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The Designing and Re-Designing of a Blended University Course Based on the Trialogical Learning Approach

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Abstract: To have a positive impact on students' development of crucial skills, blended university courses need careful planning to fruitfully integrate learning settings as well as methodologies. The authors adopted Design-Based Research to design a blended university course based on the Trialogical Learning Approach, and then to redesign it according to the learning outputs and the overall learner's experience. The first iteration of the course (a.y. 2015) was followed by an observational study that aimed to identify student perceptions of (1) the impact of the course on the acquisition of the targeted knowledge–work skills and (2) strengths and areas for improvement to be considered when re-designing the subsequent edition. A total of 109 students participated in the two editions of the course under scrutiny in this research. The data corpus included students' self-report questionnaires investigating the development of specific knowledge–work skills and focus group interviews that explored students' perceptions. The data showed this blended course had a generally positive impact on students' perception of acquisition of skills and knowledge, which increased between one edition and the next. This positive impact seemed to correspond with course refinements made by the teacher and with the activities that received greater attention in the second edition of the course.

Keywords: learning design; higher education; Trialogical Learning Approach

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1. Introduction

As universally known, in February 2020, the health emergency known as "COVID-19" forced education systems all over the world to transition online as a result of the forced closure of schools and universities. Unfortunately, in many non-Western societies this brutally meant to interrupt each form of education and learning, considering the various economic, social, and technological limitations they experienced, apart from "COVID-19". In the rest of the world, in subsequent months, we witnessed numerous efforts to ensure the continuation of the school and academic year, with teachers of all levels rushing to find the right tools for videotaping lessons, assigning homework, and verifying students' learning. Predictably, the results of this collective effort have not always been optimal. This is likely due to the suddenness of the transition from one mode to another, and, above all, a lack of methodological preparation. Many teachers improvised online learning without adequately reflecting on how to design effective online teaching and learning practices [1]. Technology, in fact, can only be fruitfully integrated into educational contexts through a thoughtful transformation of practices and consequent re-elaboration of knowledge. This is true at any level of education and particularly at the university level. Facilitating effective, active learning in online contexts can be complex because academic achievement should involve not only knowledge acquisition, but also meaningful and lasting learning in which learners construct new knowledge, actively participate in learning episodes, and experiment with

new skills [2,3]. As a consequence, and beyond any educational emergency, we believe that the best integration of technologies in higher education is oriented towards a fully blended approach. "Blended" is a term with different meanings [4,5]; in our interpretation, it does not involve only mixing face-to-face and computer-supported settings. Instead, we proposed a vision of learning in which many aspects are blended: pedagogical methods, individual study and group activity, and a large variety of tasks and end products [6,7]. Nevertheless, for technology to support this kind of active learning, teachers must be able to adapt flexibly to technological affordances and innovations, contextual constraints, and resources [8], while searching for the best "blending" of methodologies, activities, and settings. Yet, given the current educational challenges and the complexity of the learning contexts we are talking about, the need for a rigorous and scientific approach to didactic planning is evident, in which teachers and designers share, modify, and re-use effective, proven pedagogical plans [9]. Specifically, the concern was to support the decision-making processes of teachers who want to make informed decisions on the best teaching strategies to use.

In this paper, we demonstrate how using a structured process of blended-course design, review, and refinement can facilitate more positive learning experiences and knowledge acquisition. To this end, we first describe the teacher's design of a blended university course based on the Trialogical Learning Approach, which we proved as a pedagogical framework capable of supporting teachers in planning a variety of methodologies, strategies, and educational activities, effectively implemented in the intersection of online and offline settings.

2. Theoretical Framework

The Trialogical Learning Approach

The Trialogical Approach to Learning (TLA) [10,11] is a relatively recent theoretical construct that integrates "monological" and "dialogical" approaches to learning with a third element: intentional processes involved in the collaborative creation and development of knowledge artifacts shared within and useful for the community, the "shared objects". The acquisition and participation metaphors of learning [12] are, in this approach, embedded in the knowledge creation metaphor. This metaphor goes beyond many traditional dichotomies and focuses on both individual and social processes, as well as on the conceptual knowledge and social practices needed to foster collaborative creativity. The general aim is to sustain learners' development of knowledge work skills [13,14]; that is, individual capabilities (e.g., metacognition, ITC skills) that are linked both to the community (e.g., collaboration, communication) and to epistemic knowledge and skills (e.g., critical thinking, information management).

