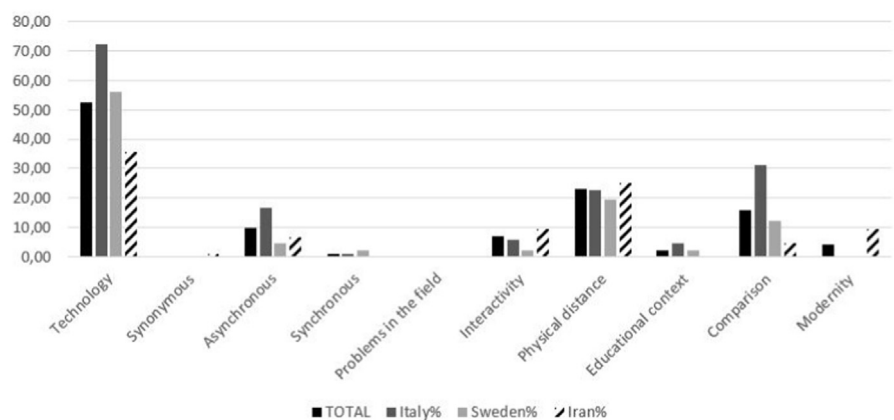


Fig. 3. Categories used to define OL\_EDE.

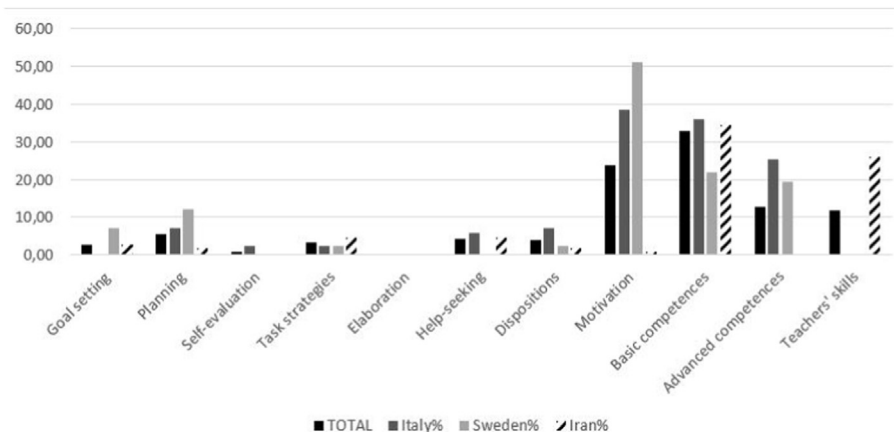


Fig. 4. Skills associated with OL\_EDE.

Table 7

Results of the chi-square test on SRL strategies associated with OL\_EDE.

DV	$\chi^2$	p
Goal	5.78	0.06
Planning	6.34	0.04
Self-evaluation	1.00	0.32
Task strategies	0.95	0.62
Elaboration	NA	NA
Help-seeking	2.46	0.29
Motivation	57.06	<0.001
Basic competences	2.76	0.25
Advanced competences	0.51	0.47
Teachers' skills	NA	NA

3.3. Cross-country differences in SRL strategies associated with OL\_EDE (RQ3)

In Fig. 4, we report the cross-country differences in the SRL strategies that the participants adopted regarding OL\_EDE.

Overall, the most important set of abilities associated with OL\_EDE was basic competences (e.g. the ability to use ICT). Basic competences were ranked as either the highest or second highest across the three subsamples. Motivation and advanced competences (e.g. critical thinking) were highly ranked components of OL\_EDE in the Italian and Swedish samples, but not in the Iranian sample. Instead, in Iran, teachers' skills were ranked as very high,

whereas the other two samples did not mention them. Almost none of the participants mentioned self-evaluation skills and elaboration skills as abilities associated with OL\_EDE.

We conducted a chi-square test on the interaction between countries and SRL strategies associated with OL\_EDE in the open question and analysed the standardised residuals. Since multiple analyses were conducted, we adjusted the threshold for statistical significance (Adjusted p = 0.05/11 = 0.005). See Table 7 for the results.

