

Participatory approaches to Learning Design: the gap between theory and practice

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Abstract. The 4Cs framework, concerning self-regulated professional learning in knowledge intensive domains, is the lens through which participatory practices in learning design are investigated in this paper. The framework identifies four types of participatory behaviours: Consuming, Creating, Connecting and Contributing. A survey involving 117 Italian practicing teachers reveals that they regard all the 4Cs as important, but self-reported behaviours do not align with such beliefs. This misalignment is most significant for Connecting and Contributing behaviours (herein called altruistic behaviours). As for Consuming and Creating (individualistic behaviours), the former is rather scant while the latter is the most practiced, despite a wealth of research addressing the need to make Learning Designs reusable. Besides, the majority of the interviewees do not know the most well-known learning design tools produced by academic research. These data reveal limited impact of learning design research and indicate the way ahead for promoting teachers' participatory practices.

Keywords: Self-Regulated Professional Learning; Learning Design, Technology Enhanced Learning, teachers' beliefs; teachers' behaviours, 4Cs framework.

1 Introduction

Learning Design (LD), also called Design for Learning (for a discussion of this dual terminology see [1]), is the decision-making process through which educational interventions are designed, from early conceptualisation through to development, including choices made during enactment [2]. Learning designers are sometimes individual teachers, but they can also be teams engaged in a collaborative endeavour ([2], [3], [4]). There are many reasons why, for about two decades, LD has attracted the attention of scholars. In the first place, the evolution and the ever-increasing penetration of technology are posing continuous challenges to teachers, offering new opportunities that are not easy to take advantage of. There is therefore a need to support teachers in the design choices concerning their teaching/learning interventions and the resources thereof, with particular attention to the way technology can be integrated in the learning process. Secondly, although research in this field is deeply

rooted in the solid results of Instructional Design (ID) research [5], impact on teachers' daily work of ID research is rather scant. In fact, in the last century, ID research has produced methods and systems to support the systematic development of complex training systems, while less attention has been devoted to the school context, where teachers have neither the resources nor the time necessary to implement complex approaches or create teaching resources based on cutting-edge technological tools. The LD research sector has therefore focused on the methods [6] [7] and tools [8] that can facilitate the task of designing smaller-scale training interventions (e.g., a series of lessons addressing a class of students) by trying to alleviate teachers' problems related to the difficulties of making pedagogically informed decisions about how to integrate technology in classroom teaching. Such problems go hand in hand with the need to keep up to date on technological and pedagogical aspects concerning Technology Enhanced Learning (TEL).

Coherently with this objective, besides investigations in the above-mentioned methods and tools, research in LD has also devoted much attention to teacher professional development in LD [9] [4]. Rather than short-term, face-to-face or online formal training interventions, many advocate the need to promote long-term, participatory, self-regulated approaches aiming to promote life-long development of teachers' professionalism [10] [11] [12]. The main advantages of this kind of approach lie in its ability to intertwine strictly with work practice and thus have an immediate and effective impact, while allowing teachers to cope with the fast development pace of the field. As it is already happening in other professional sectors, the key idea is that the formation of new skills and abilities can take place more easily and effectively through interaction and collaboration with colleagues and experts, in order to build professional competence on one another's shoulders. It is for this reason that many of the studies on LD have concerned the development of effective representation methods and formalisms for the output of the LD process [11], often called Learning Designs (LDs), and the creation of systems to facilitate the various phases of the LD process: the conception, planning, implementation, sharing and reuse of LDs [13]. Representation formalisms for LDs are a necessary, though not sufficient, condition for developing a participatory culture of LD [14] [15], one where teachers reuse colleagues' powerful design ideas and share their own. Representations make the product of the LD process explicit, easy to understand and better formalized. Participatory approaches require teachers not only to share their successful LDs, but also half-fabricates, failures, and ideas in the embryonic stage. Therefore, systems to support LD often aim to facilitate the creation, storage, and sharing of LDs, to make them easily retrievable and reusable. These systems are believed to be important enablers for the participatory culture of LD advocated by many researchers [16]. Such a culture is in line with the principles of self-regulated professional learning and relies on teachers and designers actively taking part into communities of practice [17] [18].

