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Pandemic and Post-Pandemic Effects on University Students' Behavioral Traits:

How Community of Inquiry Can Support Instructional Design During Times of Changing Cognitive Habits

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ABSTRACT

Recent investigations show how the pandemic has affected learners' behavioral traits. The results of three semi-structured surveys carried out in a major Italian university: 2020, 1st sem. (n=102); 2022, 1st sem. (n=235); and 2022, 2nd sem. (n=61) under COVID-19 containment measures, manifest deviations in students' perceptions about social patterns, learning routines, and expectations. During the two-year emergency remote learning, students revealed a progressive downsize of social expectancy and increasing self-management behaviors in relation to a higher degree of independence. The Community of Inquiry principles were adopted to observe student motivation and self-direction in a Moodle-based learning environment. Conversely, the focus on English as a Foreign Language as the main subject represents an uncharted perspective in the research contexts around the Community of Inquiry. Future expansions may enlarge the sample to further education bodies and broaden the range of e-learning tools.

KEYWORDS

Community of Inquiry, Engagement in Online Education, English as a Foreign Language, Instructional Design, Self-Paced Learning

1. INTRODUCTION

A global deployment of the Emergency Remote Education (Manca et al., 2021) has been a forced revolution revealing a huge need for improving knowledge and awareness on how pedagogical content is being taught online, as well as skills to design, facilitate, and deliver meaningful online learning experiences. The lack of specific skills related to designing online-learning-ecosystems literally exploded during the pandemic outbreak, revealing that the teaching professionals were not always trained properly to adjust their curricula to a full online setting (Daniel, 2020). The abrupt migration

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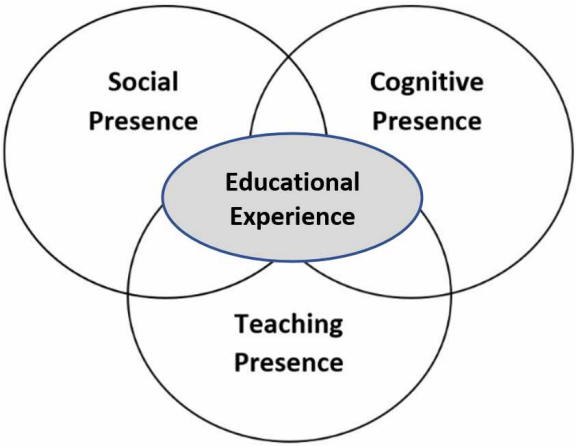
from face-to-face education to a total e-learning context, gave teachers a substantial awareness of the profound distinctiveness of online teaching (Rapanta et al., 2020). Conversely, in other cases like in universities, it was not infrequent that the challenge was perceived as an opportunity for pedagogical and professional reinvention of traditional approaches (Watermeyer et al., 2021). As a consequence, ICT integration and adaptative teaching styles are being defined as particularly relevant for early career teachers (König et al., 2020), while new needs have been emerging to ensure equity in assessment and institutional transparency for all stakeholders (García-Peñalvo et al., 2020). Similarly, different grades of students' readiness to move totally online emerged, in high schools (Chung et al., 2020) as well as universities (Aristovnik et al., 2020). Nevertheless, the pandemic-related urgence for creating more resilient education environments imposed also the theme of educational sustainable models (Adedoyin & Soykan, 2020).

In our digital society the term 'online' is no more a meaningful descriptor to define the ordinary experiences of digital native students, especially in those countries where Internet-connected devices are the norm, and the differentiations between educational time and other human activities are not so sharp anymore (Rapanta et al., 2020). Learners are fully immersed in new technologies and are also regular users of social media, hence they will advocate for the use of these tools inside and outside the classroom, this leads to less formal learning processes and to build relationships among the various agents involved (Sá et al., 2020). Aside from the continuous debate around technology and education, it is demonstrated that education practices hardly keep the pace with the latest technological innovations (Mayer, 2019). The strongest evidence of these different upgrading rates is the unsystematic adoption of Mobile Learning (ML) or *m-learning* (Grant, 2019) and the recent advance of 3D-virtual worlds, considered mature and appropriate for various pedagogical use. Despite their increasing appeal in educational practice, three-dimensional learning environments are still overlooked and disregarded by teachers, and the *affordances* of mobile computing devices have not been clearly explained. Due to instructors' rapid skill obsolescence, lack of a proper instructional-design-background and even budget-issues of their education centers (Pellas et al., 2017) the educational outreach of these technologies is not entirely verified. As Zawacki-Richter and Anderson (2014) pointed out, e-learning experience is tightly tied to the benefits of choosing the most appropriate platform, and media features are of paramount importance in the Instructional Design (ID) process. They are related to the ICT literacy of instructors and learners and can impact the subject to be learned. Indeed, among the research trends of the recent years, technology-enhanced settings supporting communication and remote interaction are still one of the most cross-thematic focuses (Blau et al., 2020; Borokhovski et al., 2016). Along with the selection of the most appropriate medium, the current digital education paradigm is a stage of a theoretical evolution that may be traced back to the Behaviourist approach, then Cognitivist, and now Constructivist (Mayer, 2019), with a reasonably predictable advent of a dominant Connectivist perspective in the future.