TLA is applied through six Design Principles (Table 1) that guide the planning of technology-based teaching and learning activities designed to facilitate shared engagement with knowledge artifacts.

Clearly, the TLA DPs function as general operational guides for the teacher, whose task is to decide how to achieve the objectives set out in each of the six formulations. As such, the importance of pedagogical design is clear. Some type of formalization, in fact, is particularly useful when introducing new practices such as those advocated by TLA [15].

Table 1. The Design Principle for the Trialogical Learning Approach.

The Design Principle	How to Apply Them
DP1 Organize activities around shared objects	Didactic activities must converge towards the collaborative construction of artifacts:designed for real uses, thus acting as a bridge between formal learning contexts and workplace contexts, embodying the skills that learners need to acquire.
DP2 Supporting integration of personal and collective agency and work	It is necessary to combine individual and group:promoting individual and collective responsibility and motivation, encouraging the development of relational skills.
DP3 Fostering long-term processes of knowledge advancement	The learning situation should be lengthy enough to allow: the iteration of different cycles of the same activities an advancement of knowledge when moving from one version to another of the same knowledge object.
DP4 Emphasizing development and creativity through knowledge transformations and reflection	Learning must involve different forms of knowledge: declarative, procedural, implicit; and different formats: text, pictures, multimedia, case-experience. Reflection should be promoted with the aim of improving learning and individual and group practices.
DP5 Promoting cross-fertilization	It is crucial to create connections beyond formal learning contexts and across communities and institutions to promote the development of new ways of interacting as well as new languages and tools.
DP6 Providing flexible tools for developing artifacts and practices	Learning activities and goals should be underpinned by a conscious use of technologies, led by the teacher who deliberately and flexibly selects technologies that allow students to create and share, reflect, and transform knowledge practices and artifacts.

3. The Research

3.1. Objectives

The present paper describes a teacher's process of designing and re-designing a TLA-based blended university course by considering students' feedback and perceptions. Specifically, our research questions (RQ), pursuant to observational data generated in each of the two iterations of the course, were:

i. RQ1: What is the impact of the course on students' perceptions of their development of specific knowledge–work skills?
ii. RQ2: Which strengths and area of improvements do the students find in the course?

3.2. Method

The design and subsequent re-design of the blended course explored in this paper was based on Design-based Research (DBR) [16]. DBR focuses on the analysis of educational practices by interrogating the planning of innovative interventions and subsequently observing the (not)/functioning elements. In this way, limits are identified, and further interventions are re-designed to overcome or address these limits. The aim of DBR, in fact, is to directly impact practices, while simultaneously stimulating the theoretical progress: The value of a theory is evaluated based on how much its principles improve the practice. Methodologically speaking, DBR is grounded in real-world interaction contexts, rather than in laboratory settings; hence, research results need to be connected with both the design process through which results are generated and the setting where research is conducted [17].

Consistent with DBR, this research is based on different iterations of the course, each consisting of four phases: (1) course design, (2) implementation, (3) data collection, and (4) re-design. Specifically, we applied this procedure to two iterations (a.y. 2015 and 2016).

3.2.1. Data Collection

To answer our RQs, we generated data around students' perception of their skills using the following tools:

1. Contextual Knowledge Practice questionnaire (CKP-q), completed anonymously at the end of the course. The questionnaire comprised 27 Likert-scale items that interrogated students' perceptions of the extent to which they developed specific knowledge–work skills (1, not at all; 5, very much). The items were organized in seven scales built around the TLA design principles [18]: (1) collaborate on shared objects (DP1); (2) integrate individual and collaborative work (DP2); (3) development through feedback (DP3 and DP4); (4) persistent development of knowledge object (DP4); (5) understanding various disciplines and practices (DP5); (6) interdisciplinary collaboration and communication (DP5); and (7) learning to exploit technology (DP6). Students were asked to declare to what extent (1, not at all; 5, very much) they perceived themselves to have acquired the related skills at the end of the course (RQ1).
2. Focus Groups (FG) held at the end of the first two iterations of the course to facilitate critical discussion around the course that had just ended (RQ2). Semi-structured interviews were used to elicit students' views on: (1) the most valuable activity of the course; (2) the adopted learning strategies; (3) pros and cons of group work; (4) the course organization; and (5) the role of technologies. FGs were conducted by external moderators in order to promote students' spontaneous and open comments.