Only one statistically significant result emerged; compared to Iranian pre-service teachers, more Italian and Swedish participants referred to motivation when discussing abilities associated with OL\_EDE.

3.4. Cross-country differences when comparing-contrasting OL\_EDE with face-to-face education (RQ4)

In Figs. 5–7, we report on the cross-country differences in the way OL\_EDE was compared and contrasted with face-to-face education.

Concerning context-level aspects (Fig. 5), more Italians than Iranians considered OL\_EDE to be more comfortable than face-to-face learning. Moreover, most participants referred to technology when comparing learning contexts, whereas the least-cited category was the environment.

Concerning individual-level variables (Fig. 6), attention,

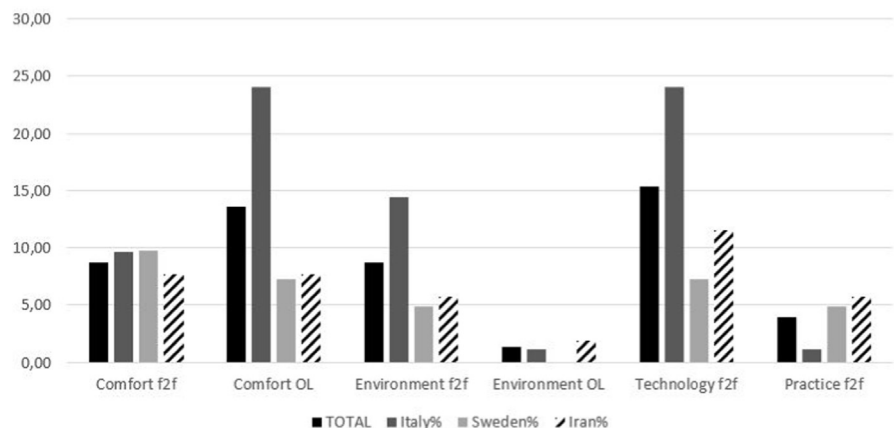


Fig. 5. Context-level categories for the comparison between online and face-to-face education.

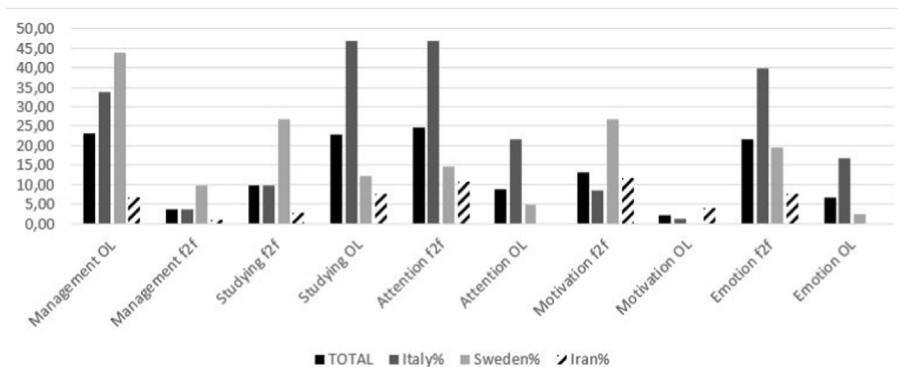


Fig. 6. Individual-level categories for the comparison between online and face-to-face education.

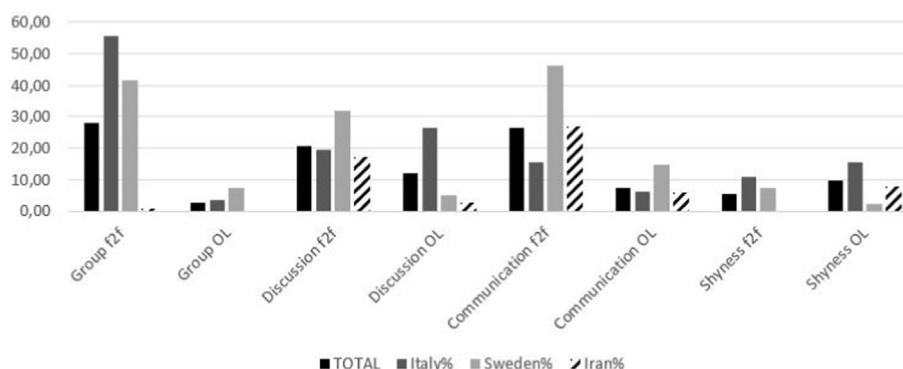


Fig. 7. Relationship-level categories for the comparison between online and face-to-face education.

