TRANSNATIONAL TRAINING FOR PROFESSIONAL DEVELOPMENT THE CASE OF TEACHER TRAINING IN FRANCOPHONE AFRICA

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Abstract

In line with the Education 2030 Agenda for achieving the Sustainable Development Goals (SDGs article explores the significance of professional development in improving public policies on employment and skills management. It emphasizes the role of professional development in higher education and its interface with the socio-professional world.

The article presents the results of an experiment conducted by an African university and UNESCO ECHEI, highlighting the positive changes in participants' beliefs and skills in designing and producing educational capsules.

Keywords: Professional development, education**,** human capital, higher education, Africa, digital skills, ICT.

INTRODUCTION

Teacher training has undergone significant transformations throughout history. In the past, teachers were experienced individuals whose accumulated knowledge formed the basis of their teaching. During the Middle Ages, teacher training took place in monastic schools, where students learned classical subjects and teaching methods. In the 19th century, normal schools, often attached to universities, were established to train teachers for the public schools. It was not until the 20th century that universities began to introduce teacher training programs and set professional standards for teachers. Universities have begun offering faculty programs to improve their teaching skills. At the same time, educational research is also evolving. Today, teacher education is evolving to adapt to new technologies and educational needs. Teachers are trained to use digital tools to enhance learning, work with students of all skill levels, and adapt to students' educational needs in a changing environment.

Education, higher and vocational education, and scientific research, considered key determinants of success, would foster an innovative and prosperous society rooted in the knowledge economy.

In addition, the transformation of the labor market and the integration of young people into the workplace has necessitated the modernization of universities and the improvement of their performance. The latter expects to learn and receive instruction following his personal preferences. According to Taylor (2012), technology "is changing the way young adults think and learn, including how they process information, their attention span, their decision-making, and their memory."

Today, technology is also affecting the way students socialize and interact with others, and enabling new dimensions in the relationship to knowledge, for both teacher and student. Thus, its use opens up new communicative possibilities in the teacher-student relationship and allows it to be extended. In this context, it is clear that more and more teachers are finding answers to their pedagogical needs in the new digital tools available, in particular electronic devices, in this case, smartphones whose penetration rate in our society is very high (see figure below).

In this context, new pedagogical methods are being developed and aim to transfer the technology that floods our lives, with the sole aim of achieving personalized and meaningful learning. Universities have made significant investments and the demand for personal and institutional education has increased. Faced with this dynamic, teachers divide themselves into two categories: those who believe their skills need to be retrained and others who believe they are immune to this development.

Problematic

Digital pedagogy is increasingly recognized as a powerful tool for improving student learning. However, in order to implement effective digital pedagogy, teachers must have strong digital skills. Research shows that

teacher training in digital pedagogy is an effective way to improve teachers' digital skills. However, like other African countries, Morocco has no formal teaching training requirements for university professors.

Their practices are generally based on their experiences and the culture of the institution (Nizet L., J Côté J.A. and Lison C., 2022). However, the disruptions caused by ICTs have led quality-conscious institutions such as Cadi Ayyad University to set up a training cycle with the aim of adapting teachers' skills to the demands of the current context. The effectiveness of this action depends on the impact of this training on the perceptions and skills of the teachers who have benefited from this cycle. The objective of this article is to find out whether the implementation of a teacher training program in digital pedagogy would improve the digital skills of the teacher.

Literature Overview

Analysis of research on the role of teachers in digital teaching reveals two types of work: on teacher education programs and the use of ICT in the classroom, and on ways to improve teacher preparation to use ICT effectively ICT. On the other hand, those who examine how teachers use ICT in teaching, what barriers they face and what factors facilitate or hinder ICT use; and those interested in the impact of ICT use on learning. This study examines the impact of ICT use on student learning, including the advantages and disadvantages of using ICT in education. Research by researchers such as P. Mishra and M.J. Koehler (2006) has shown that teacher training in educational technology can improve teachers' digital skills and increase the use of technology in the classroom.

