



# Innovative teaching strategies: enhancing the soft-skilloriented approach through integrated onsite-online learning environments

## Strategie didattiche innovative: valorizzare l'approccio soft-skilloriented mediante ambienti d'apprendimento integrati onsite-online

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### ABSTRACT

The integration of ICT in Higher Education requires reflective design by teachers. In particular, from recent international research on the subject, it emerges that the perspective of the TPCK framework (Technological, Pedagogical, Content Knowledge) can favour an effective design reasoning of teachers. Teaching practice requires the implementation of innovative organizational models for the creation of learning environments that offer continuity between classroom and distance learning (Hybrid Instruction Solution). The empirical mix-method research involved a group of volunteer teachers of different teachings. The objective was to design and implement innovative teaching solutions using ICT in onsite/online environments to enhance specific soft skills in students. The results of a questionnaire (CAWI) given to incoming and outgoing teachers from the experience of designing and conducting the didactic action will be presented. the TPCK perspective design of integrated learning environments and the reasoned choice of coherent methodologies seem to make a soft-skilloriented didactics feasible.

L'integrazione delle ICT nella didattica universitaria richiede una progettazione riflessiva da parte dei docenti. In particolare, dalle recenti ricerche internazionali sul tema, emerge che la prospettiva del framework TPCK (Technological, Pedagogical, Content Knowledge) può favorire un efficace ragionamento progettuale dei docenti. La pratica didattica richiede l'attuazione di modelli organizzativi innovativi per la realizzazione di ambienti d'apprendimento che offrano continuità tra la didattica in presenza e a distanza (Hybrid Instruction Solution). La ricerca empirica mix-method ha coinvolto un gruppo di docenti volontari di differenti insegnamenti e provenienti università europee. L'obiettivo era la progettazione e realizzazione di soluzioni didattiche innovative usando le ICT in ambienti onsite/online per valorizzare soft skill specifiche negli studenti. Verranno presentati i risultati di un questionario somministrato in modalità CAWI in entrata e in uscita dall'esperienza di progettazione e conduzione dell'azione didattica. La progettazione in prospettiva TPCK di ambienti d'apprendimento integrati e la scelta ragionata di metodologie coerenti sembrano rendere attuabile una didattica soft-skilloriented.

### KEYWORDS

TPCK Design, Higher Education, Active Learning, Soft Skills.  
Progettazione TPCK, Higher Education, Apprendimento Attivo, Competenze Trasversali.

## Introduction

The meaning of the term “hybrid solution” (hybrid instruction solution - HIS) (Kaleta, Skibba & Joosten, 2007; Dziuban, Moskal, Kramer & Thompson, 2013), often used interchangeably with “blended solution”, is broad and inclusive of diverse educational formats developed through the setting up of mixed learning environments that require targeted design (Shea, 2007; De Rossi, 2019).

In fact, we should consider “the integration not only of elements related to space, real or virtual, but also of communication methods (synchronous and asynchronous), of educational strategies to be adopted at different times and in different spaces in which the teaching-learning process develops, of different technological tools and learning resources to be used to support individual and/or collaborative study” (Trentin & Bocconi, 2015, p. 28). This requires the teacher to become a designer (De Rossi, 2017); design is a heuristic and creative operation which, although it does not escape the basic rules, implies the opening to “dialogue between ideas and the world, between theory and its application, between a concept and its realization, between instruments and objectives” (Mishra & Koehler, 2003, p. 106).