Some scholars have recently proposed the notorious Community of Inquiry framework (CoI) to facilitate ID. The rationale for this blend is the recognition that learning design is generally content-based, while the CoI is inquiry-based and thus fosters the construction of shared knowledge within a framework of critical thinking (Krzyszkowska & Mavrommati, 2020). The general findings are limited to the small sample size to date, but show that online communities have a strong awareness of cognitive and social aspects and can increase learning satisfaction accordingly. The CoI framework is based on the interaction of three dimensions named Social Presence (SP); Cognitive Presence (CP) and Teaching Presence (TP). The core concepts define CP as an essential element of critical thinking, a set of processes and outcomes manifested through the ostensible goal of all higher education. SP is defined as the ability of participants to project their personal attributes into the learning community. Finally, TP is a central dimension responsible for designing, facilitating, and guiding online learning, as well as setting in motion SP and CP to allow them to interact with each other (Anderson et al., 2001; Garrison et al., 2004, 2009, 2010; Garrison & Arbaugh, 2007; Garrison & Cleveland-Innes, 2005; Rourke et al., 1999). There is still a dearth of research on the fusion of ID with elements of TP, CP and SP.

Figure 1. CoI Framework adapted from Garrison et al. 1999



The continuous interaction between the three overlapping Presences creates the educational experience within a remote teaching/learning environment.

2. INTEGRATING AFFORDANCE IN A SITUATED LEARNING APPROACH

Concepts such as *user interface* and *user experience* (UX) are gaining relevance to explain the conceptual reasons that establish a bond between the digital space and the skills learned in online education environments. The concept of "situated learning" applied to a digital context suggests that the agent-environment interactions, based on *features* and *functionalities* and aimed to project the learners' performances into the e-learning community, should be considered of capital importance by the course designer (Oliver & Herrington, 2011). Proposals for evaluation still reveal clues of a cognitive dichotomy internal/external, since they still conceive the learner as an entity who first internalizes and then acts (Lave & Wenger, 2006). Conversely, environmental dynamics are not yet properly explored in the design of a remote experience. As Young et al. observed (2002) a complete analysis should consider not only the learner within the learning context but also the influence of the course designer and other constraints, restrictions and limitations imposed by the learning setting. Similarly, the three CoI Presences are generally described under the lens of a constructivist-collaborative approach, so scholars usually examine units of analysis built with the bricks of behavioral and psychological matter, which frame a range of intentional agencies. Indeed, being the learning-setting a multidimensional online experience, digital remote education deals also with *user interfaces, functionalities, interaction design, usability, personal perception, responsiveness*, and many more elements which converge to form a significative part of the online teaching/learning experience.

The term *affordance*, in particular, defines action possibilities in the physical environment that are objectively measurable but only become manifest in relation to an agent (Gibson, 1977). This concept has been extensively researched and widened to define relations between human behavior and ICT under different subjects and from different angles. Concerning the implementation of CoI in the present work, the field encompassed by the theories around *affordance* will be adopted. By establishing the "*possibilities for action for a class of agent*" (Young et al., 2002, p. 49) the theory of *affordance* sustains the theoretical implications of bonding the learning experience to a particular ICT setting to favor the blending of Social, Cognitive and Teaching elements.

Consequently, the context designed by the instructor will mold learners' behaviors, may generate constraints, obligations, or reductions in degrees of freedom at various stages. It follows that when

affordances are not properly identified and predicted, learners may not be fully engaged and the implementation of an inquiry-based learning community may not achieve its full potential. Indeed, as our surveys show, students tend to remain attached to their Informal *social affordances* (outside lesson timetable) if they do not find an appealing alternative in the Formal education space. As Kauffmann and Clément explained (2007) the detection of *social affordances* involves not only present actions but also a range of prior assumptions, expectations, predictions and generalizations that go beyond the information included in the context. Therefore, when designing a course environment based on the CoI principles, giving clear instructions, goals, due dates (Stefan Stenbom, 2018) and choosing intuitive e-tools may not be enough to facilitate SP and CP. A learning space implies a changing process where instructor and learners go through a practice of mutual attunement, this correlates the education experience with expectations and anticipations conveyed through digital cockpits.

When we learn something, for example some knowledge and how to apply it in certain tasks, complementarily we tend to learn the context of that learning. This learning of the context belongs to a higher logic-level compared to that associated to knowledge (Lave & Wenger, 2006). Countless definitions of the skill-learning experience bond the cognitive process to the learning context. The European Parliament identifies skills as a combination of knowledge, abilities and inclinations appropriated to the context (Regulation 2016). Other proposals similarly accentuate the aspects of emerging properties tightly related to the contexts [10] and emphasize the nature of a situated process (Trinchero, 2012), thus it would be appropriate to consider them within a social and time frame (Cantoni, 2014).