management and studying were the codes most referred to by the overall sample; however, there was large variability between the three subsamples, which we further discuss in the paragraph reporting the results of the chi-square tests. For the first two codes, there was a similar trend across countries: better attention was more often associated with face-to-face learning than OL\_EDE, whereas the opposite pattern was found for management skills. Italy and Iran believed that it was better to study online, whereas Sweden believed that it was better to study face-to-face. Across all subsamples, greater motivation online versus face-to-face was a code mentioned by a very small percentage of participants (<5%). Finally, they all agreed that face-to-face learning conveyed more emotion and motivation than OL\_EDE.

Concerning relationship-level variables (Fig. 7), overall better group interaction, communication and discussion in face-to-face learning as compared to online learning were the most frequent codes; however, the pattern was not replicated across countries. They all agreed that group interactions and communication were better when learning face-to-face than online (although only a very small percentage of Iranian students referred to this issue when comparing the two learning environments). However, while Iran and Sweden considered discussion better when learning face-to-face than online, the opposite pattern was found in the Italian sample.

We conducted a chi-square test on cross-country differences in the comparison between face-to-face and OL\_EDE and analysed the standardised residuals. Since multiple analyses were conducted, we adjusted the threshold for statistical significance (Adjusted  $p = 0.05/24 = 0.002$ ). The results of these analyses can be found in Table 8.

Table 8

Results of the chi-square test on cross-country differences in the comparison between face-to-face and OL\_EDE.

DV	$\chi^2$	p
Compare-contrast: CONTEXT		
Comfort F2F	0.28	0.87
Comfort OL_EDE	12.25	0.001
Environment F2F	5.30	0.07
Environment OL_EDE	0.85	0.65
Technology F2F	8.09	0.02
Practice F2F	2.65	0.27
Compare-contrast: INDIVIDUAL		
Management OL_EDE	30.82	<0.001
Management F2F	6.72	0.04
Studying F2F	19.34	<0.001
Studying OL_EDE	43.68	<0.001
Attention F2F	35.69	<0.001
Attention OL_EDE	5.73	0.02
Motivation F2F	8.57	0.01
Motivation OL_EDE	2.62	0.27
Emotion F2F	28.25	<0.001
Emotion OL_EDE	5.37	0.02
Compare-contrast: RELATIONSHIP		
Group F2F	72.25	<0.001
Group OL_EDE	0.82	0.37
Discussion F2F	3.87	0.15
Discussion OL_EDE	26.99	<0.001
Communication F2F	13.36	0.001
Communication OL_EDE	3.74	0.15
Shyness F2F	0.39	0.53
Shyness OL_EDE	6.34	0.04

Note. F2F = face-to-face; OL\_EDE = online learning in an emergency educational setting.

Concerning context-level variables, more Italians than expected, but fewer Iranians than expected, found OL\_EDE to be more comfortable than face-to-face learning.

Concerning individual-level variables, statistically significant differences were found for management skills, studying skills, attention and emotions. Specifically, more Italians and Swedes than Iranians found it better to manage learning in online contexts compared to face-to-face. More Italians found studying easier in an online environment than a face-to-face environment, whereas more Swedes found studying easier in a face-to-face environment than an online environment. Conversely, fewer Iranians referred to studying when comparing online versus face-to-face environments. More Italians, but fewer Iranians, found it easier to pay attention in a face-to-face environment. More Italians but fewer Iranians referred to emotions as a strength of face-to-face learning.