3.2.2. Data Analysis

Closed items of the CKP-q were interrogated to collect descriptive statistics. In terms of qualitative data (FG transcriptions), a content analysis made up of three stages was followed: (1) The answers were first read by two independent evaluators to extract preliminary categories based on the TLA DPs (collaboration, knowledge advancement, creativity, etc.); (2) each student response was then segmented into units of analysis, depending on the single DP correspondence. However, for each unit of analysis, student responses were assigned one category based on the general meaning that they expressed. This ensured that individual students were not counted multiple times for one category. (3) Each segment and its corresponding category were traced as positive or negative aspects and finally hierarchically ordered according to their recurrence in the different FG sessions.

Considered together, the tools make the Trialogical principles the very perspective from which to observe, analyze, and refine the course.

Table 2 shows participating students, tools, and data generated for each of the two iterations.

Table 2. Participants and data generated in the two iterations.

Iteration	Participants	Data Collection
a. y. 2015	55 (M: 16–29%, F: 39–71%)	CKP-q (N = 48–87.27%) FG (N = 24 participants. Participants were split across three focus groups.)
a. y. 2016	54 (M: 26–48%, F: 28–52%)	CKP-q (N = 45–83.33%) FG (N = 32 participants. Participants were split across four focus groups)

3.3. The TLA-Based Course Design

This research focused on higher education, specifically, on the Experimental Pedagogy course within the 3-year Bachelor of Psychology and Health course at Sapienza University

of Rome (IT). The aim of the course is to provide fundamental knowledge about key learning theories and scholars, and to let students experience specific collaborative techniques and an educational use of modern technologies. Once graduated, in fact, these students may enter work-related contexts and roles such as School Psychologists or Educational Designers supporting Teachers in planning their courses and managing technology-enhanced learning techniques. Yet, their prior experience about digital tools and environments was limited; therefore, the course in Experimental Pedagogy provided them with several, repeated experiences through which to acquire an adequate familiarization with educational technologies.

The teacher of both the iterations is a pedagogical expert in the field of computer-supported collaborative learning. She decided to adopt TLA to structure activities that allow students to become active builders of their knowledge, collaboratively creating concrete artifacts and hypothesizing applications of the theories studied. The TLA-designed activities were, in fact, aimed at creating useful and meaningful products for future job prospects, so as to motivate students during the study of the discipline. Furthermore, the TLA reinforces the blended nature of the course because it is a framework capable of enhancing the blended approach at different levels:

i. Mixing of a variety of teaching strategies and methodologies;
ii. Flexible integration of digital tools;
iii. Cross-fertilization between the university context and the professional/external context.

The course lasts 10 weeks, is structured in three consecutive modules, and, as mentioned, follows a blended learning approach, since it alternates classroom lessons and online activities, as well as different learning strategies and methodologies, grounded in the TLA. Students (avg. age: 21) were divided into learning groups to discuss course topics (Learning and Instruction, Technology for Learning), collaboratively construct artifacts and, finally, to develop a real pedagogical scenario.

The teacher's decision to adopt TLA first entailed a re-design of the course, aimed at strengthening some aspects, as suggested by the DPs, and at deploying appropriate strategies and teaching techniques to support TLA introduction in the course. In Table 3, TLA DPs are shown with reference to the blended setting of the course.

As shown in the table, since the first iteration of the course, each TLA principle is applied through a strong integration of online and in-presence activities that alternate during the three modules of the course and are kept together by a solid planning and the use of specific strategies. Role Taking, for instance, is a technique that reinforces the integration between the classroom and the online platform, thanks to "bridge" roles such as the observer, who is asked to observe the in-presence activity, write down a report, and then upload it online in the group-dedicated web forum for his/her groupmates to comment on it.

Table 3. The Learning Design around TLA DPs.