In this perspective, the adoption of integrated design procedures, according to the ICT-TPCK framework (Technological, Pedagogical, Content Knowledge) (Angeli & Valanides 2013; De Rossi, Trevisan, 2018), can promote a design reasoning able to harmonize all the elements converging in the HIS didactics so that methodological-technological, conceptual, procedural and spatio-temporal discontinuities can be overcome (Messina, De Rossi, 2015; De Rossi, Ferranti, 2017). That is to say, besides the classical elements (contents, objectives, strategies, evaluation) it is important to assume also the specific main components, often implicit, of the “didactic approach” construct (critical choice of models, methods, formats, techniques) conceived in accordance with: the conscious choice of technologies; the learning activities with the technologies and the forms of knowledge that they solicit (Harris & Hofer, 2009); the multiple modes of representation of meaning allowed by technologies (Cope & Kalantzis, 2000). This seems to allow the construction of a coherent didactic action, including the potential offered by ICT, also towards the enhancement of soft skills (La Marca & Gülbay, 2018). Although it is a very developed field of investigation, as far as the main question of didactics is concerned, how? There are still open paths of work that lead us to focus our attention on the innovation of procedures, strategies and tools in action.

### 1. The research design: the target group, methodology, phases, tools

The empirical study was carried out in the a.a. 2017-18 with the aim of stimulating teachers to design methodological-technological solutions able to enhance specific soft skills in the field of curricular disciplines; the hypothesis is that integrated didactic design, assuming technology as a “cognitive partner” able to amplify the effectiveness of the methodological repertoire, can activate teaching-learning processes for the development of soft skills contextualized in a technological environment: creativity, effective communication, collaboration (Fredrickson, 2003; Zhou and George, 2003; Boyatzis, Good & Massa, 2012). 78 volunteer teachers from an Italian university (N 27) and a North European foreigner (N 51) where the use of the Moodle platform is widespread were involved (average age 47,30 years; M. 64%, F. 36%; distribution 39% Human Science, 27% Life Science, 34% Hard Science;). Teachers were considered and all had at least 3 years of university teaching

experience. The majority had had at least one training opportunity in the use of Moodle and technological resources for teaching (Italian university 38.09%; foreign university 76.19%). 63.5% declared that they use ICT enough and a lot in teaching (levels 3 and 4), the remaining 36.5% little and nothing at all.

Starting from the assumption of implementing an ICT-TPCK procedure through HIS modalities, converging in blended learning-BL format (30%), teachers were invited to rethink the didactic action with the aim of developing soft skills. The design workshop was carried out according to the format Briefing for Design (BD) (De Rossi, Ferranti, 2017), choosing one or more objectives of its syllabus to be developed in BL mode using specific technological resources. The aim was to make the teacher reflect on the objective identified so that he could design, thinking in an integrated way, the development of hard skills, related to the content, and specific soft skills that can be activated through a targeted methodological-technological approach. The mixed solutions that have been given space in the choice have been flexible in order to give the opportunity to mix onsite learning and online learning (collaborative learning according to the canons of online education) (Graham, Woodfield & Harrison, 2013; Trentin 2015). Phase I included several preparatory actions for the performance of the actual teaching activities: basic methodological-technological training on advanced resources for teaching, both inside and outside the platform (e.g. Kaltura; Mobile Storytelling Platform); the creation of BD project laboratories, individual or in small groups for teachers in the same scientific area.

The realization of the BD has involved the joint action of a teacher of general education and a learning technologist (Khosrow-Pour, 2014) for the construction of HIS-BL format with active learning approach to activate the soft skills considered, selecting technological resources with adequate affordance (Fig.1).

Activity/Technological resources		% Teachers
Soft Skill: Creativity, Communication, Collaboration	a) Video and Multimedia production (for example Kaltura)	26%
	b) Digital Storytelling production (use of external resources, for example Mobile Visual Storytelling)	21%
	c) Group participation in gamification activities	8%
	d) Case analysis group activities	32%
	e) Group activity of professional problem solving	28%
	f) Group activities for the construction of glossaries	4%
	g) Group activities for the construction of artifacts (for example resource Book of Moodle)	22%

