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# The acceptance of distance education by Italian university teachers during the Covid-19 lockdown

Stefano Cacciamani\*, Donatella Cesareni\*\*,  
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## Abstract

This study explores within the Italian university context the differences emerging in the acceptance of Distance Education (DE). 112 university teachers from various Italian universities participated in a survey, which included an adapted version of the TAMPST (Technology Acceptance Measure for Preservice Teachers). Results highlight differences in the intention to maintain DE in the future with reference to previous DE experiences, teaching flexibility, and specific training received. This latter aspect was found to influence participant perceptions of the DE facilitating conditions offered by their institutions. Limitations and practical implications of the results are discussed, together with directions for future research.

**Keywords:** Technology Acceptance, Distance Education, University teachers, Covid-19.

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## **Introduction**

The public health emergency and periods of lockdown triggered by the Covid-19 pandemic, has seen the rapid adoption of Emergency Remote Teaching (ERT; Bond et al., 2021), a form of Distance Education (DE), across many educational contexts, including universities. With face-to-face contact restricted, educational technology has played a crucial role in allowing students to remotely access teaching and learning activities. In the early stage of the pandemic, synchronous collaboration tools, especially video conferencing systems, were used for ERT by many Universities, making it possible to re-create communication and interaction situations. This sudden transition to ERT, has however rendered mixed responses and great variability between nations in implementing digital strategies. For instance, many universities located in developing nations did not completely move to ERT, choosing to move the semester break dates (Crawford et al., 2020). In Europe the transition to ERT was made by all higher education systems and was largely considered successful by university leaders, teachers and students, despite a proportion of students encountering challenges in their learning (Farnell et al., 2021).

During the lock-down in Italy, the president of the Italian Council of Ministers imposed the suspension of all face-to-face services and activities (DPCM March 4, 2020, Art. 1(1d), DPCM March 8, 2020, Art. 2 (1 h) and subsequent amendments). The forced lockdown and exclusive use of ERT had a serious impact on Italian students and teachers. Studies reported that DE led to an increase in cases of mental distress (Pisano et al., 2020). Even in a region like Lombardy that was tremendously hit by the effects of Covid-19, the university community adopted a student-centric approach that generated high engagement with learning (Agasisti & Soncin, 2021). Looking specifically at Italian university contexts, in some cases, ERT has been welcomed by staff and students (e.g. Cecchinato & Gonzales-Martinez, 2021); in other cases, it has generated stress and frustration.

With the prolongation of the pandemic, forms of DE remain as part of the didactic strategy. Currently, Italian universities are implementing a hybrid solution, with university teachers teaching to a lim-

ited number of students present in the classroom, and the rest at a distance. This setting cannot be called Blended Learning but, at the same time, is no longer an ERT solution.

We acknowledge that the type of DE considered in this study cannot be considered as “normal” or intentionally designed practice (Graham, 2006; Stahl, 2002). However, as Universities look to move on from ERT and develop a sustainable DE offering post-pandemic, research is needed to understand the factors that would favour DE acceptance by university teachers (Amenduni et al., 2021; Carrillo & Flores, 2020). Here we intend to understand to what degree DE was accepted during the lockdown, considering it as a method to overcome the exceptional nature of the situation.

When introducing technological innovation in an educational context, it is essential to promote its acceptance by users involved in its use. Koet and Aziz (2021), in a systematic review of studies on teachers’ and students’ perceptions towards DE, found differences in social, technological, and pedagogical factors, including the availability of facilities and networks, ICT abilities, administration and learning assistance. The concept of DE acceptance can be borrowed from the more general “acceptance of a technology”, which is conceived as the user’s positive decision to adopt technology in their professional practices. A further differentiation is possible between the intention to use and the current use of a technological innovation (Ifenthaler & Schweinbenz, 2013; Simon, 2001). In this study we focus on the use of technology rather than the exclusion of face-to-face interaction. Several models attempt to explain the conditions under which innovation can be accepted, within professional and educational contexts. We refer to the *Technology Acceptance Model* (TAM; F. D. Davis, 1989; F. D. Davis, Bagozzi, & Warshaw, 1989), which originates from the *Theory of Reasoned Action* (TRA; Fishbein & Ajzen, 1975) and the *Theory of Planned Behavior* (TPB; Ajzen, 1991), originally used to understand computer acceptance (F. D. Davis et al., 1989). TAM postulates that the actual use of a technology is closely connected to the intention to use it, which in turn is determined by the perception of its usefulness and ease of use (Venkatesh & F. D. Davis, 2000). TAM has inspired research on the acceptance of many technological innovations, from tablets (Cacciamani et al., 2018) to e-learning (Teo, 2010a).