Similarly, the design of an education curriculum must ponder the learning taking place in both Formal and Non-Formal contexts (Da Re, 2013), on the grounds that the skills under evaluation cannot be isolated by the interactions within which they emerge (Cepollaro, 2008). The idea of skills as a result of a situated learning, indivisible from a social dimension which manifests in time and space, seems to have not yet pervaded the debate around the CoI framework, consequently, teachers, instructors and professors who are implementing the model in their educational environments, are probably lacking of evaluation tools designed to connect skills to *user experience*. On the other hand, the bond between emotions and the CoI environment has been increasingly investigated (Cleveland-Innes & Campbell, 2012; Majeski et al., 2018; Stenbom et al., 2016), but emotions and skill-learning are seldom a *passepartou* that ensures an easy access to the different values which frame the education systems in different cultures. On the contrary, it is always hazardous to de-contextualize from anthropological, historical and socio-economic circumstances. Thus, computer-based assessment environments cannot disregard "*a significant impact on individual performance and also highlighted differences in problem-solving strategies between countries*" (Nguyen et al., 2017, p. 704).

Indeed, Non-Formal and Informal aspects in education can be strongly related to the co-creation of knowledge, and the worldwide awareness of the learner-centered approach implies a generative dialogue also proceeding from the learners' backgrounds (Kaminskiene et al., 2020). Informal learning activities are also becoming a new paradigm in professional learning experience thus, teachers can test the construction of such a space in their own continuous professional development (Trust et al., 2016). The Informal and Non-Formal experiences are also a consequence of a permanent connection, which does not necessarily imply an activity to perform, but simply the fact of being there, connected and available, in a perpetual splitting-attention-state between multiple tasks (Vorderer et al., 2016). As Sun et al. remarks [2018, p. 249] "*understanding the affordances of each tool will help teachers to make informed decisions about which one(s) to use*".

3. THE LEARNING ECOSYSTEM

In the learning ecosystem adopted (Table 1), namely the one behind the e-surveys reported, the major drawback lays on the sharp separation between Formal and Informal *affordances*. It is the *Sapienza* University eLearning platform, a Moodle-based environment that instructor linked to the use of two

Table 1. Levels of potential involvement associated to the CoI Presences: *High, Medium, Low, U (Undetected)*. The last three tools on the right are out of teacher's direct control, being totally labelled as *Informal*, thus, they can be monitored only through an individual *qualitative interview.*

CoI Presences	Moodle Main Board	Moodle Forum	Moodle Collaborative Glossary	Moodle Multimedia Repository	Chat App	Mobile App #1	Mobile App #2
CP	M	H	H	M	M	H	H
SP	L	H	L	L	H	L	L
TP	H	M	M	L	U	U	U

external apps such as Kahoot plus another self-learning tool students picked up freely. The chat app included in the right box makes reference to WhatsApp, which is the most popular Instant Message service (IM) in Italy and is the favorite tool among young people also to create informal groups among students. It is not difficult to imagine the massive use of *emoticons* and/or *emojis* in students IM groups (Informal) while they are totally absent in the Moodle spaces (Formal).

It is good practice to look at common occurrences. For instance, instructors rarely assess the range of *emoticons* and/or *emojis* available in a certain IM tools or Social Network Sites (SNSs), or adopt it as a criterion to select a specific e-tool over another. Nevertheless, this is far from being a trivial detail when we recall that these set of pictographs are a key-indicator to monitor SP. The development of social role identity and engagement in a community (Garrison et al., 2004) in absence of paralinguistic information and body language (Garrison & Arbaugh, 2007) must be detected by other *communicative affordances*. From a different angle, *emoticons* and *emojis* are among those items useful for exposing the contrast between a mere interaction and a "presence" in a group cohesion. In fact, the plain interaction by itself does not imply that a learner is highly engaged in a process of inquiry according to the CoI framework (Garrison & Cleveland-Innes, 2005). Having clear learning objectives not detached by social needs assists the instructor in the basic course design. For instance, another observation made during the courses is that only a few students uploaded a personal image in their Moodle profile. While a profile picture is common on SNSs (informal) it is considered unnecessary in this environment (formal) to let your course-mates and teacher know who you are. Needless to say, in a CoI-based context all these *affordances* must contribute to boost SP and to follow up social interactions. By adopting a configuration of two or more e-tools, the context leads instructors and learners to use predetermined behavioral patterns. The *affordances* established in such a way may negatively impact perception and usability for all agents: administrators, instructors, and students.

4. DATA COLLECTION

During the 2020 pandemic outbreak, from March 8 Italy was sealed off, starting from the northern regions (*Lombardia, Emilia-Romagna, Liguria, Piemonte, Veneto* and *Friuli-Venezia Giulia*). From March 10 the measure was extended to the rest of the country. Students and their families lived in total isolation for almost 2 months. Schools and universities remained closed until September 2020, working only remotely. Taking into account holidays and other planned school interruptions, Italian students lost 65 days of regular schooling to combat covid-19 and also the 8th and 13th grade final exams were mostly performed online. This long disruption required an immediate massive switch to Emergency Remote Education (ERE), a fact that raised many concerns about teachers and students' performances.

Concerning the questionnaires, they were framed on open-ended, multiple choice and ordinal scale questions. The likert-scale items were ranged from 1 to 5 labelled as *Totally Disagree; Disagree; Neither Agree Nor Disagree; Agree; Strongly Agree*.