**Fig. 1. Distribution of the activities and technological resources chosen in the design by the teachers**

For convenience we have grouped resources into 2 macro-categories of function: i) production of artifacts (a,b,f,g); ii) analysis and problem solving activities (c, d, e). As can be seen, the greater distribution of artifacts (Video and Multimedia; Digital Storytelling; elaboration of materials with Libro resource) in group activities; Case Analysis and Problem solving activities follow, also from a professionalising point of view, concentrated more in masterful CdS teachings; the choice of gamification activities was low due to the complexity of implementation by the teachers (data extracted from the self-reports) and for the construction of glossaries, chosen from teachings in specific areas (e.g. linguistics). Some activities were chosen in complex formats (e.g. case analysis-problem solving combined; construction of artifacts with resource Book integrating video). Phase II of the research path concerned the carrying out of the didactic actions and their monitoring (about 3 months). The mix-method approach (Teddlie & Tashakkori, 2009) allowed the use of different tools for both teachers and students: structured questionnaire administered anonymously online, inbound and outbound (4 dimensions: 18 items, self-anchoring scale at 4 levels, 1= not at all agreed; 4= very agreed), on which 2 pilot test reviews were carried out. The questionnaire was addressed to detect perceptions on the following dimensions: a) integrated design procedure (4 items); b) technological affordance complementarity of the resources used and methodological approach (5 items); c) integration of ICT for the development of soft skills (5 items); didactic organization (4 items). An additional qualitative tool (self-report) was also used in order to stimulate reflective processes for the entire duration of the experience. In this article, for economy of synthesis, will be presented only the main data related to the questionnaire administered to teachers.

## 2. The results of the questionnaire: the perceptions of incoming and outgoing teachers

Below will be presented the data that emerged in and out of the items relating to the four dimensions of the structured questionnaire addressed to teachers. The incoming administration was carried out at the beginning of the BD design laboratories and at the end of the courses.

The total number of incoming and outgoing respondents (N 78). It is proposed to reflect on the results by reporting them in tables divided by size, for each item was made the average (M) of the levels of incoming and outgoing response. Neutral values were considered to be those set at  $M = 2.5$ ; positive trends were considered for  $M > 2.5$ , (level 3-agreed; level 4-very agreeable), while negative trends were considered for  $M < 2.5$ ; (level 1-unagreed; level 2-unagreed).

## 2.1. Integrated design

Dimension A - Integrated Design	Average entry	Average output
I.1) In didactic planning, knowledge of the disciplinary contents is prevalent.	3,64	2,04
I.2) ICT helps teachers to transpose content into a competence perspective	2,24	3,12
I.3) The teacher must be able to plan the didactic path by appropriately combining the disciplinary contents of the teaching, the didactic methodologies and the adequate ICT	2,37	3,45
I.4) Designing by integrating ICT allows you to monitor learning processes	2,74	3,57

**Fig.2 - item size “Integrated planning”, average inbound and outbound**

Dimension a) “Integrated design” (4 items), aimed to investigate the perception of teachers on the specific focus “design” taking into account that it is a necessary action for the preparation of syllabuses. It was verified that in both the Institutions to which they belong no specific training had ever been activated, nor were there any finalized support resources and therefore the incoming perceptions were considered referable to the spontaneously matured didactic experiences. As far as the reference to the ICT-TPCK framework is concerned, implicitly underlying items 1 and 3 (Fig. 2), there is evidence of a change in perception with an inverse trend: in I.1 the average level found at the exit decreases, while in I.3 it increases. That is, in the outgoing I.1, after having designed and worked with the students in an innovative way, the teachers seem to have perceived in a marked way that to teach effectively is not enough only the knowledge of the contents of their discipline. This can be linked to the trend of I.3 data, the average of which initially showed how little perceived was the importance of knowing how to combine content, methods and technologies in design; instead, the perception of the outgoing HS-BL experience, through which teachers evidently had the opportunity to broaden their gaze towards the complexity of the elements in action in teaching, beyond the content alone, was widely modified.