In light of the above considerations, many training initiatives intended to develop LD competence of teachers also aim to promote such participatory practices, an approach that, by leveraging on the self-regulation skills of individuals [19], promises to be sustainable and in line with the way professionals learn in many other knowledge-intensive fields. However, to the best of our knowledge, it is unclear whether teachers are really embracing this culture, and to what extent. Several research endeavours have been devoted to creating the conditions to disseminate such

a culture [20] [4] [21] [22], but many researchers have voiced the failure of these efforts, at least on a large scale [23] [24] [1].

This study aims to shed light on this aspect. Specifically, it intends to understand whether teachers believe in the importance of a participatory culture of LD and to what extent their behaviours are aligned with such culture. To this purpose, we used the 4Cs framework for self-regulation in professional learning proposed by Milligan and colleagues [25]. This framework describes the ways in which professional development takes place within communities of professionals under the dual push of the demands of their jobs, on the one hand, and the evolution of information and communication technologies, on the other. The influence of technologies is particularly strong in knowledge intensive sectors, such as teaching, because technological development is also changing professional practices and consequently the skills needed to carry out these professions effectively. The role of self-regulated learning in this field is therefore of paramount importance [26]. According to the 4Cs framework, self-regulated professional learning is based on participatory logics, thus aligning with the literature on LD [27] [28] [14]. Specifically, the framework identifies four types of behaviours typical of self-regulated professional learning:

- Consume, representing the consumption (or re-use) of knowledge and resources produced by others;
- Create, representing the creation of new knowledge, i.e. the elaboration of new ideas/concepts and theories from scratch or the re-elaboration of already available knowledge;
- Connect, concerning the confrontation with colleagues through networks that allow the sharing of ideas and resources;
- Contribute, concerning contributing to collective knowledge by making the new knowledge developed available.

This study applies the 4Cs framework [25] [29] to the professional development of teachers in the field of LD with the aim of investigating beliefs and behaviours of Italian teachers with regard to the 4Cs. Specifically, the research questions addressed are the following: are teachers aware of the importance of the 4C behaviours for their professional development concerning LD? Are the 4Cs behaviours put into practice in teachers' professional development in LD? The study also investigates whether teachers are aware of the technological tools produced by LD research and if they try to integrate technology in their teaching since the design phase.

2 Method

The study included an initial exploratory phase, which consisted of a focus group with 7 volunteers (6 teachers and 1 school manager, all Italian), who were invited to contribute their opinion on the applicability of the framework to teachers' in-service professional development, on the importance of the 4Cs, on the extent to which they themselves practice them and the possible reasons why they do not practice them. This exploratory phase was qualitative in nature and informed the subsequent, quantitative phase, that we will call the main phase. The main phase of investigation was carried out through a survey filled in by 117 teachers in service in Italian schools

to verify which self-regulated behaviours they practice (actual behaviour) with reference to the 4C framework and to what extent they consider them relevant (perceived importance). Additionally, the survey investigated their awareness and use of LD tools to plan TEL. The survey was developed specifically for this study.

2.1 The exploratory phase

In the exploratory phase, after a presentation of the 4Cs framework, teachers participating in the Focus Group were prompted to discuss the framework relevance and applicability to the case of teachers' self-regulated professional learning, the importance of each of the 4Cs in teachers' self-regulated learning and the extent they practice them. At the end of the discussion, each of them was invited to rate importance and practice on a scale from 1 (very little) to 5 (a lot). As the discussion shed light on a difference between importance and practice, they were also invited to elaborate on the reasons for this difference.

2.2 The main phase

Data for the main phase were collected using a survey which included 8 sections for a total of 42 items: a first section investigating profiling information; a second section investigating perceived importance and actual practice for the Consume behaviours (items 1-10), a third section on the Create behaviours (items 11-14), a fourth section on the Connect behaviours (items 15-28), and a fifth on the Contribute behaviours (items 29-38). A sixth section on Importance of the 4C behaviour contained 4 items, one for each of the Cs. All items asked to rate a statement on a 5-point Likert-type scale (1 = completely disagree; 5 = fully agree). A seventh section investigated which LD tools were known to the respondents. In this section respondents were asked if they knew seven academically well-known LD tools and, in case of positive answer, if they used them. This section also included an open-ended question asking whether they knew any other LD tool. The final section of the survey prompted respondents to rate on a 5-point Likert-type scale (1 = completely disagree; 5 = fully agree) their agreement with a single item ("When I design a new lesson, I try to integrate ICT in my design") followed by the open ended question ("Why?").