4.1 Questionnaire 2020 – 1st sem.

The first set of observations arise from an e-survey carried out in 2020 in *Sapienza University of Rome*, during the first academic sem., when the national lockdown was over but university students were not allowed to attend face-to-face yet. The 102 respondents were freshmen from two English as a Foreign Language (EFL) courses, where the author served as an English Lecturer. During the first sem. of 2020, all academic courses were delivered online through the *Sapienza* University Zoom application, other G-Suite tools and the Moodle based eLearning *Sapienza* platform. Students were asked to access the survey using their official *Sapienza* email and complete a survey of questions regarding their online experience.

The e-survey was framed on open-ended, multiple choice and likert-scale questions; 40 in total. The internal consistency was measured by Cronbach's Alpha, calculated on the 20 likert-scale items, returning an acceptable value of 0.822. The survey was conducted through a Google Form during the timeframe September/October 2020, corresponding to the first academic sem.. Leaving aside some marginal demographic responses, 35 questions are relevant to the present analysis. Only those including key-data are extracted and grouped according to the concepts discussed step by step.

4.2 Questionnaire 2021/22 - 1st sem.

The second survey was carried out in the first sem. of the academic year 2021/2022, during the September-October 2021 time span, involving a total of 235 students. A section of this survey was structured on some items borrowed by the Arbaugh's survey instrument (2007), in particular those items with the higher Cronbach's Alpha in terms of Social Presence (2007, pp. 77-78). Other items have been formulated to detect personal motivation or adjusted to the subject taught in the course, EFL. Indeed, the students' various degree of inhibition in English speaking represents a category out of the present work, but this data may introduce the old topic (too often neglected) of adjusting the CoI to the specific subject taught.

4.3 Questionnaire 2022 - 2nd sem.

This survey was proposed the very first day of three EFL courses in the Faculty of Economics at the beginning of the 2nd sem., and even though it presents some identical answers to the 2020 survey, it also introduces new items. This questionnaire includes 39 mixed method questions and the total number of respondents was 61. Apart from data associated to demographics and educational background, a total of 31 items are *ordinal likert scale questions*. The internal consistency of this set of 31 items was measured by Cronsbach's alpha, which returns an acceptable value of 0.872. The most relevant difference of this third survey is that during the second sem. of 2022 students were allowed to attend face to face or to attend remotely. Physical attendance was possible under the mandates of wearing a mask and access university facilities showing the digital vaccine certificate. Consequently, face-to-face attendance was a personal choice and a variable percentage (70-75%) of students kept on attending remotely. The most relevant data is the exposure period to ERE, which in this case is more than 4 months for 49,8% of students.

5. EXPOSURE TO ERE AND TO A FORMAL/INFORMAL AFFORDANCES

The importance of selecting a suitable tool, such a discussion forum to measure the level of students' engagement opens promising opportunities associated to automatic text-analysis (Farrow et al., 2020). The CoI suits the monitoring of interactions in a learning forum as the framework supports social knowledge construction. However, the object of the present investigation is not the breakdown of messages exchanged in the learning forum, but the learners' perception of this and other features across the pandemic period and the degree of effectiveness associated to *social affordances* and the subject learnt.

Table 2. Survey 2020, 1st sem. (n=102)

Item	Response	%
Did you experience online-learning before the 1st academic sem. of 2020?	Yes, for 3 months	34,4
	Yes, for 4 months	23,5
	No	17,6
	Yes, for more than 4 months	12,7
	Yes, for 2 months	6,9
	Yes, for 1 month	3,9
	Only for an exam	1
Did you use a Forum to practice English prior to attending this course?	Never	78,4
	Once	14,7
	More than once	7,8

In 2020 a significative 78,4% of students had never used a forum for learning tasks before, nevertheless, this tool was welcomed and they were rapidly trained on the rules and *netiquette* for the sharing of posts and comments. Responses to ERE makes explicit reference to the 2020 Italian lockdown, when the whole education sector was obliged to move online. The inhomogeneous responses are due to the fact that Italian Regions were entitled to partially modify the lockdown restrictions according to local needs and situations, so the consistency of the ERE was not always uniform. Notwithstanding a high percentage of respondents had never used a forum for e-learning purposes, in subsequent replies they declare to be at ease with the functionalities of the Moodle e-learning space configured by the instructor within the *Sapienza* platform. Therefore, despite the fact that the forum was an unknown learning tool for most of the students, this scenario should not be a drawback for instructors, since skills and confidence in using an e-learning tool are not the consequential results of the total hours of previous practice (Sun et al., 2018). On the other hand, the forum is not perceived as a complex tool to be used, whilst the quality of student's interactions through this medium is a totally different matter.