TAM is said to explain only 40% of the variance related to the adoption of a technological innovation (Venkatesh & F. D. Davis, 2000). This limitation had led to the development of the *Unified Theory of Acceptance and Use of Technology* (UTAUT; Venkatesh et al., 2003) which integrates core elements of different models of technology acceptance. According to UTAUT, acceptance can be explained by a set of key factors: Performance expectancy, effort expectancy, and social influence as predictors of behavioural intention to use, and facilitating conditions (e.g., technical infrastructure) as a predictor of actual use. In contrast to TAM, the variance explained by UTAUT has been found to be up to 70% (Venkatesh et al., 2003).

For the present study, we developed a study-specific questionnaire based on the Italian adaptation of the *Technology Acceptance Measure for Preservice Teachers* (TAMPST) to explore factors that may impact Italian university teachers' acceptance of DE as a method of education. TAMPST is one of the most commonly used tools to study technological innovation acceptance (Teo, 2010b), and integrates the four main theoretical models previously discussed. We further adapted the scale to include items about future intention to use DE.

The following research questions were considered in this study: What factors influence University teachers' acceptance of DE and how do they differ, in relation to:

- i) teaching flexibility prior to DE?
- ii) previous experience of DE?
- iii) specific training on DE?
- iv) the interaction between previous experience and training on DE?
- v) the delivery method of the DE (synchronous, asynchronous, mixed)?

## **Method**

### **2.1 Participants**

One hundred and twelve university teachers, with an average of 19.74 years of teaching experience, participated in the survey. Participants



were sampled from several Italian universities located across the national territory: 54% situated in the Central Regions, 24% in the North, 12% in the South and 6% in the Islands. Over half (53%) of the participants had experience of teaching disciplines within human sciences, sectors which in Italy female university teachers prevail; the remaining participants represented disciplines where male university teachers prevail: 19% teaching technical subjects, such as engineering and architecture; 16% mathematical, physical and natural sciences, and 11% economic and political-social sciences. Data collection was carried out exclusively online, from April to June 2020. University teachers were contacted by members of the research team via emails containing information about the study, informed consent and the survey link.

## 2.2 Materials

A translated and adapted version of the TAMPST questionnaire was used to explore factors influencing DE acceptance in Italian university contexts. All items were first adapted, replacing the terms ‘computer’ or ‘technology’ with DE. Additional items were included to capture a further dimension of DE acceptance: The intention to use technology in the future, inspired by a questionnaire by Lee et al. (2017). A back-translation technique was used to ensure concordance between the English and the Italian versions. Items were translated from English into Italian, then from Italian back to English by a different translator. Finally, a native English speaker, not involved in any of the two previous steps, compared the two English versions (the original one and the translation) and inconsistencies were resolved.

The final version includes five subscales: a) *Perceived Usefulness* (PU; 4 items): How useful DE is in teaching; b) *Perceived Ease of Use* (PEU; 3 items): How easy DE is to use; c) *Subjective Norm* (SN; 2 items): How much a user perceives that others (e.g., a colleague) believe that DE should be used; d) *Facilitating Conditions* (FC; 3 items): The degree to which technical infrastructures support the

use of DE; e) *Attitude Towards DE* (ATDE; 4 items): The degree to which the use of DE elicits positive affective reactions; and f) *Intention for Future Use of DE* (IFU; 4 items): The degree to which DE can be used in future teaching. Together, we call this questionnaire the *Teacher's Acceptance of Distance Education* (TADE). Items were measured on a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The full questionnaire is available in Appendix 1.

A measure of *Teaching flexibility* captured teacher's propensity to use diversified didactic strategies. Participants were divided into two groups, according to their pre-pandemic teaching strategies: Low teaching flexibility (i.e., university teachers who used exclusively traditional lecturing methods) and high teaching flexibility (i.e., used traditional lecturing with at least one other teaching strategies; such as group work, collective discussions, construction of artifacts or project work). *Previous experience of DE* and *specific training received* were detected by means of dichotomous items (yes / no). *Method of delivering DE* was identified by asking participants to choose one of the following delivery methods: Synchronous, asynchronous, and mixed.