The survey structure and items examples are reported in Table 1. The sample included 117 teachers (26 males, 91 females, age = 48.70 ± 6.81) of every order and grade of the Italian school, enrolled in in-service training courses on the use of educational technology. The survey was filled in before the training, to provide an unbiased snapshot of their beliefs.

All participants in the study signed a consent form allowing the researchers to use the anonymised study results for research purposes.

Table 1. Questionnaire structure with item examples.

Section	Content	Example item
Section 1	Profiling information	Age, Gender, School level, Years of experience, etc
Section 2	Consume behaviours	When I have to design a new lesson, I generally search for ideas in online repositories (1=completely disagree; 5=fully agree)
Section 3	Create behaviours	When I have to design a new lesson, I do it on my own, starting from scratch (1=completely disagree; 5=fully agree)
Section 4	Connect behaviours	When I have to design a new lesson, I discuss possible ideas with my colleagues online (1=completely disagree; 5=fully agree)
Section 5	Contribute behaviours	When I am happy about a new lesson I have designed, I share it with colleagues through online repositories (1=completely disagree; 5=fully agree)
Section 6	Beliefs about the importance of the 4Cs	(Connect) In the teaching profession, it is important to discuss lesson plans with colleagues (1=disagree;5=fully agree)
Section 7	LD tools familiarity	Tool name (I know it / I don't know it; I use it
Section 8	Intention to include ICT in learning designs	(single item) When I design a new lesson, I try to integrate ICT in my design

3 Results

3.1 Exploratory phase results

During the Focus Group discussion, participants agreed that the 4Cs framework is relevant and applicable to the case of teachers' professional development (in a Likert scale from 1 to 5, where 1 = "not at all" and 5 = "completely", $M = 4.5$; $DS = .84$). Participants motivated the answers in a variety of ways, but mostly agreed in claiming that "this framework can counterbalance the present, dominant culture, which tends to be self-referential".

All the 4Cs of the framework were regarded as important/useful, and the final ratings provided by participants attributed importance, most of all, to "Contribute" ($M = 4.71$, $SD = 0.49$), then "Connect" ($M = 4.64$, $SD = .48$), "Consume" ($M = 4.43$, $SD = .53$) and "Create" ($M = 4.29$, $SD = .76$). When talking about their own practice,

however, participants indicated “Consume” as the most practiced ($M = 4.36$, $SD = .75$), then “Create” ($M = 3.86$; $SD=1.07$); “Connect” ($M = 3.79$, $SD = .81$) and “Contribute” ($M = 3.21$, $SD = .91$).

These rankings reveal that perceived importance and actual behaviour were almost inversely related (fig. 1). In other words, a paradox emerged: in the opinions of the focus group participants, the behaviours perceived as most important were also those that were less practiced (e.g. Contribute). This finding guided the design and analysis of the subsequent phase.

As for the barriers preventing participatory practices in LD in Italian schools, 4 Focus Group participants out of 7 indicated the lack of a sense of community on the side of teachers, and the lack of digital skills. Three participants mentioned the lack of a participatory culture and technological infrastructures. Finally, a few participants reported scarce motivation of the teachers, which is partly, but significantly, determined by the scarcity of professional and economic incentives. Age issues were also mentioned, meaning that Italian teachers were regarded as too old, on average, to be able to embrace such a model of professional development, so different from the traditional one. Last but not least, they also attributed the responsibility to the spread, in Italian schools, of a competitive attitude, deriving from misleading productive and business logics applied to the school context, which hinders collaboration and sharing among teachers.