Table 3. Survey 2021/22, 1st sem. (n=235)

Item	Response	%
Did you experience online-learning before the 1st academic sem. of 2022?	Yes, for more than 4 months	49,8
	No	11,5
	Yes, for 3 months	10,6
	Yes, for 1 month	8,9
	Yes, for 2 months	8,9
	Yes, for 4 months	6
	Only for an exam	4,3
Did you use a Forum to practice English prior to attending this course?	Never	74,4
	Once	17,4
	More than once	8

Table 4. Survey 2021/22, 2nd sem. (n=61)

Item	Response	%
Did you experience online-learning before the 2nd academic sem. of 2022?	Yes, for more than 4 months	72,9
	Yes, for 2 months	8,5
	Yes, for 3 months	6,8
	Yes, for 4 months	6,8
	No	3,4
	Yes, for 1 month	1,7
Did you use a Forum to practice English prior to attending this course?	Never	55,7
	Once	26,2
	More than once	11

While the % of those students unfamiliar with a learning forum decreased across the two years from 74,8 to 55,7, in order to monitor the perceived *social affordance* of this tools it is necessary to go in depth into social-related behavioral attitudes.

In 2020, while students declared that the ERE were not dramatically changing their learning habits, the majority complained about the interruption of face-to-face interactions with their peers (60,8%) and with the teacher (54,9%). Socialization was perceived as a motivating factor and was informally carried out in student's groups on IM services; mainly on WhatsApp. At a first glance, this shows that the formal e-learning space configured by the instructor did not match students' demand for social interactions and did not enhance their informal community. As is known, the favorable conditions for the CoI to allow SP to flourish, in other words encourage a *degree of reciprocity to make learners feel socially and emotionally connected with others in an online environment* (Cleveland-Innes & Campbell, 2012). Consequently, the structural relationships of the SP elements, *Affective Expression*, *Open Communication* and *Group Cohesion* (S. Stenbom, 2018) were not properly activated during the formal activities of the course.

The set of items shown in Tables 5 and 6 aimed at detecting the psychological impact of being forced to switch to ERE.

Table 5. Survey 2020, 2nd sem. (n=102)

Item	Mean	SD
I miss the opportunity to socialize with other students face-to-face	3.735	1.143
I miss sharing my learning experiences with other students face-to-face	3.676	1.212
I miss the face-to-face exchange of notes, materials & resources with other students	3.520	1.212
I miss interacting with the teacher face-to-face	3.569	1.095

Table 6. Items related to *Usability* and *Learning Autonomy*

Item	Mean	SD
The autonomy that Remote Learning offers to students is a great advantage	3.471	1.114
The eLearning *Sapienza* platform is easy to use	3.775	0.994
The Forum is useful to improve my English skills	3.578	0.978

Only the items focused on tools show a lower SD, whilst those linked to social elements show a wider variance. This feedback is aligned to the general unsetting situation generated by covid-19 containment measures which affected university as every other social activity.

At the beginning of the first sem. of 2022, when face-to-face attendance was permitted under the vaccine mandate, this group of respondents were asked about the way they planned to attend lessons during the whole sem.: blended 58,7%, only remotely 22,5%, face-to-face 18,7. The blended mode implied that students themselves could decide when to go face-to-face and when to attend remotely, as professors gave lessons from digitalized classrooms in both modalities. After two years, SD tends to decrease but it is still far from clustering around the mean.

The need to socialize seems to be downsized after two years, but the variance is still remarkable.

A CoI should have the property of being reflective and interactive in order to foster appropriate adjustments leading to higher-order learning outcomes within a collaborative network. (Garrison et al., 2004). A multiple-choice question asked the respondents to provide suggestions to improve the course design (this task engages the CP), but surprisingly preferences did not favor synchronous solutions.

Most students selected proposals for asynchronous study and self-paced learning, such as *lessons recorded in video formats* and *pdf summarizing lesson contents*. So, on one hand students claim that the lack of social interactions affects their learning experience, but on the other hand, they are in favor of asynchronous learning solutions. In this context, this incongruence may suggest that social needs might correspond to a more common feeling of being part of a community. In fact, another multiple-choice question asked if students had created a specific group via IM apps for the English course they were attending, but 27,5% answered no; 28,4% answered that it was not necessary since they

Table 7. Item The autonomy that Remote Learning offers to students is a great advantage

Survey	Mean	SD
2020 - 1st sem. (n=102)	3.471	1.114
2022 - 1st sem. (n=235)	3.911	0,985
2022 - 2nd sem. (n=61)	3.984	1.118

Table 8. Item I miss the opportunity to socialize with other students face-to-face

Survey	Mean	SD
2020 - 1st sem. (n=102)	3.735	1.143
2022 - 2nd sem. (n=61)	2.590	1.283

Table 9. First survey (2020)

Item	Response	%
Besides the Forum, what tool do you think may enhance this online course? (multiple-choice possible)	Pdf resuming lesson contents	65,7
	Recorded video lessons	60,8
	Chat active during lessons	40,2
	Distance work-groups (out of lesson timetable)	24,5
	Recorded podcast lessons	17,6
	Chat accessible 24/24	12,7

kept on using the IM groups already in place; eventually a 43,1% replied they did not know anything about a new group. The avoidance of setting up a new IM subgroup may reveal the students' strategy to keep ties and continuity within the existing online community previously built up with their peers through familiar IM services and SNSs. This aspect suggests that the formal environment designed by the instructor should be merged with IM solutions aimed to allow informal interactions, leaving aside formal tasks and evaluations. For instance, the use of WhatsApp for educational purposes in a variety of contexts has been widely researched, but a more extensive adoption of this IM solution within Formal education is being affected by common *biases* among educators (Coleman & O'Connor, 2019). On the other hand, without a direct instructor's incentive, standardized informal interactions may neither change nor generate new social spaces spontaneously. In fact, as the next multiple-choice question reveals, students' IM groups are seldom built up through structured interactions.