### 2.3 Data analysis

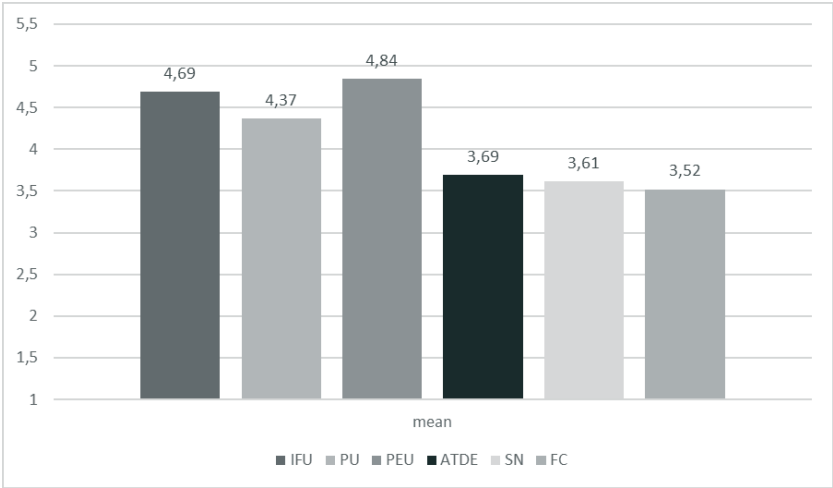
Preliminary data analysis did not reveal the presence of multivariate outliers. A Confirmatory Factor Analysis (CFA) was used to assess the adaptation of the questionnaire. The Mardia test (TADE value = 479.98, greater than the critical value = 420) verified the non-normality of the multivariate distribution. *Robust Maximum Likelihood Estimation* was used. Model fit was assessed by the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). According to Schermelleh-Engel et al. (2003), the values that may be interpreted as indicators of an acceptable fit are respectively: CFI between .97 and .95; RMSEA between .05 and .08 and SRMR between .05 and .10.

To provide an initial indication of the intention for future use of Distance Education and the perception of the factors that can influence it, an initial descriptive analysis was carried out. To answer the first research question, a univariate ANOVA was conducted assuming teachers' flexibility as an independent variable with two levels: Low and high teaching flexibility. The six dimensions measured by TADE were considered as dependent variables. Similarly, previous experience and training with DE were treated as independent variables (both with two levels: yes / no) in an ANOVA (2x2) where the six dimensions measured by the TADE questionnaire were considered as dependent variables. Regarding the last research question, a univariate ANOVA was conducted assuming the delivery mode of DE as an independent variable, with three levels (synchronous, asynchronous and mixed) and again the six dimensions measured by the TADE questionnaire as dependent variables.

## **Results**

Results obtained from the CFA show an acceptable goodness of fit of the six-factor model of the TADE (CFI =.94; RMSEA= .078; SRMR=.054). Internal reliability for the whole questionnaire (Cronbach Alpha .94) and of the six dimensions (ranging from .80 to .93) was satisfactory.

Participants were quite positive about the future use of DE (IFU:  $M = 4.69$ ;  $SD = 1.67$ ). DE was perceived as fairly easy to use (PEU:  $M = 4.84$ ;  $SD = 1.29$ ), but the support received in implementing DE was considered insufficient (FC:  $M = 3.52$ ;  $SD = 1.68$ ). Usefulness of DE was judged positively (PU:  $M = 4.37$ ;  $SD = 1.65$ ) (see Figure 1).



**Figure 1.** Means of the participant responses to the six dimensions of TADE questionnaire

With reference to teaching flexibility before the pandemic, almost all university teachers (97.3%) said they used traditional lecturing, 53.57% deployed student group activities, 27.68% organized student discussions, and a similar percentage reported requiring students to build an artifact. Project work was used by only 13.4% of the sample. The results relating to teaching flexibility prior the introduction of DE are reported in Table 1.

**Table 1.** Means (SD) of TADE dimensions depending on teaching flexibility prior to DE

Teaching flexibility before DE	N	IFU M (DS)	PU M (DS)	PEU M (DS)	ATDE M (DS)	SN M (DS)	FC M (DS)
Lecturing	40	4.26* (1.58)	3.89* (1.74)	4.89 (1.46)	3.45 (1.63)	3.40 (1.45)	3.62 (1.76)
Other teaching strategies	72	4.93* (1.52)	4.62* (1.55)	4.81 (1.19)	3.82 (1.68)	3.73 (1.81)	3.47 (1.65)

\* $p < .05$ ; \*\* $p < .01$

For participants who indicated that they used more than one teaching strategy pre-pandemic, as opposed to only traditional lecturing, the ANOVA reported statistically higher perceptions of both DE utility (PU:  $F(1, 110) = 5.30, p < .05$ ) and Intention for Future Use (IFU:  $F(1, 110) = 11.48, p < .05$ ). The results concerning specific training on DE, are presented in Table 2.