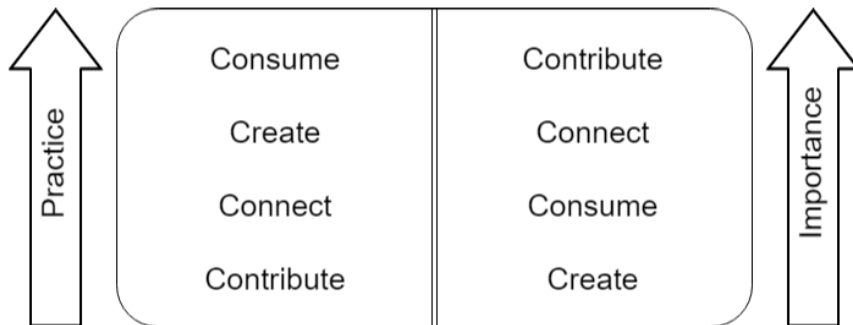


Fig.1 Practice versus Importance in the opinions of Focus Group participants

3.2 Main phase results

The results of the survey substantially confirm those of the exploratory phase, with some differences.

With reference to Consume practices, the interviewees reported mostly using both paper sources ($M = 3.40$, 95% CI [3.21, 3.59]) and the Internet ($M = 3.34$, 95% CI [3.16, 3.53]), and to a lesser extent online archives ($M = 2.68$, 95% CI [2.48, 2.87]); they use ideas that come from training courses ($M = 3.09$, 95% CI [2.91, 3.28]); when asking colleagues for design ideas, they mostly ask teachers in the same disciplinary sector ($M = 2.91$, 95% CI [2.72, 3.09]). Regarding Create, the interviewees reported

frequently starting from scratch ($M = 3.35$, 95% CI [3.15, 3.55]) but, even more frequently, improving and adapting existing LDs to a new context ($M = 4.51$, 95% CI [4.35, 4.66]). Regarding Connect, the interviewees reported discussing their design ideas with colleagues mainly face-to-face ($M = 3.44$, 95% CI [3.25, 3.63]), and most often with colleagues teaching the same subjects ($M = 3.42$, 95% CI [3.22, 3.62]). They also reported an average degree of information about their colleagues' LDs ($M = 3.09$, 95% CI [2.87, 3.31]), and an average degree of difficulty in getting information about colleagues' LDs ($M = 2.85$, 95% CI [2.61, 3.10]). Finally, with respect to Contribute, interviewees reported sharing their projects mainly face-to-face ($M = 3.53$, 95% CI [3.34, 3.71]), and mainly with colleagues from the same school ($M = 3.06$, 95% CI [2.85, 3.28]) and teaching the same subjects ($M = 3.39$, 95% CI [3.18, 3.60]).

The data of fig. 2 present a comparison between perceived importance and actual practice for each 4Cs behaviour.