Concerning relationship-level variables, statistically significant differences were found for group, discussion and communication. More Italian and Swedish than Iranian participants considered relationships and emotional sharing with classmates easier in face-to-face learning as compared to online learning. More Italians but fewer Iranians considered it easier to talk with peers and the teacher about something related to the lesson during class in OL\_EDE than in face-to-face learning. Finally, fewer Italians but more Swedish participants considered the exchange of information with teachers and peers easier in face-to-face learning than in online learning.

#### 4. Discussion

The present study investigated pre-service teachers' experiences with and conceptions of OL\_EDE in three different countries: Italy, Sweden and Iran. The study was conducted in late spring 2020 during the first wave of the COVID-19 pandemic, when most educational institutions in the world shifted to emergency distance education. Participants were given a questionnaire with closed questions on their experiences of OL\_EDE (components of online courses and perceived utility) and open-ended questions on their conceptions of OL\_EDE (definition, relevant skills and comparison with face-to-face learning).

Overall, online courses include two elements that are also typically found in traditional courses: (streamed) lectures and exams. OL\_EDE provides the possibility of extending class time beyond lectures, but this opportunity was not fully exploited. Asynchronous group work and quizzes were minimally reported in all countries. Iranian participants also reported a low presence of online assignments, recorded lectures or synchronous group work. Such differences may be influenced by each country's progress toward their respective digital agendas; while Swedish and Italian universities have been adopting ICT to support face-to-face courses in the past, the promotion of learning and teaching with technology in Iran is still in its early stages. For instance, during the first emergency distance education phase, the participating universities in Sweden and Italy relied on prior experiences with LMSs, whereas the participating universities in Iran mainly relied on instant messaging technologies. However, differences may also depend on the mainstream pedagogical approach. Whereas Italy (Corbo et al., 2019) and Sweden (Uusimäki & Garvis, 2020) have made significant progress in the implementation of learner-centred approaches in recent years, Iran seems to be still anchored to a teacher-centred style of instruction (Khany & Tarlani-Aliabadi, 2016). The dominance of this type of instruction in Iran's higher education system may have led students to think that good instruction is one in which teachers effectively present information to students and students are passive recipients of the new information. This also explains why students referred to "teacher skills" when they were

asked about the abilities needed for a good OL\_EDE experience.

The differences in digital agendas and progress in the digitalisation of society may also explain some differences between Italy and Sweden. Notwithstanding the availability of ICT, Italian people still lag behind Swedes in digital skills, making them reliant on traditional means of communication, such as office hours with the teacher. A greater level of digital skills may explain, at least partially, a greater reliance on asynchronous communication (i.e. forum activity) among the Swedish participants. Indeed, in Sweden, office hours exist in digital format. Swedish students contact their professors/teachers with questions in forums or via email, regardless of the time of the day and expect fast answers.

The presence of components of online courses is, to a certain extent, correlated with the participants' utility ratings. Online lectures received high utility ratings and were among the most frequently implemented components in online courses. Asynchronous groupwork and quizzes were not considered very useful, besides not being included in the online courses attended. Similarly, Italian students assigned a greater utility rating to office hours in addition to reporting a greater presence of this component than students from the other two countries did.

According to the literature, the definition of OL\_EDE should include several components besides the use of technology. Importantly, learners should be aware that OL\_EDE requires an adjustment to the educational environment as well as to their studying approach (Singh & Thurman, 2019). Unfortunately, our data showed that the participants had little overall understanding of the implications of OL\_EDE. Indeed, most of the participants simply defined OL\_EDE as learning through the use of technology with the addition of physical distance. It is not surprising that the most frequently mentioned SRL skill was basic competence (e.g., knowing how to use a video-conferencing software), with participants almost exclusively referring to the use of ICTs. Interestingly, Italian and Swedish participants referred to motivation as an important component of SRL in OL\_EDE environments much more often than Iranian participants did. This finding might be associated with the way Iranian participants conceive OL\_EDE (i.e. as a sign of modernity and thus intrinsically motivating), but also with the idea that the effectiveness of OL\_EDE mostly depends on teachers' skills, rather than students' skills. Italian and Swedish students' loci of control may be internal, whereas Iranian students' loci of control may be external. Overall, the participants from the three countries displayed a rather skewed perception of SRL skills when learning online, whereas a complex approach would be necessary in higher education, especially when considering the specific challenges that students face in distance education settings. Considering university students as "digital natives" may have induced teachers to trust students to cope with this situation, leaving it to them to find the motivation to take on assignments and readings, as schedules were dissolved.