Students did not feel that was necessary to open a new IM group as well as upload their personal picture to customize their Moodle profile (which was opened just to attend the English course). These specific actions fall into the range of possible behaviors expressed by self-regulation in blended learning environments (Van Laer & Elen, 2017). Nowadays, it is plain to all education professionals that formal learning experiences are braced also by informal dynamics.

According to the CoI framework, SP is indicated by three subcategories: *affective expression*, *open communication*, *group cohesion*. TP is indicated by three subcategories: *design and organization*, *facilitation of discourse*, *direct instruction*. CP is identified by four subcategories: *triggering events*, *exploration*, *integration*, *resolution* (Anderson et al., 2001; Garrison, 2009; Garrison et al., 1999, 2010). Needless to say, if TP does not favor *group cohesion* within the Formal timetable harmonizing the principles of SP and CP it will not be capable to incubate a good exchange among the three dimensions. Not enough exploration has been carried out of the connection between formal, non-formal and informal learning (Greenhow & Lewin, 2016). A stronger focus on these dynamics is needed since the progressive adoption of MOOCs, SNSs, learning apps and other e-learning methodologies is blurring the border between institutional education and learners' personal sphere, making the traditional dichotomy between formal and informal learning increasingly fuzzy (Dabbagh & Kitsantas, 2012; Greenhow & Lewin, 2016; Madge et al., 2009). Therefore, users' perspective of the e-learning context is already expanding outside the formal setting (school and university) and starts including communication as integral part of the learning experience (Al-Aufi & Fulton, 2015).

5.1 Emotional Traits

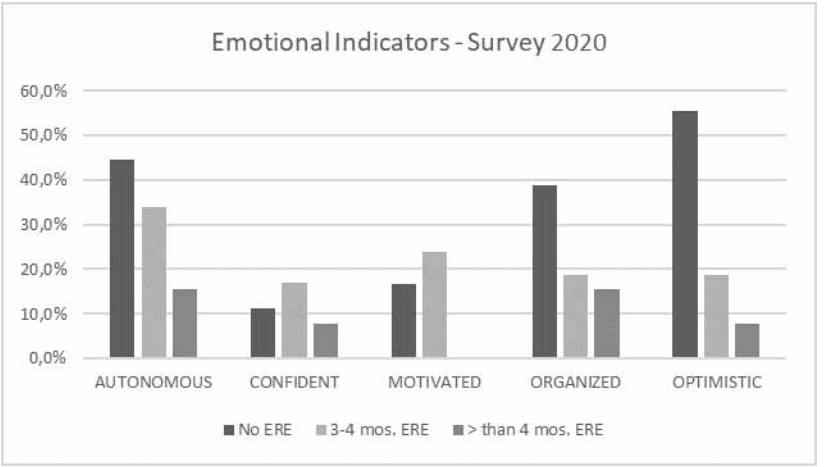
In 2020, respondents were asked to choose three adjectives, from a list of 18, to define their emotional state. When we relate these responses with the exposure period to ERE a declining trend of the positive emotional lexicon emerges. The survey item *I had experienced remote education before 2020* required to choose among 7 options: *No; 1 month; 2 months; 3 months; 4 months; more than 4 months; I only gave exams remotely*.

The most statistically relevant responses were sorted in three groups: No ERE; 3 and 4 months of exposure to ERE; more than 4 months of exposure to ERE.

Table 10. First survey (2020)

Item	Response	%
If you are a member of a social media group of students, how did you get to know it? (multiple-choice possible)	Informally; I've heard of it from friends or other students	84,3
	Chatting out of the classrooms, university's premises	14,7
	I received an invitation from the students' representative	10,8
	A notice on the University bulletin boards	2,9
	A teacher's mediation	2

Figure 2. Most representative emotional indicators from the 2020 survey. The adjectives were sorted according to the first one chosen



The longer the exposure to ERE the weaker the feelings of autonomy, confidence and organization become. In particular, the adjective *motivated* is not chosen anymore after 4 months of ERE. The shift from a passive classroom experience to more active interactions, according to the CoI principles, demands independence, self-directed attitude and learning-to-learn desire (Garrison et al., 2004). Indeed, it is unlikely that learners may activate this learning vision without a proper motivation (Linnenbrink-Garcia et al., 2016).

In order to explore a basic correlation between motivation and self-directed attitude, a specific group of responses may be chosen to form an independent variable. The item asking to select *the main element of an effective Remote Learning* offered a range of ready answers; the last option was open to add personal answers.