**Table 2.** Means (SD) of TADE dimensions depending on specific training on DE

Specific training on DE	N	IFU M (SD)	PU M (SD)	PEU M (SD)	ATDE M (SD)	SN M (SD)	FC M (SD)
No	77	4.56 (1.51)	4.24 (1.60)	4.70 (1.25)	3.48 (1.55)	3.41 (1.56)	3.17** (1.56)
Yes	35	4.97 (1.68)	4.65 (1.74)	5.13 (1.32)	4.15 (1.83)	4.06 (1.88)	4.30** (1.69)

\* $p < .05$ ; \*\* $p < .01$

The difference between trained and untrained university teachers was statistically significant only when considering the Facilitating Conditions (FC:  $F(1, 108) = 10.27; p < .01$ ). Trained teachers had a higher perception of benefiting from facilitating conditions offered by their organization. The results relating to the participants' previous experience with DE are reported in Table 3.

**Table 3.** Means (SD) of TADE dimensions depending on prior experience with DE

Prior experience with DE	N	IFU M (SD)	PU M (SD)	PEU M (SD)	ATDE M (SD)	SN M (SD)	FC M (SD)
No	59	4.21* (1.46)	3.83** (1.57)	4.62 (1.36)	3.18* (1.67)	3.12* (1.49)	3.30 (1.76)
Yes	53	5.23* (1.53)	4.97** (1.53)	5.08 (1.17)	4.26* (1.48)	4.16* (1.75)	3.77 (1.57)

\* $p < .05$  \*\*  $p < .01$

Prior experience of the use of some form of DE induced positive perceptions. Comparing users of DE to novice DE users, significant differences were found in terms of: Intention for Future Use of DE (IFU:  $F(1,108) = 5$ ;  $p < .05$ ), Perceived Usefulness (PU:  $F(1,108) = 8.64$ ;  $p < .01$ ), Attitude towards DE use (ATDE:  $F(1,108) = 5.60$ ;  $p < .05$ ), and Subjective Norm (SN:  $F(1,108) = 6.11$ ;  $p < .05$ ). No significant differences were found when looking at Perceived Ease of Use and Facilitating Conditions. Table 4 displays the results for the influence of Intention for Future Use, considering both specific training and previous experiences.

**Table 4.** Means (SD) of Intended future use depending on both specific training and DE past experiences

Past DE Experiences	Specific Training	N. of respondents	Mean	Standard Dev.
No	No	48	4.05	1.39
	Yes	11	4.93	1.59
Yes	No	29	5.42	1.32
	Yes	24	4.99	1.75

The ANOVA indicated a significant interaction effect Past DE Experience x Specific Training, ( $F(1,108) = 4.23$ ,  $p < .05$ ). Furthermore, DE acceptance and the perception of the factors that can influence DE acceptance did not significantly differ when considering the three modes of delivering DE (synchronous, asynchronous or mixed).

## Discussion

The study examined Italian university teachers' acceptance of the use of DE imposed during the first wave of the Covid-19 emergency. Specifically, it explores the differences that emerge in accepting DE and the factors that influence this: Teacher flexibility, previous DE experiences, specific training and mode of delivery.

Teaching flexibility may affect the perceived DE usefulness and intention for future use. University teachers who normally use mul-

multiple teaching strategies are most likely to perceive a higher utility of DE. They are also more likely to use DE in the future. Prior training on DE, does not favour the intention of using it in the future, but does influence a perceived reliance on the facilitating conditions offered by the organization.

Previous DE experiences influenced university teachers' intention for future use as well as almost all dimensions included in our model. Two dimensions not impacted were perceived ease of use and facilitating conditions. The interaction between past experience and DE training affected the intention to use DE in the future, university teachers with previous DE experiences and without specific training, or without previous DE experience but with specific training were more inclined to use DE in the future. No differences emerged in relation to the different modes of delivery.

The results align with studies from other countries during the pandemic (e.g., S. El Firdoussi et al., 2020; Lassoued et al., 2020). However, in a study conducted by Giovannella and Passarelli (2020), with university teachers it was found that their intention to continue teaching on-line in the future was driven by preconceptions rather than experiences and by the capability to manage one's own time. We did not investigate preconceptions, but it would be interesting to see if these are affected by previous experiences with DE and by teaching method flexibility.