Design Principle	Implementation in the Course	Blended Setting
DP1 Organize activities around shared objects	The meaningful and shared object around which the course is organized is students' documentation of a pedagogical scenario meant to be implemented at school or at university. Intermediate collaborative objects are: – a conceptual map on the figure of the "good teacher" – a PowerPoint presentation reporting the analysis of preschool children' spontaneous writings.	Artifacts' building–online Artifacts' sharing-in presence

Table 3. *Cont.*

Design Principle	Implementation in the Course	Blended Setting
DP2 Supporting integration of personal and collective agency and work	Students are divided into groups of 9 to 11 members and participate in discussion by bringing their own ideas about the topic to be discussed by the group. Through the first module discussion, key shared understandings are distilled and captured in a collaboratively built cognitive map. In the second module, students' personal and shared understandings are 'tested' through the common activity of analyzing collected writings. Interaction and interdependence are supported by the role-taking strategy. Four stable roles are assigned, in turn, to students in each module: social tutor, synthetizer, skeptic, and responsible for the collaborative artifact. In addition, during classroom collaborative activities, one student carries the role of critical observer.	Group discussions-online Collected writings' analysis-in-presence Role Taking-online and in-presence
DP3 Fostering long-term processes of knowledge advancement	The course is structured into three consecutive modules of approximately 4 weeks. Each module addresses a different part of the curriculum, and it is based on iterative activities of knowledge production and object creation. Knowledge advancement is reinforced through peer-review sessions during which each group is asked to look at the objects of two other groups and to provide constructive feedback. Later, each group works on improving their products, based on the feedback provided.	Peer-review sessions-in-presence Artifacts' revising-online
DP4 Emphasizing development and creativity through knowledge transformations and reflection	Different forms of knowledge and practices are involved in the course: from spontaneous discussions to the representation of concepts through conceptual maps; from reading and commenting on academic articles to knowledge building discussions; and from theoretical lessons to designing and reviewing concrete projects. Moreover, individual and collective reflection on the learning process is generated through: – group discussions of teacher's evaluation after each module – the observer's critical report of classroom collaborative activities.	Knowledge building discussions, academic articles–online Theoretical lessons, evaluation discussions–in presence Conceptual maps, project works, observer critical report–online and in presence
DP5 Promoting cross-fertilization	Real "school world" enters the learning contexts, leading students to experience genuine school practices. The creation of the pedagogical scenario is supported by a guiding template, which highlights the crucial aspects to keep in mind when planning a learning course (e.g., learning goals, evaluation, tools, etc.).	Learning course planning–online and in presence

Table 3. *Cont.*

Design Principle	Implementation in the Course	Blended Setting
DP6 Providing flexible tools for developing artifacts and practices	The course is based on blended collaborative knowledge-building activities, hosted in the Moodle platform (http://elearning.uniroma1.it, accessed on 23 September 2021). Each group has its own dedicated Moodle course to discuss, add external resources, upload documents, share collaborative products, and much more. Each course is linked to tools such as Padlet (for brainstorming activities), Google drawings (to create online conceptual maps), and Google documents (for the collaborative writing of the pedagogical scenario).	Digital tools–online and in presence

4. Results

In the following section, we describe the results of the analysis after each of the course iterations and articulate how these shaped and influenced the subsequent re-design.

4.1. First Iteration

To investigate which skills students perceived they developed at the end of each course iteration (RQ1), responses to the CKP questionnaire were analyzed (N = 48; 87.27%). As described earlier, the questionnaire comprised 27 closed-response items. For each item, students were asked to assign a score from 1 (not at all) to 5 (very much), answering the question "How much do you think you have developed the following knowledge–work skills?". Figure 1 illustrates the averages reached from each scale in the first course iteration:

