Exploring the use of YouTube across different teaching groups: a digital profile analysis

Explorando el uso de YouTube entre diferentes colectivos docentes: un análisis de perfiles digitales

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ABSTRACT

This study assesses the digital competences of pre-service and in-service teachers in Early Childhood Education, Primary Education, and Higher Education regarding YouTube use. Given the scarcity of previous research on this topic, three objectives are proposed. Firstly, to find out the level of digital competence in the use of YouTube. Secondly, to analyze possible disparities in the use of YouTube among educators at each educational stage. Finally, to identify significant predictors that influence the use of YouTube. To measure these competencies, the instrument of Guillen-Gámez et al. (2023) was used through an ex post facto approach and a non-probabilistic sampling with a sample of 1706 teachers. Both educational stages and types of teachers expressed medium and high self-perceptions in information search and selection, but low self-perceptions in the creation of educational material. Significant differences exist between teacher groups at both stages, suggesting the need for a differentiated approach to professional training in YouTube use. Additionally, gender, creation and subscription to educational channels, and the ability to include images or questions in video editing are significant predictors of these skills according to the teaching group. These findings imply the need to recognize individual differences in educators' skills and tailor training programs to their needs.

Keywords: digital competence; teachers in training; competence assessment; YouTube.

RESUMEN

Este estudio evalúa las competencias digitales de docentes en formación y docentes en servicio de Educación Infantil, Educación Primaria y Educación Superior, en relación con el uso de YouTube. Dada la escasa investigación científica previa sobre este tema, se plantean tres objetivos. En primer lugar, conocer el nivel de competencia digital en el uso de YouTube. En segundo lugar, analizar posibles disparidades en el uso de YouTube entre los educadores de cada etapa educativa. Por último, identificar predictores significativos que influyan en el uso de YouTube. Para medir estas competencias fue utilizado el instrumento de Guillen-Gámez et al. (2023) a través de un enfoque ex post facto y un muestreo no probabilístico con una muestra de 1706 docentes. Tanto ambas etapas educativas como tipos de docentes manifestaron autopercepciones medias y altas en búsqueda y selección de información, pero bajas en creación de material educativo. Respecto al segundo objetivo, existen diferencias significativas entre los diferentes grupos de docentes de ambas etapas, lo que sugiere la necesidad de abordar de manera diferenciada la formación profesional en el uso efectivo de YouTube. Además, fue identificado que el sexo, la creación y suscripción a canales educativos, así como la habilidad de incluir imágenes o preguntas en la edición de los videos son predictores significativos en el desarrollo de estas habilidades en función del grupo docente. Estos hallazgos implican la necesidad de reconocer las diferencias individuales en las habilidades de los educadores y adaptar a sus necesidades los programas de formación.

Palabras clave: competencia digital; docentes en formación; evaluación de competencias; YouTube.

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INTRODUCTION

Technological advancements have revolutionized teaching and learning methods for both students and teachers through enhanced access to technology and the Internet (Şimşek & Ateş, 2022). Consequently, various digital media have been integrated into educational practices, with the YouTube video platform being particularly significant (Marín-Díaz et al., 2022; Ríos Vázquez & Romero Tena, 2022).

YouTube is the most popular and relevant video platform worldwide, with over two billion users (Abdullah et al., 2023). Its widespread acceptance extends to the educational community (Abubakar & Muhammed, 2023). From a pedagogical perspective, YouTube enhances the teaching and learning process as it offers access to a vast array of up-to-date educational content (Pattier & Ferreira, 2022). It enables students to learn dynamically, visually, and practically, while also promoting social interaction and collaboration through online comments and discussions (Colás-Bravo & Quintero-Rodríguez, 2023; Dubovi & Tabak, 2020).

Scientific research has shown that YouTube stimulates critical thinking, fosters collaborative learning, and increases student motivation (Muslem et al., 2022). Additionally, students value videos as learning tools that enhance their performance, with significant differences observed between students who use YouTube and those who do not (Laugerman & Saunders, 2019; Mohammed & Ogar, 2023). The main reason is that videos can explain concepts and provide real-world examples (Tiernan & O'Kelly, 2019). While these benefits have encouraged teachers and instructors to create and share audiovisual content on YouTube, educational professionals need to improve their digital competencies to effectively integrate this resource into their instructional design. Similarly, it is necessary to improve digital literacy training for trainee teachers to maximize the educational potential of YouTube (García-Sampedro et al., 2024).

Several studies have highlighted the skills teachers must possess to effectively integrate YouTube into the classroom. These include content production and editing (Watt, 2019), as well as the ability to search for and distinguish relevant and reliable educational content using tools such as filters. Teachers should also be able to create engaging and meaningful educational content, incorporating elements including music, subtitles, and annotations (Guillén-Gámez et al., 2023; Guillén-Gámez, Colomo-Magaña et al., 2024). Other authors emphasize the importance of maintaining optimal visual and auditory quality in audiovisual materials. This requires basic skills in handling cameras, microphones, and editing software to enhance the video's aesthetics and coherence (Castillo et al., 2021). Additionally, linguistic skills are crucial for communicating ideas clearly and simply, avoiding the excessive use of technical jargon, especially for live educational videos (Avila & Varas, 2021). Furthermore, YouTube itself offers numerous educational resources that can promote and enhance digital literacy training (Neumann & Herodotou, 2020).