The grouping of responses oriented to a higher perception of self-regulated learning such as *my method of study* (12,1%) and *the interaction between digital tools and my method of study* (7,1%) come precisely from those students longer exposed to ERE.

Both surveys show a partial role assigned to digital tools as mere instruments. After two years of alternate cohabitation with ERE, the % of students who never used a forum is still remarkable: 78,4% in 2020 and 74,7% in 2022. This data is totally in line with those scholars observing how the switch from face-to-face learn to ERE has not been influencing teaching styles and ID in a significative way. But what is more decisive in the present work is the attitude this block of students displays towards socialization through digital media.

Table 11. Survey 2020, 1st sem.. Item The main element of an effective Remote Learning

Response	%
the teacher	41,4
the interaction between the teacher and the digital tools	21,2
my method of study	12,1
the interaction between digital tools and my method of study	7,1
the digital tools	6,1
the interaction between digital tools and the group of students	5,1

Table 12. Survey 2022, 2nd sem. (n=61). Item The main element of an effective Remote Learning

Response	%
the teacher	44,8
the interaction between the teacher and the digital tools	20,7
my method of study	8,6
the interaction between digital tools and my method of study	8,6
the digital tools	6,9
the interaction between digital tools and the group of students	5,2

5.2 Social Traits

A relevant block of questions in the 2020 and 2021/22-2nd sem. survey reveals the surfacing of habits related to a higher degree of learning autonomy. Concerning which SNS and/or IM service were used by respondents (multiple choices were possible) the results show a remarkable decrease of SNSs and an increase of IM apps (WhatsApp and Telegram). This may reflect the emerging need for an *informal synchronous social immediacy* among peers, as a consequence of restrictions and limitations due to covid-19 mandates.

The need for immediacy may also be linked to the higher level of independence granted by mobile devices to access content and even to follow synchronous Zoom lessons. Given that the increase popularity of IM apps is also linked to more flexible e-learning contents, it is possible to associate that trend to a growth in the use of mobile and portable devices, and a sharp-edge upturn in the perception of learner autonomy as the next tables shows.

By confronting the mean of six selected questions from 2020 and 2021/22-2nd sem., it is possible to weight the contraction of those elements related to social immediacy and the growth of the learner autonomy attitude.

Figure 3. Chart showing use of SNSs and IMSs according to 2020 and 2022 surveys

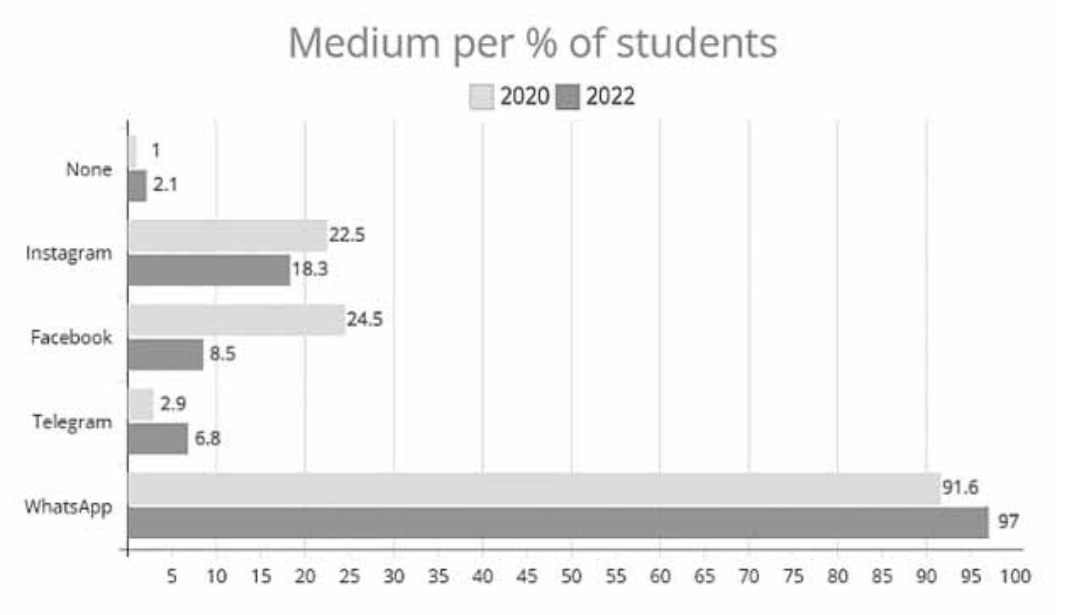


Table 13. Devices used by respondents to attend the course lessons remotely. Surveys 2020 and 2022

Item		% 2020	% 2022
I followed the remote course activities mainly by:	Desktop Computer	26,5	16,4
	Laptop	71,6	75,4
	Tablet	10,8	13,1
	Smartphone	11,8	18

Table 14. Comparison of means from surveys taken in 2020, 1st sem. and 2022, 2nd sem

Items	Mean 2020	Mean 2022
Digital remote learning is more effective than face-to-face learning	2.451	2.639
I miss the opportunity to share my learning experience with other students face-to-face	3.676	2.590
I miss the face-to-face exchange of notes, course materials/resources with other students	3.520	2.656
I miss the face-to-face interaction with the teacher	3.569	2.639
I miss the motivation that a face-to-face classroom group can give me	2.863	2.377
The autonomy that remote learning can offer to students is a great advantage	3.471	3.984