The current situation provides a unique opportunity to comparatively analyse students' perceptions of OL\_EDE versus face-to-face learning in a sort of within-subject design. What is particularly concerning is that participants compared, on a contextual level, the two learning environments in terms of tools (i.e. use of ICT) but not in terms of pedagogy. Students might not be able to give examples based on educational/pedagogical differences as they had no prior experience of a different educational context if their prior online courses simply replicated traditional formats through streamed lectures and online exams.

Only one country (i.e. Italy) considered OL\_EDE to be more comfortable than face-to-face learning, a finding that should be further researched to be interpreted. Such a preference may depend on the face-to-face context in which students generally attend classes. Italian participants reported larger class sizes than

Swedish and Iranian students, making the live attendance experience uncomfortable. However, such a preference may also depend on physical comfort (such as less time spent commuting) or psychological comfort (such as a preference for staying at home). Of course, comfort is linked to the availability of technological resources (devices and connections) at home.

Overall, the participants reported that OL\_EDE facilitates management skills but that face-to-face learning facilitates attention. Such a result directs our attention to the pedagogical adjustments that need to be made to facilitate learning in specific contexts. Regarding the level of individual differences, countries diverge in reporting which type of environment facilitates studying skills. Italians (and Iranians, although on a descriptive level only) displayed a preference for OL\_EDE, whereas Swedish students displayed a preference for a face-to-face environment. This difference cannot be attributed to the greater availability of ICTs, as Sweden is characterised by greater technological advancement than the other two countries. The results may depend on contextual-level factors (more student-friendly universities in Sweden, for instance, in terms of class sizes) or individual-level factors (more prior experiences with OL\_EDE for the Swedish participants). Moreover, the results may depend on a third factor: Italians may find it easier to study online because it is more comfortable. More research is needed to link these differences to a cause or set of causes. Certainly, it is important to further investigate this, given the relevance of studying skills in SRL.

On the relationship level, face-to-face learning was perceived as a more emotional environment than OL\_EDE. All countries identified face-to-face learning as the best environment for group interactions and communication, suggesting that the research agenda on OL\_EDE should take these aspects into account. A plausible explanation for this is the familiarity experienced with face-to-face communication. In a face-to-face learning situation, it is possible to see and code group members' body language and to speak simultaneously, while in an online environment, only the head/face is visible and meticulous turn-taking in conversations is crucial to maintain communication (Fisher et al., 2020). Recently, research on online and multimedia learning has focused on the role of emotions when learning through ICTs (Weidlich & Bastiaens, 2019), and our results support the importance of this theme: students felt that it was easier to express emotions and build relationships when learning face-to-face than online. Consequently, we suggest that the research agenda for OL\_EDE should take these aspects into account and strive to design OL\_EDE tools that facilitate emotional expression.

Regarding this general trend, the only significant exception was represented by the Italian participants, who expressed a preference for talking with peers and the teacher when learning online rather than when learning face-to-face. Thus, it is important to differentiate among the different functions that communication may have: communicate to get information, communicate to discuss, communicate to achieve a common goal (i.e. a group project), communicate for affective reasons. Students' preferences may depend on the specific goal for which the communication is intended.

#### 4.1. Limitations

When interpreting the findings of the current study, some limitations should be taken into account. First, the results are limited to the specific universities in which the study was conducted. Each country is characterised by internal variability in terms of digitalisation and teaching practices for OL\_EDE. Nevertheless, the universities involved are considered representatives of the general trends in each country. Second, the results are limited

to the specific instruments used in the present study. The questionnaire allowed the investigation of the students' conceptions of OL\_EDE but could not be used to draw conclusions about the causes and effects. Third, when exploring contextual factors, cultural and social values interact in influencing people's conceptions. It is difficult to understand how much reactions to the COVID-19 pandemic mattered, what impact each country's digitalisation strategy had and how these two social aspects were associated with overarching cultural values, such as short-or long-term orientation or individualism-collectivism.