In addition, several studies in the field of teacher education for digital instruction have been conducted in different contexts and countries with similar results, showing that professional technical education improves teachers' technical skills and leads to greater use of technology in the classroom.

A study conducted by N. Bakir et al (2016) also showed that teacher training in educational technologies can improve teachers' digital skills and increase the use of technology in the classroom.

According to their study, teachers who participated in educational technology training showed an increase in their technological skills and increased use of technology in the classroom.

Several authors who have examined the impact of a technology professional education program on the self-efficacy and attitudes of future teachers have shown that the training program has increased future teachers' self-efficacy and positive attitudes toward technology.

Rasmy, A and T Karsenti. T (2016) examined the determinants of teacher motivation in the context of professional development. The results showed that training is one of the main determinants of teacher motivation. Similarly, Didion, L., Toste, J. R, and Filderman, M. J. (2020) conducted a meta-analysis to assess the impact of vocational training on student achievement. The results showed that teachers' professional development positively and significantly affects the performance of their students.

Training teachers in digital pedagogy could therefore be an effective way to improve teachers' digital skills and foster the use of technology in the classroom. It remains to be seen how a training program could improve teachers' skills.

Indeed, the development and implementation of a teacher training program in digital pedagogy can improve teachers' digital skills in several ways.

Several models and theories have been developed in the field of teacher training in digital pedagogy. The Technological Pedagogical Content Knowledge (TPACK) model, developed by Mishra and Koehler (2006), describes how teachers combine their knowledge of content, pedagogy, and technology to teach effectively. The SAMR (Substitution, Increase, Modification, Redefinition) model, proposed by Fr. Ruben Puentedura in 2006, describes how technologies can be used to improve and transform education. The theory of connected learning, developed by George Siemens in 2005, highlights the importance of social relations and networks in online learning, is also relevant for teacher training in digital pedagogy.

Other models and theories have been developed by other authors for teacher training in digital pedagogy such as the C3 model (Creativity, Knowledge, Competence) developed by G. D. Siemens (2015), the ADDIE model (Analysis, design, development, implementation, evaluation) developed by A. Rossett (1999), or the ARCS model (Attention, Relevance, Confidence, Satisfaction) developed by J. Keller (1987).

These models and theories have all contributed to the understanding of the integration of technology in teaching and have been used to help trainers design and implement effective teacher training programs.

Hou and Y. Lai (2017) examined the impact of a training program modeled on TPACK (Technological Pedagogical Content Knowledge) for teachers who set up a flipped classroom. The results showed that the training program improved teachers' TPACK skills and led to increased use of flipped classroom in teaching.

In the African context, few studies have been conducted on teacher training in digital pedagogy, particularly in higher education. Authors such as Darko (2015) and Mwalongo (2011) examined the use of ICTs to improve

pedagogy in teacher professional development in Africa. The results showed that the training improved teachers' skills and led to increased use of ICT in teaching.

In addition, the hybrid approach seems to be the most adopted for teachers' professional development according to several studies. Thus, Peraya, D., Peltier, C., & Villiot-Leclercq, E. (2012), Lameul, G., Eneau, J., Charlier, B., Lebrun, M., Lietard, A., Peltier, C., ... & VilliotLeclercq, E. (June 2011) believe that the adoption of the hybrid system affects teachers' practices. In the experiments conducted by these authors, the training programs were delivered according to a hybrid system (*Blended-learning*) supported by a training platform in SPOC (Small Private Online Courses) format. The latter would be more suitable for small groups and would allow more autonomy in the learning process (Lebzar B. et al., 2016).