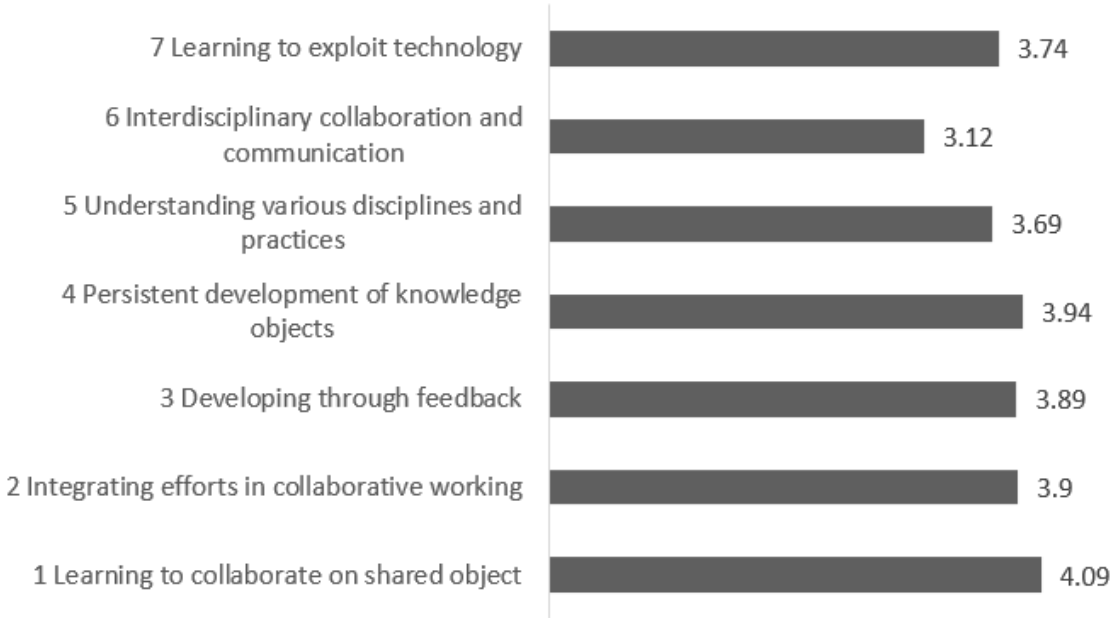

Figure 1. CKP-q scales (first iteration).

Here, we can see that after the first iteration, students perceived they had consistently developed almost each of the skills grouped in the seven scales, especially those related to collaboration on collaboratively built artifacts ("shared objects") (Scale 1; avg. 4.09) and integration of individual and group work (Scale 2; avg. 3.90). Both these scales are anchored around the very blended nature of the course, that is, around the careful mix of

activities and strategies that are carried out through a strong integration and online and in-presence, such as artifact building and revising or role taking.

The set of skills considered to be less developed (although still arguably developed to a good degree) is related to interdisciplinary collaboration and communication (Scale 6; avg. 3.12).

For a better understanding of the data collected through the CKP-q, we decided to also observe the individual items that obtained a score lower than 3.5 (Table 4), which is the threshold that we identified as the minimum desirable level.

Table 4. Items reporting the lowest average (first iteration).

Item	First Iteration
To ask questions relating to the practices of another field.	3.35
To present my expertise to representatives of another field.	3.02
To collaborate with representatives of other fields.	2.98

Only three items out of 27 reached an average lower than 3.5 and they are all included in Scale 6. This scale refers to cross fertilization of practices, that is, to the blended nature of the course in the sense of integration of university and beyond-university contexts.

The qualitative feedback collected through the FG allowed us to respond to RQ2, concerning strengths and areas of improvement to be considered in order to improve the course in its next edition. Specifically, through analysis of the transcripts, we highlighted three recurring aspects that refer to three macro-areas (Table 5).

Table 5. Most recurrent FG feedback (first iteration).

Improvement Area	Feedback
Course structure	Difficulty to connect Modules 2 (collecting/analyzing children's spontaneous writing) and 3 (developing a pedagogical scenario about collaborative use of technologies), also because of compressed timing
Learning strategies	For some roles, the contribution to the group work is not clear (e.g., for the critical observer)
Collaboration	Unequal levels of contribution and participation in the group

Once the data analysis was complete, the teacher began to adjust the course design, simultaneously considering the areas of skill perceived as less developed and the students' feedback on the less appreciated aspects of the course. In both cases, the teacher tried also to reinforce the blended nature of the course, at each of the considered levels. Table 6 reports the main changes the teacher adopted. To better show the link between the changes and the data, we (1) specified the scales corresponding to each DP and (2) numbered the changes made in response to the FG in a way corresponding to the suggestions themselves.

The main innovations introduced by the teacher during the re-design process mainly aimed to strengthen the skills related to cross-fertilization of practices and knowledge (DP5, Scale 5–6), which the CKP-q reported as not sufficiently developed and which refer to the blended nature of the course in the sense of integration between academic and external world. Additionally, innovations also aimed to improve course aspects related to timing, assignments, and collaboration within the groups. The revision of timing and contents in module 2 (changing the topic from "children's spontaneous writing" to "use of technologies in teaching") was also due to the desire to give more importance to the construction of the final shared object, thus reinforcing the TLA nature of the course.

Table 6. The course re-design (first iteration).