## 5. Conclusions

The present study contributes to our understanding of pre-service teachers' conceptions of online learning in emergency distance education. The research design and the exceptional circumstances in which the study took place do not allow us to draw definite conclusions. Nevertheless, it contributes to capturing students' experiences with online learning and how it is defined and conceptualised by future teachers. The sudden shift to online learning, with limited time for universities and students to adapt, has the potential to influence how online learning is perceived by future teachers. For the first time, it was possible to study how different societies (varying by digital readiness and degree of online learning) reacted to the need for online learning and how students adapted to it in terms of SRL.

The first conclusion is that conceptions of learning are underdeveloped when compared to theoretical definitions. The participants did not associate a change in the learning environment with a change in the pedagogical approach and mainly referred to basic competencies when reflecting on the skills needed to learn online. Online learning is more than knowing how to use a learning management system or videoconferencing tool. Indeed, the online courses attended included a few additional components besides lectures and exams, which did not help students adjust or regulate their learning skills or develop a sophisticated definition of online learning (Tsai, 2009). Consequently, online teacher education programmes should introduce further innovations, besides tutorials, on how to use technology. For instance, online programmes should introduce reflective practices to make explicit how attitudes towards technology interact with perspectives on teaching and balance faith in technology with sound pedagogical perspectives (Mumford & Dikilitaş, 2020). This is particularly relevant in emergent distance education, in which timely adjustments should be made at the technological and pedagogical levels. Particular attention should be paid to students' motivational and attentional components, which appear to be sensitive to context. Institutions should introduce workshops aimed at increasing student' awareness of how strategies used to sustain the effort required to achieve a learning goal should be adapted to the learning environment. SRL strategies should be scaffolded explicitly by the instructor (Hromalik & Koszalka, 2018). Adopting unsophisticated conceptions of SRL seem to be a general trend found in all three participating countries, but it becomes a more urgent issue in countries lagging behind in digital readiness. Interestingly, face-to-face learning was identified as the best environment for group interactions and communication, even in Sweden, a country with a long tradition of online learning, a greater level of online learning implementation and greater digital readiness. Instructors need to address this issue when designing learning environments, especially if social restrictions are imposed.

A rationale for the need to broaden the range of SRL strategies within pre-service teachers is their future responsibility to convey this knowledge to their own students. Thus, since their training to become teachers, it is important for pre-service teachers to develop

a flexible approach to SRL, that takes into consideration the demands of the specific educational setting in which learning takes place.