Method Experience setup

This experiment aims to improve the quality of education by empowering teachers and allowing to improve their knowledge and skills.
The project consists of curriculum development and transnational training of teachers from eleven French-speaking African countries.
The training was designed based on the methods of Horton (2000). The course was delivered entirely online as the trainees targeted for this program come from different institutions and countries in Africa.
In general, the design was learner-centered taking into account the diversity of the trainees' technical skills as well as the varied accessibility to IT facilities in Africa as shown in the following figure.

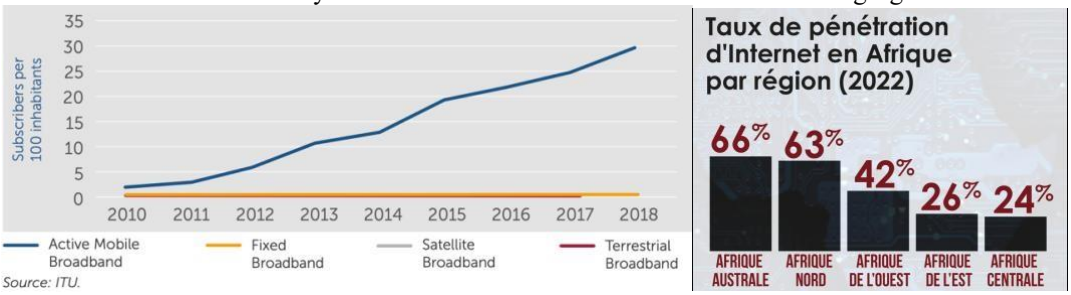

Fig. 1: Evolution of ICT adoption in Africa - Source: IUT reports 2018 and 2022

The program was designed to be flexible, accessible and cost-effective. All learning materials, including videos and slides, are open, and available for download and offline access.

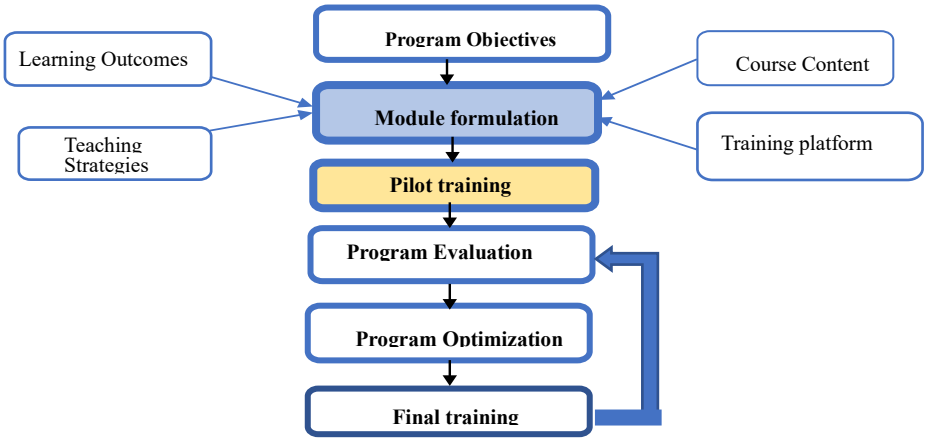

Fig. 2: Training Program Development Process

The training was delivered according to the blended learning model supported by a training platform and according to a SPOC (Small Private Online Courses) form. Blended learning is defined in different ways by several authors such as Graham, Allen, and Ure (2005). In this project, the form adopted is a mix of online and offline learning (Graham, 2006; Osguthorpe, and Graham, 2003; Watson, 2008).

Fig. 3: Learning Process

To acquire the skills expected from this training, synchronous sessions were organized to address aspects requiring direct interaction with the teacher.

Learning strategies used included presentation, tutorial discussion, and practice. In keeping with the experiential learning model, each module was initiated with an online conference (synchronous and asynchronous), which was immediately followed by a group discussion session to digest the content. Subsequently, there will be a critical reading task of the module material accompanied by well-designed questions to guide the in-depth analysis of the content.

The final module of the program was a capstone project where trainees will be challenged to apply the knowledge, and skills they have acquired during their training to produce an online course. Interns were allowed to choose their respective projects and work under the guidance of one of the facilitators as tutors.