Design Principle	Changes Introduced in Response to CKP-q	Changes Introduced in Response of FG	Blended Setting
DP1			
DP2		1. Individual agency strengthened through an additional task introduced in module 2, preliminary to the collective discussion: the individual research and mapping of learning experiences using technology.	Online
DP3		1. Revised times and contents of module 2 to reinforce the advancement of knowledge: The analysis of children's spontaneous writing is replaced by the study of experiences of use of technologies in teaching, which becomes the basis for module 3.	In–presence and online
DP4		1. Critical-observer role modified: The observation grid focuses now on the whole module and not just on single classroom activities; it is completed online, thus becoming more easily usable by the group.	Online
DP5	(CKP scales 5–6) Introduction of teachers and school principals in the activities of Module 3, as external experts offering feedback to improve the pedagogical scenario, before its revision		Online
DP6			

4.2. Second Iteration

The answers (N = 45–83.33%) to the CKP-q collected after the second iteration of the course confirmed, and in some cases reinforced, the perception that knowledge–work skills were strongly developed (Figure 2). This time, the scales with the highest score were: Collaboration on shared object and Development through feedback (Scales 1 and 3–4.0). Interdisciplinary collaboration and communication (Scale 6–3.34), while remaining the one with a relatively lower score, recorded quite a substantial improvement compared to the first iteration (from 3.12 to 3.34).

With respect to the average of the individual items (Table 7), in the last places we now find the same three items on the sixth scale, but only two were below the minimum acceptable average (3.5), and are still improving compared to the first course iteration.

Figure 2. CKP-q scales (first and second iterations).

Table 7. Items reporting the lowest average (second iteration).

Item	Year 2015	Year 2016
To ask questions relating to the practices of another field.	3.35	3.53
To present my expertise to representatives of another field.	3.02	3.24
To collaborate with representatives of other fields.	2.98	3.24

Analysis of feedback collected through the FGs once again revealed three recurring critical elements (Table 8).

Table 8. Most recurrent FG feedback (second iteration).

Improvement Area	Feedback
Learning strategies	Not being able/confident in commenting on other groups' products Poor discussions mainly shaped as long monologue
Collaboration	Unequal level of contribution and participation in the group

Table 9 shows the re-design after the second year of the course.

The re-design after the second iteration of the course once again focused on Cross-fertilization (DP5-scales 5 and 6). In fact, while there was a trend of improvement, cross-fertilization continued to be less developed than the other scales. As for students' feedback, the teacher decided to focus also on Collaboration, which, as in the first iteration, seemed to be challenging for students. Some other significant changes were introduced to respond to students' feedback about the quality of the discussions and the limits perceived when being asked to provide colleagues with comments on their work. Once again, the blended nature of the course is reinforced through specific strategies and techniques purposely built as a bridge between the online and the in-presence setting. This is the case for the peer-review sessions starting online and then being completed online, through each group member's contribution.

Table 9. The course re-design (second iteration).

Design Principle	Changes Introduced in Response to CKP-q	Changes Introduced in Responses of FG	Blended Setting
DP1			
DP2		1 Added two new roles: researcher, scenario reviser 2. Self-Monitoring questionnaire (SM-q) introduced to promote a structured and ongoing reflection about one's own participation in and contribution to the group work 3. Provided specific assignments on how to constructively discuss, that is, by using explicit quotations and references to peer contributions in the Moodle Web forums	Online and in presence Online Online and in presence
DP3		1. Peer review session reinforced with two new assignments: (1) the groups build the criteria they then use to give feedback; (2) the groups clearly state how to improve their own product after seeing that of their colleagues	
DP4		1. Introduced teacher's formative evaluation of the maps through a classroom session, showing the changes between the first and second versions and the impact of given and received feedback	In presence
DP5	(CKP scales 5–6) Experts coming to class lessons to listen to group presentations. Students experiencing assessment practices.		In presence
DP6			

5. Discussion

The choice to apply TLA to this university course was derived from the teacher's desire to reinforce the blended nature of the course at various level, thus further promoting students' crucial knowledge–work skills. The subsequent course re-designs were, therefore, based on the attempt to make the course increasingly able to achieve this purpose. Courses, in fact, take time and consideration to develop effectively and even when positive results are achieved it is worth investigating how these can be maintained and/or strengthened over time.

To this end, we analyzed students' perceptions of the development of specific work skills and collected their feedback about the course during two subsequent iterations. In fact, it is only by considering both the optimal modalities for learning as well as the learners' needs, and the context, that a course can effectively be improved [19].