## References

- Alonso-Mencía, M. E., Alario-Hoyos, C., Maldonado-Mahauad, J., Estévez-Ayres, I., Pérez-Sanagustín, M., & Delgado Kloos, C. (2020). Self-regulated learning in MOOCs: Lessons learned from a literature review. *Educational Review*, 72, 319–345. <https://doi.org/10.1080/00131911.2019.1566208>
- Andersson, J. (2019). *Svenskarna och internet 2019: Undersökning om svenskarnas internetvanor [the Swedes and the internet, 2019: Investigation about Swedes' internet habits]*. Internetstiftelsen. <https://svenskarnaochinternet.se/rapporter/barnen-och-internet-2019/sammanfattning/>.
- Archambault, L., Archambault, L., DeBruler, K., & Freidhoff, J. (2014). K-12 online and blended teacher licensure: Striking a balance between policy and preparedness. *Journal of Technology and Teacher Education*, 22, 83–106.
- Berge, Z. L. (2005). *Virtual schools: Planning for success*. Teachers College Press.
- Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *Internet and Higher Education*, 27, 1–13. <https://doi.org/10.1016/j.iheduc.2015.04.007>
- Carmichael, T., & Cunningham, N. (2017). Theoretical data collection and data analysis with gerunds in a Constructivist Grounded Theory study. *Electronic Journal of Business Research Methods*, 15, 59–73. [www.ejbrm.com](http://www.ejbrm.com).
- Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). SAGE.
- Corbo, F., Micheli, M., & Uricchio, A. F. (2019). *Innovazione didattica universitaria e strategie degli Atenei italiani* (en. tr. "Pedagogical innovation in higher education and strategies of Italian universities"). Università degli Studi di Bari Aldo Moro. <https://www.uniba.it/ateneo/editoria-stampa-e-media/linea-editoriale/fuori-collana/volumegeo>.
- Department of Economic and Social Affairs. (2020). *E-Government survey 2020*. Digital government in the decade of action for sustainable development. With addendum on COVID-19 response. [https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020 UN E-Government Survey \(Full Report\).pdf](https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20(Full%20Report).pdf).
- Entwistle, N., Skinner, D., Entwistle, D., & Orr, S. (2010). Conceptions and beliefs about "Good Teaching": An integration of contrasting research areas. *Higher Education Research and Development*, 19, 5–26. <https://doi.org/10.1080/07294360050020444>
- Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers and Education*, 59, 423–435. <https://doi.org/10.1016/j.compedu.2012.02.001>
- Evans, J., & Hazelman, V. (2006). Hard digital realities: Teaching with technology in the Pacific islands. PCF 4 the fourth Pan commonwealth forum on open learning. <http://pcf4.dec.uwi.edu/viewpaper.php?id=192>.
- Fisher, S., Guralnik, T., Fonagy, P., & Zilcha-Mano, S. (2020). Let's face it: Video conferencing psychotherapy requires the extensive use of ostensive cues. *Counselling Psychology Quarterly*, 1–17. <https://doi.org/10.1080/09515070.2020.1777535>
- Gilgun, J. F. (2014). Deductive qualitative analysis and grounded theory: Sensitizing concepts and hypothesis testing. In A. Bryant, & K. Charmaz (Eds.), *The SAGE handbook of current developments in grounded theory* (pp. 107–122). Sage Publications.
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). *Remote teaching and online learning*. Educause Review. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>.
- Hromalik, C. D., & Koszalka, T. A. (2018). Self-regulation of the use of digital resources in an online language learning course improves learning outcomes. *Distance Education*, 39, 528–547. <https://doi.org/10.1080/01587919.2018.1520044>
- Kara, M., Kukul, V., & Çakır, R. (2021). Self-regulation in three types of online interaction: How does it predict online pre-service teachers' perceived learning and satisfaction? *Asia-Pacific Education Researcher*, 30, 1–10. <https://doi.org/10.1007/s40299-020-00509-x>
- Khany, R., & Tarlani-Aliabadi, H. (2016). Studying power relations in an academic setting: Teachers' and students' perceptions of EAP classes in Iran. *Journal of English for Academic Purposes*, 21, 72–85. <https://doi.org/10.1016/j.jjeap.2015.12.002>
- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Computers and Education*, 104, 18–33. <https://doi.org/10.1016/j.compedu.2016.10.001>
- Lee, Y., & Choi, J. (2010). A review of online course dropout research: Implications for practice and future research. *Educational Technology Research & Development*, 59, 593–618. <https://doi.org/10.1007/S11423-010-9177-Y>
- Lee, Y., & Choi, J. (2013). A structural equation model of predictors of online learning retention. *The Internet and Higher Education*, 16, 36–42. <https://doi.org/10.1016/J.IHEDUC.2012.01.005>