Table 15. Survey 2022, 1st sem

Items	Mean	SD
Socializing during a course increase my motivation to study	3.528	1.027
By getting to know other classmates help me feeling a member of the learners' group	3.604	1.022
I need to get an idea about other course mates' personalities	2.574	1.003
Communicating online or by a web tool is an excellent way to increase social interactions	3.136	1.049
I feel comfortable communicating through a digital tool	3.013	1.064
I feel comfortable communicating in English face-to-face in the classroom	2.553	1.078

Socialization is defined as the process allowing an individual to learn the characteristics of his/her group and the adjustments required to meet group values through appropriate actions (Garrison et al., 2004). In the set of items above, the lowest SD (1.003) is expressed by a statement that conflicts with the pillars of SP, when respondents indicate their low interest in getting an idea of other course mates' personalities. The development of online community demands intentional self-disclosure and a re-attunement of learners' identity into the new dynamics proposed by the environment. As already mentioned, a behavioral trait of these samples was characterized by two online patterns showing a social distancing attitude: keeping the webcam off during Zoom synchronous sessions and not customizing the Moodle profile with a personal picture. This low development of trust may affect learners' engagement and make difficult feeling part of the class community.

6. DISCUSSION

Data shows that after two years of covid-19 pandemic, this samples of Italian university students relate less on face-to-face social interactions to define their learning needs, still value the teacher's role and show an increasing level of cognitive independence through digital media. Surveys manifest a growth in the use of IM services and a significative decrease of social and cognitive immediacy linked to synchronous learning habits. This behavior may be a sign of how informal synchronicity related to peer-socialization and formal cognitive asynchronicity are two modes students prefer to keep well detached. Other items back up this tendency when respondents express their preference for asynchronous tasks and downsize their social needs during the learning experience. Being TP excluded from course-related informal exchanges, a wider range of *social affordances* should be integrated in the ID, in order to give students the opportunity to explore semi-formal environments where they can also share informal communication. Indeed, TP may operate far more in asynchronous ways than synchronous, through feedback, direct emails and forum, so a chat-room which is moderated by the instructor should not differ much (in terms of perceptions) from the interactions within a forum. Notwithstanding these assumptions, the inhibitions created by the presence of the instructor should be examined.

The exposure to ERE is one of the most significative differences among the two samples from 2020 and 2022: only 12,7% of students surveyed in 2020 had experienced ERE for longer than 4 months; whilst this value goes up to 49,8% in 2022. This parameter seems to indicate that when remote learning is prolonged over a certain period, it may induce remarkable changes in the cognitive self, behavioral and learning habits accordingly.

Our results align to what has been stated by a circle of scholars who, after investigating the CoI, considered SP to be an overestimated dimension in a successful e-learning journey. Annand (Annand, 2011) raised an issue priorly examined also by Shea and Bidjerano (Shea & Bidjerano, 2010), who identified the "individual learner role" as the area more open to further improvements to expand the CoI. As our surveys show, students may assign a moderate importance to the *projection of their personalities in the e-learning space* and may not consider the knowing-each-other aspect as particularly relevant to a learning success.

In such a context, ID should increasingly support e-learning scenarios through the spectrum of metacognition, personal motivation and individual study methods. All these elements represent *the interface between learner motivation and cognition* (Shea & Bidjerano, 2010), namely a variety of indicators that are not identified by the collective dimension of SP (Arbaugh, 2007; Garrison, 2009; Rourke et al., 1999).

UX may be relevant to the three CoI Presences since it is directly related to the benefits of choosing the most appropriate platform, tool or media, but is not yet object of deep investigation, while Presences are most commonly framed within psychological and behavioral patterns. Similarly, Weidlich & Bastiaens (2019) report a gap in the literature on e-learning on which characteristics and qualities of learning environments favour social presence and other socio-emotional variables, leaving aside UX.

7. CONCLUSION

According to our inquiry, after 2 years of covid-19 restrictions the most significative findings are the following:

- Student's self-regulated habits are affected significantly after 4 months exposure to ERE.
- Students downsize the role of social interactions within formal learning.
- Forum as a teaching/learning tool is not yet frequently adopted by instructors and teachers.

- There is an increasing preference for IM apps and mobile devices alongside formal learning settings, but if these apps and devices are not integrated within the formal setting they became students' parallel channels.
- Some of the major SNSs are becoming less popular among university students.
- The CoI applied to ID may favor the monitoring of social and cognitive aspects in relation to the course design and the specific *features* chosen by the instructor.

As future perspective to implement ID based on the CoI principles, UX may be adopted as a situated learning approach to examine the three Presences in a set of coexisting and coextensive set of *features* specifically oriented to SP, CP and TP. It would be advisable to explore an "affordance model" to study the CoI implementation from and within every single *feature* of a certain *user interface*. For instance, the CoI framework could be assessed when a specific software or application is implemented in a course, according to the *functionalities* of that specific medium.

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