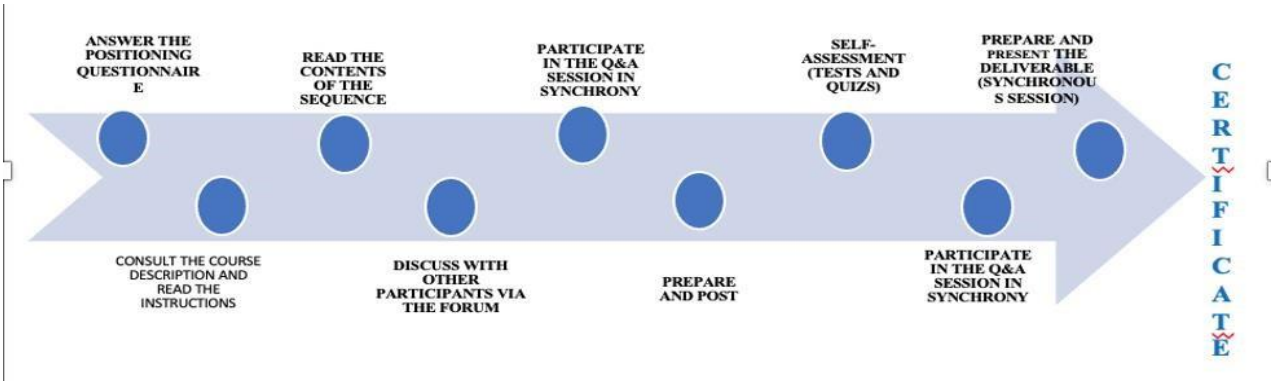

Fig. 4 Learner's journey

Results

Test results before and after training on the use of video in learning. It should be noted that all participants answered a questionnaire before and after the training. The objective of this questionnaire is to measure teachers' beliefs and skills regarding the use of video in teaching. It consists of 10 statements on the use of video in instruction, where teachers rated their degree of agreement or disagreement with each statement on a scale of 1 to 5.

Table 1

Questions	Before	Aprests	Difference
1: The use of video in learning is important	4,3824	4,7941	0,4118
2: The use of video is possible in all learning situations	3,4706	4,5294	1,0588
3: I can adapt the course curriculum to the use of video clips	3,3529	4,5455	1,1925
4: I can write a script and make an educational video	2,6471	4,3824	1,7353
5: I can draw a storyboard to create more elaborate educational videos	2,0294	4,1471	2,1176
6: I need to take the necessary steps to have clear sound in a video	3,2647	4,5588	1,2941
7: I can easily add animations and effects to make the video more attractive	2,2647	4,1176	1,8529
8: To produce and stream video, I can check the resolution of the recording and production	2,4706	4,3529	1,8824
9: Overall, I can produce educational videos	2,5588	4,5882	2,0294
10: Overall, I can use educational videos in my classes	3,2353	4,7353	1,5000

It can be seen that post-training scores are significantly higher than pre-training results, which means an improvement in teachers' beliefs and skills regarding the use of video in teaching.

The most important differences are found in states 2,3,4,5,7 and 9. Teachers seem to have a better understanding of the use of video in all learning situations and have a better ability to adapt the curriculum

to the use of video capsules, write a script and make an educational video, and draw a storyboard to make more elaborate educational videos, add animations and effects to make the video more engaging, and produce educational videos.