In terms of teaching flexibility, the literature shows that this is a crucial condition for educational success at university level (Trede & McEwen, 2016). Long-lasting and deep learning is obtained, and the acquisition of soft skills is ascertained, including digital skills, which are essential for entering any professional market (Lawless & Pellegrino, 2007; Mason et al., 2009). Participants reporting flexible teaching methods are well disposed to use DE, probably because they rely on their versatility to integrate digital technologies within their teaching. Their diverse teaching methods may have made them feel capable to redesign their course to be delivered remotely. This sense of capability may favour a perception of a greater usefulness of DE, and its future use.

Specific training influenced higher perceptions of the support received by their organization (Facilitating Conditions), but did not

have an effect on the other dimensions. A possible interpretation of this result may be connected to the characteristics of the training received. In the rapid transition to DE during Covid-19, university teacher training may have focused on the technical aspects of use. However, Lassoued et al. (2020) highlight a major obstacle that university teachers have found in the online transition to be psycho-pedagogical in nature. Pre-pandemic research underlines that for DE, university teachers prefer training focused on how to facilitate students' participation (Muñoz Carril et al., 2013). They want to be trained to design courses where students can interact online and take an active role in knowledge building processes (Cacciamani et al., 2019). More influential to acceptance are prior DE experiences. They represent a wealth of practices from which individuals can draw on to cope with the innovation dictated by the emergency and lead to positive perceptions of how students cope with DE results. Jelinska and Paradowski (2021) reported that teachers who had used DE pre-pandemic estimated that their students were coping better and had fewer difficulties, compared with their colleagues who never conducted online courses. The interaction we found between training and past experiences can be interpreted in the same direction.

Practical implications can be derived from the present study. The findings outline the importance of delivering specific DE training to promote the adoption of DE. Training that provides an understanding of technical functionalities and tools required and also promotes theoretical frameworks guiding the use of technology for effective learning is required. As Farnell et al. (2021) state, the impact of the pandemic presents an opportunity to rethink methods of teaching and learning in higher education; but this requires providing support and training in adapting curriculum and methods. Institutions should also promote teaching flexibility to improve practical experiences. Flexibility provides a valuable resource in day-to-day delivery of teaching and is crucial for educational responses to emergency situations.

A limitation of the present research is that we did not specifically explore the type of training received and the type of DE experience previously gained by the participants. These elements could have provided more articulated interpretative explanations for the results ob-



tained. In addition, we have not collected specifically data about gender, and we are aware of this limitation, considering the need to reflect about differences in DE acceptance concerning gender dimension. Furthermore, we do not have information about the academic ranks of the university teachers involved. Distinguishing between individuals at different career stages and/or with different workload patterns could be explored in a future development of the study. Finally, the limited number of university teachers who responded to our survey requires caution regarding the generalizability of the results obtained.

Future research directions could consider how DE has been used during subsequent waves of the pandemic and monitor its development in a post-lockdown world. Furthermore, research should consider specific DE training methods to further our understanding of successful and necessary approaches to user training. Finally, as we look to the future, we should consider how the professional skills and teaching strategies developed during the imposition of DE could be capitalized on and used to design blended learning environments. To this aim, pandemic experiences and insights from research into blended approaches (Graham, 2006; Ligorio et al., 2006; Ligorio & Sansone, 2016) will together be precious commodities in promoting the development of purposely designed training for university teachers.

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## **APPENDIX 1**

Teacher's Acceptance of Distance Education (TADE) Questionnaire  
(Adapted from Teo, 2010b)

1. Using Distance Education will improve my work (PU)
2. Distance Education makes my work more interesting (ATDE)
3. My interaction with Distance Education is clear and understandable (PEU)
4. I look forward to those aspects of my job that require me to use Distance Education (ATDE)
5. When I need help to use Distance Education, specialized instruction is available to help me (FC)
6. Working with Distance Education is fun (ATDE)
7. I find it easy to have Distance Education do what I want it to do (PEU)
8. In the future I will continue to use some tools for Distance Education (IFU)
9. Using Distance Education will increase my productivity (PU)
10. I find Distance Education easy to use (PEU)
11. When I need help to use Distance Education, a specific person is available to provide assistance (FC)
12. I will strongly recommend other colleagues to include Distance Education in their regular teaching (IFU)
13. People whose opinions I value will encourage me to use Distance Education (SN)
14. I like using Distance Education (ATDE)
15. People who are important to me will support me in using Distance Education (SN)
16. Assuming I will have access to Distance Education in future, I will certainly use it (IFU)
17. Using Distance Education will enhance my effectiveness (PU)
18. When I need help to use Distance Education, guidance is available for me (FC)
19. I find Distance Education a useful tool in my work (PU)
20. I will use tools for Distance Education as much as possible in the future (IFU)