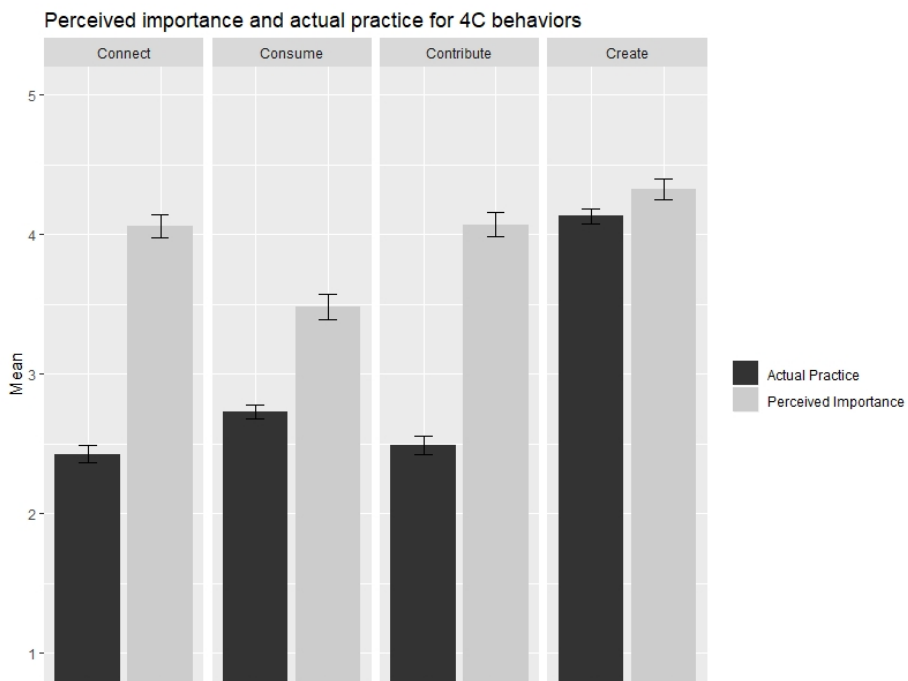


Fig. 2. Means and 95% confidence intervals for perceived importance and reported actual practice for each 4C behaviour.

When considering reported behaviour, Consume has an average of 2.73 [2.61, 2.85]; Create of 4.13, [4.01, 4.24]; Connect of 2.42 [2.30, 2.55], and Contribute of 2.49 [2.36, 2.61]. Except for the difference between Contribute and Connect ($p = .894$), all comparisons are significant ($p = .026$ for the difference between Contribute and Consume, $p < .001$ for all other comparisons).

For perceived importance, Consume has an average of 3.48 [3.32, 3.65]; Create

of 4.32 [4.16, 4.49]; Connect of 4.06 [3.90, 4.23]; Contribute of 4.07 [3.90, 4.23]. Comparisons are significant when comparing Consume with Connect ($p < .001$), Contribute ($p < .001$), and Create ($p < .001$). All other comparisons are non-significant (p ranging .121-1.000).

Responses to section 7 of the questionnaire show that relatively few participants know a Learning Design tool: specifically, only 16 (13.68%) know Web Collage [30], 1 (0.85%) knows ILDE [31], 10 (8.55%) know the Learning Designer [27], 2 (1.71%) know Compendium LD [32], and 1 (0.85%) knows LAMS [33]. All participants reported not using any of the LD tools mentioned in the survey. To the open-ended question asking which LD tools they use, most participants reported using tools (e.g. PowerPoint) that are not specifically tailored for LD.

Regarding responses to section 8 (intention to integrate ICT use in their learning designs), participants generally reported a positive intention (see Fig. 3; $M = 3.44$, $SD = 1.13$). The average response was significantly above the mid-point of the scale ($t(114) = 4.20$, $p < .001$).