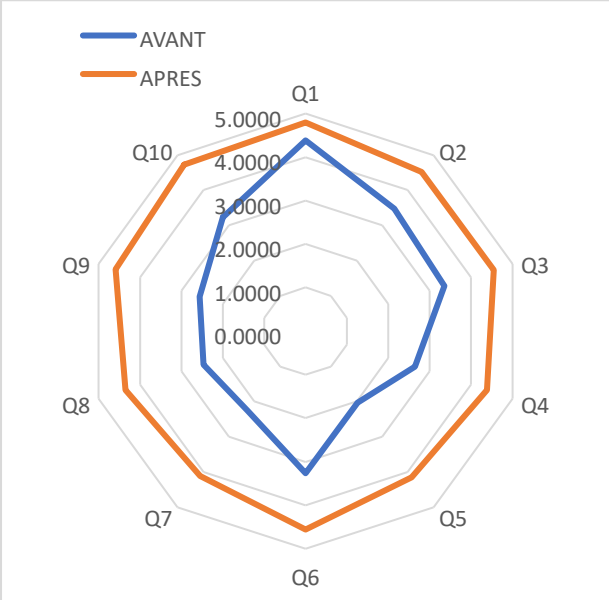

Figure 1- Results before and after training

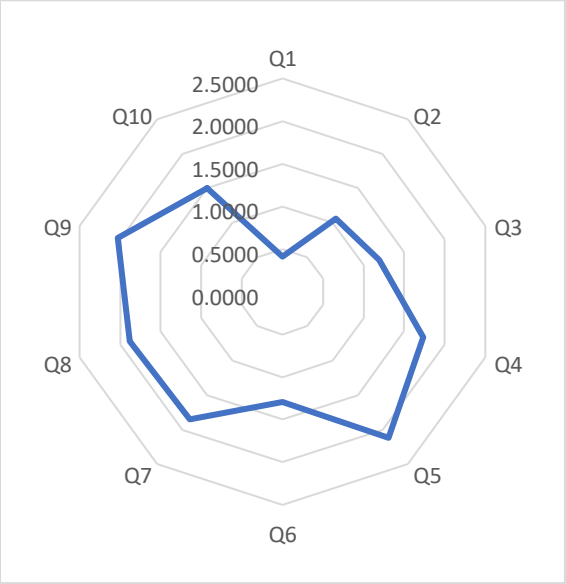

Figure 2: Difference before and after

Table 2 - Matching Samples

		Paired differences					t	Ddl	
		Average	Standard deviation	Average standard error	Confidence interval 95% of difference				Sig. (bilateral)
					Inferior	Upper			
Pair 1	Q1AV - Q1AP	-,41176	,89163	,15291	-,72287	-,10066	-2,693	33	,011
Pair 2	Q2AV - Q2AP	-1,05882	1,41295	,24232	-1,55183	-,56582	-4,370	33	,000
Pair 3	Q3AV - Q3AP	-1,24242	1,14647	,19957	-1,64894	-,83590	-6,225	32	,000
Pair 4	Q4AV - Q4AP	-1,73529	1,50371	,25788	-2,25996	-1,21063	-6,729	33	,000
Pair 5	Q5AV - Q5AP	-2,11765	1,51287	,25945	-2,64551	-1,58978	-8,162	33	,000
Pair 6	Q6AV - Q6AP	-1,29412	1,76720	,30307	-1,91072		-4,270	33	,000
Pair 7	Q7AV - Q7AP	-1,85294	1,50015	,25727	-2,37637	-,67751	-7,202	33	,000
Pair 8	Q8AV - Q8AP	-1,88235	1,40916	,24167	-2,37403	-1,32951	-7,789	33	,000
Pair 9	Q9AV - Q9AP	-2,02941	1,31392	,22534	-2,48786	-1,39067 1,57096	-9,006	33	,000
Pair 10	Q10AV - Q10AP	-1,50000	1,46163	,25067	-2,00999	-,99001	-5,984	33	,000

The results of the matched sample show the differences between the "before" and "after" training scores for each question. Thus, the mean, standard deviation, mean standard error and confidence interval give information about the mean differences and variability of the results and show that the statistical test is significant.
The statistical analysis "P-value" indicates the probability that the observed differences are due to chance. In our case, the results show that for all questions, the observed differences are statistically significant ($p<0.01$) which shows that the training had an impact on teachers' skills in the use of video in teaching.