Also interesting is the data on the change in the perception of usefulness of ICT in teaching processes (I.2 - Exposure to competence perspective; I.4 - Process evaluation). After the experience, in fact, they seem to have more perceived the potential given by the integration of ICT both in reference to the overcoming of the didactic transmission, towards the one for competences, and in relation to the possibility of implementing process evaluation, difficult to achieve with a traditional approach.

## 2.2. Complementarity between technological affordance of the resources used and methodological approach

The second dimension b) “Complementarity between technological affordance of the resources used and methodological approach” (5 items) focused in greater depth on the critical issue of knowledge of technological resources declined didactically, which is why the literature on digital competence (eg. Ala Mutka, 2011;

Redecker & Punie, 2017) stressed that the knowledge in itself of the tools is only a prerequisite for teachers, but is not sufficient for the adoption of ICT that can effectively support educational innovation. The concept of affordance, as well as those of form of knowledge and representation of knowledge were extensively discussed during the training phase so as to allow awareness in the responses. The items (Fig. 3) stimulated a general reflection on the relationship between affordance and methodological approach, considering that in any didactic format different resources are used. By methodological approach we mean the choice of formats, strategies, techniques and tools that characterize the didactic action in the field.

Dimension B - Complementarity between technological affordance of the resources used and methodological approach	Average entry	Average output
I.1) To develop an effective didactic action it is important to reflect on the specific affordances of each technological resource	2,18	3,64
I.2) Technological resources (ICT) allow to diversify the forms of knowledge in teaching	2,45	2,95
I.3) Technological resources (ICT) allow to diversify the forms of representation of knowledge in education	2,74	3,05
I.4) L'integrazione delle ICT nella didattica facilitano approcci Active Learning	2,37	3,56
I.5) The affordance of technological resources is complementary to the choice of the methodological approach	2,02	3,07

**Fig.3 - dimension "Complementarity between technological affordance of the resources used and methodological approach"**

Generally it can be noticed that all the items in the input report an average lower than level 3, even if I.2 and I.3 are located with slightly positive trend  $M > 2.5$ , while in the output the shift is oriented towards levels with positive trend (in the case of I.1 and I.4,  $M > 3.5$ ). Specifically, with regard to the question of the perceived relationship between affordance of technological resources and choice of methodological approach, in both items explicitly dedicated (I.1 and I.5), there is an increase in the level of agreement, as well as the perception of potential derived from the integration of ICT in teaching for the adoption of an active learning approach (I.4).

Therefore, the training, the project support and the reflective field experience foreseen by the research project seem to have had an interesting impact on the participating teachers, at least in terms of perception. In fact, overall, the changes recorded in the output seem to agree with the perspective that emerged from other literature studies according to which the teacher, of any kind, thanks to the adoption of integrated ICT-TPCK design procedures is stimulated to act more as a "designer", overcoming the "consumer" role of pre-built models (Niess, 2015).

### *2.3 Integration of ICT for the development of soft skills in the technological environment (creativity, communication, collaboration)*

The third dimension (5 items) concerning the perceptions on the development potential of soft skills derived from the integrated use of technologies in teaching, opened up interesting reflections given by the results (Fig. 4). In particular, I.3 in-

tended to capture the perceptions of teachers regarding the possibility of considering the soft-skilloriented approach in curricular teachings not specifically dedicated (e.g. the development of effective communication can be a transversal objective to be set and evaluated even in teachings that are not focused on the contents of communication and so for creativity or collaboration). In fact, for over twenty years, the importance of developing transversal skills has been established in university education, but the complexity of the connection between hard and soft skills - to be designed, implemented with targeted teaching and evaluated - still seems to be a complex issue to be fully implemented.