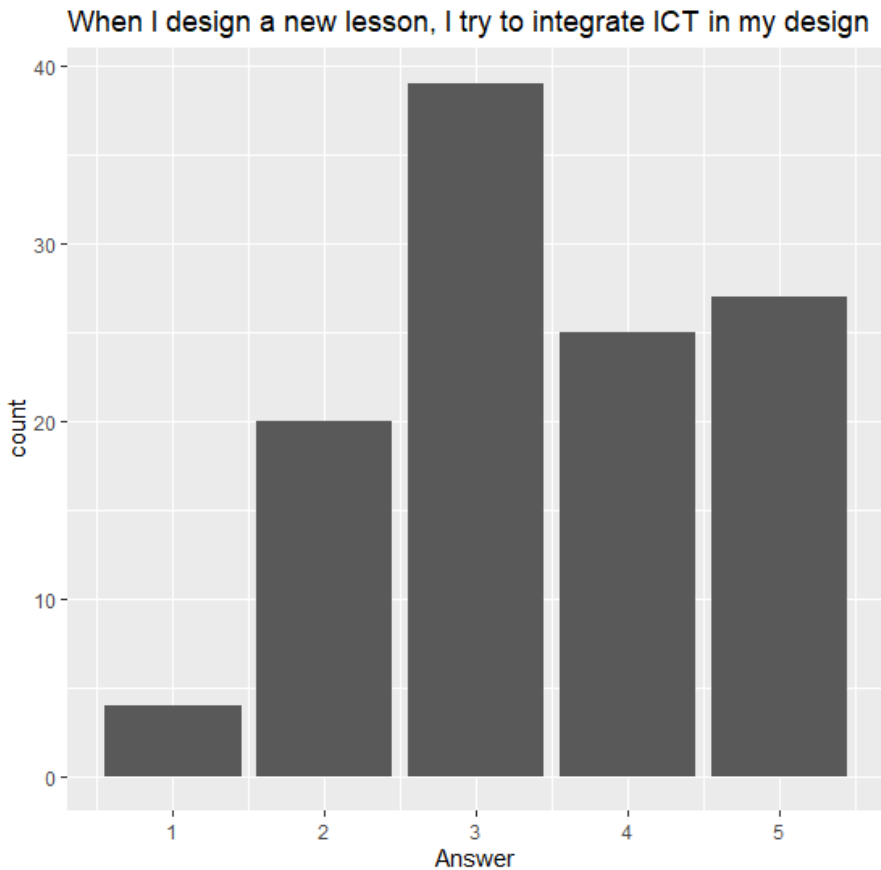


Fig. 3. Barplot for the intention to integrate ICT in learning designs.

The reasons why respondents try (or don't try) to integrate ICT in their learning designs were investigated through an open-ended question. Responses were analysed using open coding, which identified some common reasons for using ICT. Specifically, 29 (24.79%) participants reported including ICTs because they deem them motivating for students, 18 (15.38%) because they believe they are effective teaching tools, 14 (11.97%) because they find them useful, 6 (5.13%) because they find they can improve teaching methodology, and 5 (4.27%) because they believe they promote active learning. All other reasons were reported by less than 3% of participants. Reasons cited for *not* integrating ICTs in their designs include lack of available technology, reported by 7 participants (5.98%) and perceived lack of competence on their part, reported by 5 participants (4.27%). All other reasons were reported by less than 3% of participants.

4 Discussion

The results of the main phase of the study partially confirm the results of the exploratory phase. No significant difference was detected for perceived importance of the 4Cs behaviours, with the exception of Consuming, which was reported as the least important (while in the exploratory phase it was ranked second-to-last). This datum is not in line with the theory of LD, according to which the ability to reuse colleagues' designs is regarded as an essential skill for professional teachers [24]. Regarding actual behaviour, the most practiced is Creating, followed by Consuming, and with Connecting and Contributing ranking last. In the exploratory phase, Consuming was ranked first, followed by Creating, then, Connecting and, lastly, Contributing. The rankings are therefore very similar between the two phases, but not identical; with teachers taking part to the survey reporting practicing much more Creation than teachers participating to the focus group. Both groups agree on Consuming being relatively less important and Contributing and Connecting being rarely practiced.

This latter result is one of the most interesting, as the two most "individualistic" Cs (Consume and Create) are reported as being practiced the most, while the more "altruistic" ones (Connect and Contribute) are less practiced. This confirms the result already emerged in the exploratory phase, of the decoupling of practices with respect to perceived importance, but also highlights that the "altruistic" Cs seem to be the most impacted by this problem. There is an inner logic to these results: while respondents recognise the importance of most of the Cs, they admittedly do not practice all of them. Consuming is seen as the least important, while Creating is seen as the most important. In other words, teachers still privilege individual creativity, both in principles (beliefs), and even more in practice (behaviours).

As for the causes of this phenomenon, responses to single items suggest that one of the problems, at least for what concerns Connecting behaviours, is a difficulty on the part of teachers in interacting with colleagues teaching different disciplines or subjects. This issue extends to the Contributing behaviour, as sharing of resources and designs is mostly carried out *in situ* with colleagues teaching the same subjects in the same environment. Although this result may seem rather obvious, it again contradicts the theory of LD, whereby design ideas should be represented in an abstract form and thus easily transferable across contexts and disciplines [24] [34]. Indeed, much of the efforts in this field aim to represent LDs as abstract and reusable objects [11] [15], i.e.

patterns that can be applied in different contexts. Besides disciplinary divisions, there is also a tendency of teachers to privilege f2f interactions with respect to the sharing of digital artefacts, let alone searching repositories expressly built for sharing designs. Our data show that there still are limitations to the practice of resource sharing, confining it to the immediate context of teachers, and fragmenting the community in small, local, and isolated tribes. Results regarding awareness and use of LD tools show that teachers rarely know about tools specifically designed for LD, and no participant to the study actively uses them. This gap in knowledge may be an important factor for the relatively low practice of 4Cs behaviour, as many of these tools are meant to support participatory behaviours, e.g., by facilitating sharing and reuse of LDs [13] [31]. This leads us to conclude that much of the work in LD, devoted to the definition of suitable representations and to the construction of repositories of designs, has had, so far, only limited impact.