Table 3 - Statistics (Pre-Training Test)

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
N Valid	95	95	95	95	95	94	94	94	94	
Missing	0	0	0	0	0	1	1	1	1	
Evil	4,35	3,72	3,64	3,13	2,80	3,78	2,74	2,96	3,06	3,46
Median	5,00	4,00	4,00	3,00	3,00	4,00	3,00	3,00	3,00	4,00
Standard deviation	,896	1,088	1,148	1,393	1,404	1,288	1,414	1,383	1,318	1,301
Skewness	-1,293	-,572	-,594	-,038	,200	-,866	,233	,003	-,005	-,459
Standard error of asymmetry	,247	,247	,247	,247	,247	,249	,249	,249	,249	,249
Kurtosis	1,222	-,194	-,400	-1,283	-1,190	-,258	-1,273	-1,154	-1,040	-,841
Erreur type Kurtosis	,490	,490	,490	,490	,490	,493	,493	,493	,493	,493

According to this table, which presents the test results "before" and "after" training, we can see the differences in scores for each question of the test. Thus, it appears that scores increased for all questions, with significant differences for all but one question.
This indicates that digital teacher training has had a positive impact on teachers' digital skills.

Table 4 - Statistics for matched samples

		Evil	N	Standard deviation	Average standard error
Pair 1	Q1AV	4,3824	34	,95393	,16360
	Q1AP Q2AV	4,7941	34	,41043	,07039
Pair 2	Q2AP	3,4706	34	1,23669	,21209
		4,5294	34	,61473	,10543
Pair 3	Q3AV	3,3030	33	,95147	,16563
	Q3AP	4,5455	33	,56408	,09819
Pair 4	Q4AV	2,6471	34	1,20309	,20633
	Q4AP	4,3824	34	,65202	,11182
Pair 5	Q5AV	2,0294	34	1,16737	,20020
	Q5AP	4,1471	34	,70205	,12040
Pair 6	Q6AV	3,2647	34	1,46285	,25088
	Q6AP Q7AV	4,5588	34	,66017	,11322
Pair 7	Q7AP	2,2647	34	1,16278	,19941
		4,1176	34	,80772	,13852
Pair 8	Q8AV	2,4706	34	1,13445	,19456
	Q8AP	4,3529	34	,64584	,11076
Pair 9	Q9AV	2,5588	34	1,15971	,19889
	Q9AP	4,5882	34	,55692	,09551
Pair 10	Q10AV	3,2353	34	1,32708	,22759
	Q10AP	4,7353	34	,44781	,07680

Table 5- Matched sample tests

		Paired differences					t	Ddl	Sig. (bilateral)
		Average	Standard deviation	Average standard error	Confidence interval 95% of difference Inferior	Upper			
Pair 1	Q1AV - Q1AP	-,41176	,89163	,15291	-,72287	-,10066	-2,693	33	,011
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Pair 10	Q10AV - Q10AP	-1,50000	1,46163	,25067	-2,00999	-,99001	-5,984	33	,000

It can be seen that the differences between pairs are statistically significant for all questions with very low significance levels (less than 0.05). These differences show that post-training scores (Q1AP to Q10AP) are significantly higher than pre-training scores (Q1AV to Q10AV)

It is also noted that the standard deviations of the differences are quite high compared to the differences in means. This indicates that the results vary from person to person.

Looking at the trainer scores for the teachers' deliverables shows that the scores in the different criteria are quite high, meaning that the teachers have benefited well from the training overall. However, this result should be put into perspective if we take into account the differences between the scores. Indeed, we found very low scores for many teachers. This significant dispersion of scores could be explained by the profile and experience of each participant, his motivation, the degree of involvement, etc.