Dimension C- Integration of ICT for the development of soft skills in the technological environment (creativity, communication, collaboration)	Average entry	Average output
I.1) The integration of ICT in the curricular didactics allows the activation of creative processes	2,15	2,95
I.2) The integration of ICT in the curricular didactics allows the activation of communicative processes	2, 65	3,34
I.3) It is possible to develop curricular didactic projects that connect objectives of disciplinary competence (hard skill) and objectives of transversal competence (soft).	1, 69	3,08
I.4) Integrated learning environments with ICT enable the development of collaborative learning processes.	2, 47	3,45
I.5) Integrated learning environments with ICT allow the evaluation of soft skills	1,85	3,14

**Fig.4 - dimension “The integration of ICT for the development of soft skills in a technological environment (creativity, communication, collaboration)”**

In the first place, the relationship between the use of ICT in teaching and the development of communication processes (I. 2,  $M=2.65$ ) seemed to be the one most perceived by teachers, largely increasing the trend of outgoing level, after the field experience ( $M=3.34$ ). As for the other soft skills specifically considered (I.1 and I.4), evaluated at  $M<2.5$  inbound, there is an increase with a positive trend outbound, especially with regard to collaborative processes. The most interesting data in the analysis phase are derived from I. 3 and I. 5, the first referring to the aforementioned issue of soft-skilloriented curricular design and the second to the evaluation; in fact, both incoming items showed decidedly negative trends ( $M<2$ ), which in the output were instead around a positive level,  $M$  in zone 3. This allows us to hypothesize that specific procedures for teacher training, support in the design and implementation of HS modes allow a greater focus on complex training objectives in curricular teaching, including the development and evaluation of transversal skills.

#### 2.4. Educational organization

The last dimension of the questionnaire, 4 items (Fig.4), was intended to describe the overall picture of some issues considered by the research group to be most relevant because they are more widely found in the literature (Picciano, Dziuban, & Graham, 2014; Pratt & Kovatcheva, 2018).

Dimension D- HS-BL Teaching Organisation	Average entry	Average output
I.1) The HS-BL didactics is useful to solve problems and/or organizational criticalities (time management; space management)	3,64	3,87
I.2) In case attendance is not mandatory but it is mandatory in distance activities, finding students in the virtual community can stimulate their active participation in the teaching/learning processes	2,47	3,52
I.3) Setting up a learning environment in HS-BL mode is useful to give methodological support to students in learning processes	2,42	3,25
I.4) Having the possibility to plan the didactic activities with the support of a group of methodological and technological experts helps to innovate one's own didactics	2,74	3,85

Fig.4 - dimension "HS-BL educational organization"

Overall, the average output levels of all 4 items were largely positive  $M > 3$ . In particular, I.1 is close to the highest level of agreement with reference to the perception of the usefulness of HS-BL didactics in resolving organizational problems, such as time or space management, allowing for greater flexibility and diversified solutions thanks to the onsite/online learning mix. The support of experts that seems to have stimulated teachers to change their teaching routines towards the assumption of an innovative perspective was also appreciated. Items I.2 and I.3 underlined a positive perception of the usefulness of HS-BL teaching in terms of the greater active participation found in students and the possibility of offering support in learning.

### Conclusions

The empirical research, although with the limits of involving a small group of teachers, has highlighted some interesting trends for the implementation of innovation actions in university teaching in the perspective of developing a soft-skill-oriented approach. The integrated design according to the TPCK framework was perceived at the end of the experience as a relevant element able to stimulate in teachers a more targeted and consistent use of ICT in teaching. Content processing was made more effective by the strategic use of active methodologies and technologies adapted to the training objectives. In particular, more attention has emerged towards the knowledge of the affordance of technological resources chosen and used. The reasoning in the design was focused not only on the development of knowledge of content, but also on defined soft skills that represented a transversal training objective: creativity, communication, collaboration. As far as the didactic method of realization of the didactic experiences is concerned, the effective realization of onsite/online blended learning environments was decisive. This seems to have facilitated the personalization of the times and methods of learning allowing the expansion of the time beyond the classroom work and collaborative processes between students (McGee, 2014).

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