- List, A., Brante, E. W., & Klee, H. L. (2020). A framework of pre-service teachers' conceptions about digital literacy: Comparing the United States and Sweden. *Computers and Education*, 148, 103788. <https://doi.org/10.1016/j.compedu.2019.103788>
- Lizzio, A., Wilson, K., & Simons, R. (2002). *University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice* (Vol. 27, pp. 27–52). <https://doi.org/10.1080/03075070120099359>. <https://doi.org/10.1080/03075070120099359>.
- Luyt, I. (2013). Bridging spaces: Cross-cultural perspectives on promoting positive online learning experiences. *Journal of Educational Technology Systems*, 42, 3–20. <https://doi.org/10.2190/ET.42.1.b>
- Mumford, S., & Dikilitaş, K. (2020). Pre-service language teachers reflection development through online interaction in a hybrid learning course. *Computers and Education*, 144, 103706. <https://doi.org/10.1016/j.compedu.2019.103706>
- Näringsdepartementet, & Utbildningsdepartementet. (2018). Regeringen vill utveckla distansutbildningen – för ett Sverige som håller ihop. <https://www.regeringen.se/pressmeddelanden/2018/06/regeringen-vill-utveckla-distansutbildningen-for-ett-sverige-som-haller-ihop/>.
- Nelson, M. J., & Hawk, N. A. (2020). The impact of field experiences on prospective preservice teachers' technology integration beliefs and intentions. *Teaching and Teacher Education*, 89, 103006. <https://doi.org/10.1016/j.tate.2019.103006>
- OOKLA. (2021). *Iran*. Speedtest Global Index. <https://www.speedtest.net/global-index/iran>.
- Organization for Economic Co-operation and Development. (2017). OECD skills strategy diagnostic report: Italy 2017. <https://doi.org/10.1787/9789264298644-en>.
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). Academic Press.
- Portulans Institute. (2020). Network readiness Index 2020 analysis. <https://networkreadinessindex.org/nri-2020-analysis/>.
- Purdie, N., Hattie, J., & Douglas, G. (1996). Student conceptions of learning and their use of self-regulated learning strategies: A cross-cultural comparison. *Journal of Educational Psychology*, 88, 87–100. <https://doi.org/10.1037/0022-0663.88.1.87>
- Shi, Y., Frederiksen, C. H., & Muis, K. R. (2013). A cross-cultural study of self-regulated learning in a computer-supported collaborative learning environment. *Learning and Instruction*, 23, 52–59. <https://doi.org/10.1016/J.LEARNINSTRUC.2012.05.007>
- Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988–2018). *American Journal of Distance Education*, 33, 289–306. <https://doi.org/10.1080/08923647.2019.1663082>
- Statistical Center of Iran. (2018). Internet and information technology. <https://bit.ly/3gjtNQT>.
- Sutherland, L., Howard, S., & Markauskaite, L. (2010). Professional identity creation: Examining the development of beginning preservice teachers' understanding of their work as teachers. *Teaching and Teacher Education*, 26, 455–465. <https://doi.org/10.1016/j.tate.2009.06.006>
- Tsai, C. C. (2009). Conceptions of learning versus conceptions of web-based learning: The differences revealed by college students. *Computers and Education*, 53, 1092–1103. <https://doi.org/10.1016/j.compedu.2009.05.019>
- Ulus, İ.Ç. (2020). *Emergency remote education vs. distance Education*. EPlatform for Adult Learning in Europe. <https://epale.ec.europa.eu/en/blog/emergency-remote-education-vs-distance-education>.
- Uusimäki, L., & Garvis, S. (2020). Reflections of learning experiences of international students in Sweden. *Journal of International Students*, 10, 2166–3750. <https://doi.org/10.32674/JIS.V10I52.2757>
- Vettori, G., Vezzani, C., Bigozzi, L., & Pinto, G. (2018). The mediating role of conceptions of learning in the relationship between metacognitive skills/strategies and academic outcomes among middle-school students. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.01985>, 1985.
- Wang, C.-H., Shannon, D. M., & Ross, M. E. (2013). Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Education*, 34, 302–323. <https://doi.org/10.1080/01587919.2013.835779>
- Weidlich, J., & Bastiaens, T. J. (2019). Designing sociable online learning environments and enhancing social presence: An affordance enrichment approach. *Computers and Education*, 142, 103622. <https://doi.org/10.1016/j.compedu.2019.103622>
- Yan, L., Whitelock-Wainwright, A., Guan, Q., Wen, G., Gašević, D., & Chen, G. (2021). Students' experience of online learning during the COVID-19 pandemic: A province-wide survey study. *British Journal of Educational Technology*, 52, 2038–2057. <https://doi.org/10.1111/BJET.13102>
- Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press.