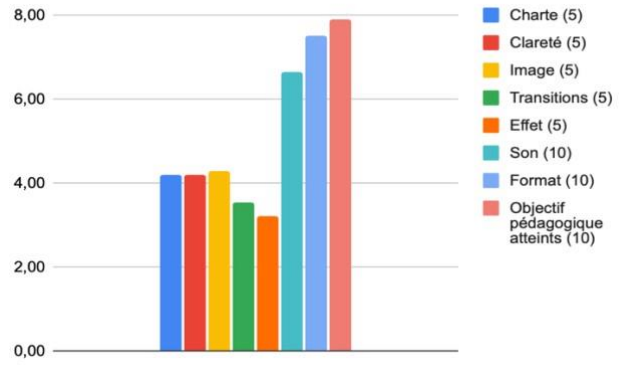

Figure 3 - Scores by criterion

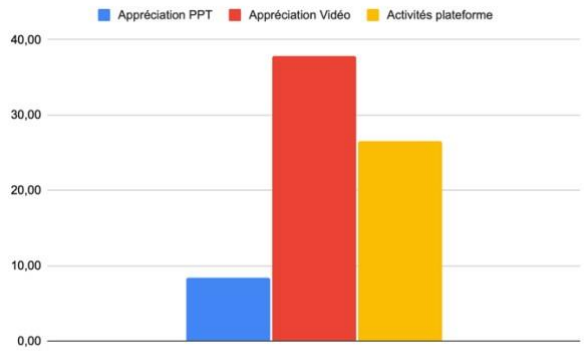

Figure 4 - Overall averages

Comparing the averages, we see that the averages of the criteria "Educational objective achieved" and "PPT appreciation" are quite similar, indicating that teachers have generally understood the pedagogical objectives of the training and have developed quality PowerPoint presentations. However, the average of the "Platform Activities" criterion is somewhat lower, which could indicate that teachers had difficulty using the platform for activities. Finally, the average "overall score" is high, which shows that teachers have benefited overall from the training.

CONCLUSION

The results of our study confirm previous research and show that teacher training in digital pedagogy in the context of professional development can significantly improve teachers' digital skills and increase the use of technology in the classroom.

The hybrid system through the SPOC would also be appropriate in this type of program insofar as it takes into account the constraints of teachers and allows more flexibility and autonomy in the learning process. Another factor that seems decisive in terms of participants' motivation is the certification of the skills acquired, which represents a reward for the teachers who have followed and achieved the requested deliverables.

Teacher training is, therefore, crucial to improve the use of ICT in teaching and to promote learning and create a learning dynamic, thus promoting teachers' professional development and thus the quality of teaching. It can have many benefits namely increased the teachers' professionalism, experienced and innovated their knowledge and skills toward the use of digital learning (Syafryadin and al. 2021).

REFERENCES

Bakir, N., Devers, C. and Hug, B. (2016). Affordances and constraints of a blended course in a teacher professional development program. Journal of Educational Multimedia and Hypermedia, 25(4), 323341.

Chen T.M., Y.J. Liang et C.C. Tsai (2010) The Impact of a Technology Professional Development Program on Preservice Teachers' Self-Effectiveness and Attitudes »

Gaudin, C., & Chaliès, S. (2015). Viewing Videos for Teacher Education and Professional Development: A Literature Review. Journal of Education Research, 16, 41-67.

Graham, C. R., Allen, S., & Ure, D. (2005). Benefits and challenges of blended learning environments. In Encyclopedia of Information Science and Technology, first edition (pp. 253-259).

Hall, J. A. (2018). Returning to the first principles of teaching: a review of the development of technological integration of teachers in training. Journal of Digital Learning in Teacher Education, 34(4), 201-218.

Horton, W. K. et Horton, W. (2000). *Design a training in line: How to Teach Anyone Anything, Anytime* (Vol. 1). New York: Wiley.