The above considerations, mostly based on the results of the main phase of our study, match, to a good extent, the reasons indicated by the teachers who participated to our exploratory phase. In fact, they confirm the lack of a sense of community on the side of teachers, and therefore, the scarce adoption of the participatory culture advocated by LD researchers. The lack of digital skills, indicated by participants to the exploratory phase as a possible reason for the above situation, sounds as a possible reason, given that f2f is still preferred as an interaction method and that overall awareness of the availability of LD tools seems to be low, while the reuse of a formalised design would be much easier if digital tools and repositories were used. The lack of motivation on the side of teachers is not confirmed but it is coherent with the gap between perceived importance of all the 4Cs behaviours and their practice. Therefore, the lack of professional and economic incentives, especially those directed specifically to teachers who show readiness to adopt participatory approaches, together with the issue of the high average age of Italian teachers, might provide a sensible explanation for the scarce adoption of a participatory culture. In the authors opinion, in fact, professional and economic incentives should be used to promote participatory approaches rather than foster competitiveness.

One of the frequently mentioned reasons for promoting a participatory culture of Learning Design among teachers is that this seems to be an effective way to keep up to date with technological developments and thus become able to harness its potential for teaching and learning. Through the last section of our survey, we investigated the extent to which our respondents intend to integrate ICT in their LDs. Their generally positive answers (together with the motivations provided when answering the subsequent “Why” question) show a positive but cautious attitude towards technology integration. LD research certainly does not aim to promote acritical, techno-centric attitudes towards technology in education. As some respondents pointed out, technology deserves being integrated in teaching and learning processes only when “it helps”. However, such a positive attitude towards technology integration in their designs appears to offer a rather fertile soil for technology adoption. And yet, our data suggest that there are barriers preventing the acknowledgement of the importance of participatory LD practices to become a reality. For one thing, LD tools are mostly unknown to our respondents. A possible reason for this is that attempts to promote their use have been sporadic and small scale. In addition, there are risks that, even if these tools were more widely known, it would not be apparent to teachers that there is gain in using them, due, on the hand, to time and workload factors, and, on the other, to the prototypical nature of most of the tools available [32].

5 Conclusions

According to the outcomes of this study, it seems that the teachers recognize the importance of practicing all the 4Cs, but there is a gap between “theory and practice”, that is, “beliefs and behaviours”. This gap concerns above all the two more altruistic Cs (Connect and Contribute), while the individualistic Cs (especially Create) are more practiced. However, even Consume behaviours are not practiced consistently, despite a wealth of research focussing on creating archives of reusable resources and designs for teachers [34] [35] [36], it seems that teachers still rely on Creation as the primary approach to LD. We therefore claim that the participatory culture, so much emphasized and pursued by LD researchers, is still far from being a reality, at least in Italy. However, the cause for this is not that teachers do not believe in their usefulness, but that adoption of the altruistic behaviours is limited, especially when these require de-contextualisation from discipline and school. Additionally, our results point to a generally low awareness in the teachers’ community regarding the availability LD tools produced by academic research. Our respondents also show an overall positive attitude towards the introduction of ICT in their teaching since the design phase. However, positive attitudes are not a guarantee for uptake, as demonstrated by our data concerning the 4Cs. Overall, we can state that our study shows that the impact of LD research is indeed limited, at least in Italy, and although its main principles, included the need to build on one another’s shoulders to improve LD processes, are shared by teachers, individual creativity is still the main asset they rely on. As for the barriers towards adoption of participatory LD practices, we agree with [23], that there is a lack of adequate teacher training, where adequate means large scale and focused on altruistic practices. Our data also suggest that none of the plethora of existing tools has proved able to move beyond the “early adopters” phase, at least so far. Our future research directions include an extension of the study to other countries and a more in-depth analysis of the ways this gap between beliefs and practice can be overcome. Rather than the development of complex new tools, this field seems to need strategies to encourage the uptake of currently neglected practices on a larger scale [9] [37].

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