Based on these data, it seems that the progressive changes made in these areas have had a largely positive outcome. In relation to students' feedback, timing and collaboration seemed to be the recurring criticalities requiring ongoing refinement. On the one hand, as noted by the students themselves, timing is a limit strongly linked to context elements beyond the teacher's control: The third module of the course, the one perceived as a critical area, takes place during the examination period, and students feel the pressure of multiple assessment demands, confirming the importance of taking into account organizational

factors as a key to successful implementation [20]. On the other hand, despite collaboration being reported as difficult and group participation as unequal, the related CKP-q scales (1, learning to collaborate on shared objects; 2, integrating efforts in collaborative learning) are constantly perceived as highly developed. These scales refer to the blended nature of the course based on a learning design that carefully selects and integrates strategies, techniques, and activities carried out between the online environment and the classroom physical context.

The Design principles of TLA have positively guided the planning and re-planning of the course, supporting positive outcomes in terms of knowledge–work skills. The key points of the curriculum design reside in the combined active and reflective nature of the course, which proposes the collaborative construction of meaningful objects to students and the continuous improvement of the objects themselves through recursive peer feedback activities. Each of these techniques, however, would be not sufficient without the adequate care of the teacher–student relationship. In the course described, in fact, the teacher took care to set up an environment based on mutual respect and collaboration: From the modelling offered to students who covered the role of tutor to that relating to peer feedback activities, each student had multiple indications and examples on how to be mutually supportive and able to recognize the value of the colleagues and him/herself primarily.

In summary, the results observed through the CKP-q confirmed the effectiveness of TLA application in a blended course as designed and re-designed. Most significantly, changes in specific DPs resulted in a perceived impact on skills developed by students. Additionally, the issues identified in one iteration were not repeated in the next, at least, not to the same degree, as for the case of the DP 5, referring to the blended aspect of cross fertilization, that students perceived as better implemented in the second iteration. Thus, it would appear to confirm that educational courses need to be developed over time to meet the needs of the learners and, in so doing, help teachers to refine their practice.

6. Conclusions

This research describes a teacher's process of designing and re-designing a university course in which the Trialogical Learning Approach was introduced as a theoretical basis for a blended course that involves students in concrete activities and genuine collaboration to generate knowledge and build significant artifacts while developing key knowledge–work competences.

The course re-design was founded on careful analysis of the impact of the course on students' perception of skill development and feedback on the course structure.

The results collected confirmed the validity of a similar approach to Learning Design:

1. The design was strongly anchored to a theoretical model as well as structured and formalized through templates of pedagogical scenarios, yet left teachers able to personalize the design principles' declinations;
2. Each course iteration was progressively and gradually developed based on the results, and the re-design also included the revision of the Impact Analysis Instruments;
3. Theoretical reflection continued to accompany all subsequent iterations.

The course design was, in fact, replicated in the following years with other students, confirming the positive aspects evidenced in the first two iterations. The course, in its current design, could be, however, transferred to other courses or contexts, as long as the Key issues defined by the TLA principles are kept, possibly maintaining those conditions we found as effective based on the data here presented: collaborative construction of useful and concrete objects; attention to the individual's agency within the group, also supported by specific techniques, such as the role-taking strategy; search for a continuous improvement of products and ideas, especially supported by peer feedback activities; supporting high connection and cross-fertilization between university studies and the world of work. Transferability will, of course, also depend on the possibilities of the context to make students use flexible technologies, which allow collaboration within small and

large groups. We also note the teacher's willingness to go further than his/her known methods, often putting an extra effort in the course implementation.

However, we are aware of the limits of our research. First, the effectiveness of a learning course does not only reside in the participants' point of view, but must also be observed and, above all, take account of the intended learning outcomes. In addition, we are aware that our sample is small and culturally bounded to a specific context. Despite these limitations, this paper illustrates how DBR can be fruitfully used to refine and improve teaching and learning experiences in the context of a tertiary course, inspired by a specific theoretical construct. Our approach, moreover, highlights that engaging the students in a process of review, helps practitioners to refine module content and delivery more effectively and, in so doing, build in more robust opportunities for technology-based collaboration and learning.

Acting as designers and researchers, teachers can be empowered to both refine their practice and contribute to an enhanced understanding of learning theories such as TLA, a recent framework that, while still evolving, holds promise for educational research, and it seems extremely powerful in sustaining the blended nature of the future of higher education.

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