Hou Y. et Lai Y. (2017), The impact of a Flipped Classroom Professional Development Program on Teachers' TPACK »

Keller, J. M. (1987). Development and use of the ARCS instructional design model. Journal of instructional development, 10(3), 2.

Lameul, G., Eneau, J., Charlier, B., Lebrun, M., Lietard, A., Peltier, C., ... & Villiot-Leclercq, E. (2011, June). Effects of hybrid training programs on professional development. Development of a conceptual and methodological framework in Hy-Sup research". In Proceedings of the conference "Questions of pedagogy in higher education" (pp. 173-184).

Lebzar, B., Bendaoud, R., & Berrada, K. (2016). SPOCs, another way to develop initial and continuing training. International Journal of Pedagogical Innovation in Higher Education.

Metikaridis, D. and Xinogalos, S. (2021). A comparative analysis of location-based game development tools. Entertainment Computing, 37, 100403.

Mishra, P. and Koehler, M. J. (2006). Knowledge of pedagogical content technological: A framework for teachers' knowledge. Teachers college record, 108(6), 1017-1054.

Mwalongo, A. (2011). Teachers' perceptions of ICT for teaching, professional development, administration and personal use. International Journal of Education and Development using ICT, 7(3), 36-49.

Nizet, I., Côté, J. A., & Lison, C. (2022). Professional development in higher education evaluation by higher education teachers. International Journal of Higher Education Pedagogy, 38(38 (2)).

Osguthorpe, R. T. et Graham, C. R. (2003). Blended learning environments: definitions and guidance. Distance Learning Quarterly Review, 4(3), 227-33.

Owston, R. D., Sinclair, M. and Wideman, H. (2008). Joint learning for development professional: an evaluation of a program for secondary math and science teachers. Teachers College Record, 110(5), 1033-1064.

Park.J, Lim. Y and Lim J. (2019) Exploring the effects of online professional development on the integration of teacher technology »

Patton, K., Parker, M. et Tannehill, D. (2015). Helping teachers help themselves: professional development that makes a difference. NASP Newsletter, 99(1), 26-42.

Patton, K., Parker, M. et Tannehill, D. (2015). Helping teachers help themselves: professional development that makes a difference. NASP Newsletter, 99(1), 26-42.

Peraya, D., Peltier, C., & Villiot-Leclercq, E. (2012). What are the effects of hybrid training schemes on learning processes, on teachers' professional development and on institutions? Proceedings of the International Congress of University Pedagogy, May 14-18, Quebec City.

Rasmy, A,.and Karsenti, T. Determinants of teacher motivation in the context of continuing professional development related to technology integration. International Review of Technology in Higher Education, 2016. Volume 13, Number 1.

Rossett, A. (1999). Knowledge management meets analysis. Training & Development, 53(5), 62-69.

Siemens, G. (2015). Preparing for Digital University: An Examination of the History and Current State of Remote, Blended and Online Learning.

Syafryadin, S., Wardhana, D. E. C., & Febriani, R. B. (2021). Digital training for increasing English teachers' professionalism at junior high school. *Journal of Education and Learning (EduLearn)*, *15*(1), 27-35.

Taylor, P. C., Taylor, E. and Luitel, B. C. (2012). Multi-paradigmatic transformative research as/for teacher training: an integral perspective. Second International Science Education Textbook, 373-387.

Watson, J. (2008). Blended learning: the convergence of online and face-to-face education. Promising practices in online learning. North American Council for Online Learning.

Wetzel C., Georgiou J. et Papastergiou K. (2019), « Investigating the Impact of Technology Professional Development on Teachers and Students ».

Yılmaz, Y., Çalışkan, S., Darcan, Ş. & Darendeliler, F. (2022). Flipped Learning in Faculty Development Programs: Opportunities to Increase Faculty Engagement, Self-Learning, Collaboration and Discussion. Turkish Journal of Biochemistry, 47 (1), 127-135.

Reports:
International Telecommunication Union Global Connectivity Report 2022