Given the critical role of teachers in educating new generations, it is essential that they receive digital training to effectively use YouTube as a teaching strategy. However, the literature reveals a gap, as few studies address this issue comprehensively. This gap refers to both trainee and practicing teachers in Early Childhood and Primary Education, as well as active teachers in Higher Education. How to close this gap is the primary contribution of this study.

The authors pose the following questions: Are teachers adequately trained in digital skills so they can use YouTube as a teaching resource? Are Higher Education

teachers more proficient in these digital skills compared to other teaching groups (pre-service and in-service teachers), given that teaching is often taught at university level? What predictors significantly impact teachers' digital skills?

Related research

This section is organized based on the research questions outlined in the previous section and the study's objectives, which are detailed at the end of this section.

Few studies have investigated the skills needed to use YouTube among active teachers or those in training, especially in the early stages of their careers. For example, Basgall et al. (2023) analyzed the digital skills of in-service teachers across various educational stages in Spain (Early Childhood Education, n=226; Primary Education, n=887). The study found that teachers at both stages had similar skills levels, scoring high at searching for and sharing content but medium-low in creating audiovisual material. In a related context, Watt (2019) qualitatively analyzed the perceptions of 40 trainee teachers at the Primary Education level at the University of Ottawa (Canada). The study revealed inadequate training in multimedia material creation, with responses such as, "I find technology very daunting, and I don't really like videos on my phone or anything like that. I don't know how to upload or edit them, so I don't really have any experience" (p. 89). Similar results were found by Tomczyk et al. (2023) and Domínguez and Murillo-Estepa (2018). They identified that the main reasons for not creating a YouTube channel with educational content were a lack of training, the extra workload it entailed, and insufficient time.

Regarding Higher Education teachers, no scientific studies specifically measure digital skills related to YouTube usage. Although previous research has focused on the frequency of use and benefits of the platform, none have evaluated teachers' digital competencies in using YouTube. Closing this gap is one of the main contributions of the present research.

Comparative studies on digital competencies for the didactic use of YouTube between practicing teachers and teachers in training at each educational stage are lacking. While a wide range of research explores the digital competencies of both practicing teachers and future educators, these studies rarely focus on creating multimedia content such as educational videos or the skills needed to search for and share information effectively on the YouTube platform.

In the specific context of multimedia material creation, Polly et al. (2023) found significant differences between pre-service teachers (n=60) and in-service teachers (n=45) in the United States, with in-service teachers perceiving video creation and editing as more important. In a more general context, Yang et al. (2022) analyzed digital competencies among both groups of teachers (250 pre-service and 248 in-service) from Anhui, China, and found that in-service teachers generally have higher levels of digital competence than pre-service teachers.

Similar results were found in the study by Guillén-Gámez and Mayorga-Fernández (2020), which analyzed the digital competencies of 715 Spaniards, including trainee teachers, higher education teachers, and graduates. The study identified significant differences in digital skills between trainee teachers and higher education teachers, favoring the latter group. However, when it came to tools for editing videos and images, the scores were slightly higher for trainee teachers than for university teachers in both knowledge and use. Additionally, Linde-Valenzuela et al. (2022) found no significant

differences in digital literacy between in-service primary education teachers (n=99) and pre-service teachers at the same educational stage (n=203).

Numerous studies have explored factors influencing teachers' digital competencies, identifying predictors such as attitudes towards technology acceptance (Şimşek & Ateş, 2022), age (Palacios Rodríguez et al., 2023), and gender (Guillén-Gámez, Gómez-García & Ruiz-Palmero, 2024). However, significant gaps exist in the literature regarding the didactic use of YouTube. Specifically, there are no in-depth studies analyzing the effectiveness of predictors for these skills or their impact on student performance. For instance, Alabsi (2020) emphasized the importance of adding subtitles to multimedia material, noting that this could help English learners improve their listening comprehension and acquire new vocabulary. This underscores the need for teachers to possess skills in editing and adding such features. Snelson (2015) proposed various strategies for incorporating YouTube into educational curricula, such as "developing a YouTube channel to collect and organize video content, subscribing to other channels, and compiling videos into a playlist" (p. 171). Similarly, Dwiyogo (2013) suggested that creating these channels "requires specific skills and teamwork" (p. 216).

Considering how the digital competencies of the teaching group in using YouTube have been evaluated and the potential impact of various predictors, the objectives of this study are as follows:

- **O1.** To assess the self-perceived level of digital competence in using YouTube among different types of teachers.
- **O2**. To analyze potential differences in YouTube usage among trainee teachers, practicing teachers, and Higher Education teachers at each educational stage.
- **O3**. To identify significant predictors of YouTube use as a teaching resource for each type of teacher.

METHOD

Design and Participants: This study employed a non-experimental (ex post facto) cross-sectional design. Data was collected through non-random purposive sampling during 2023 and 2024. The authors reached out to practicing teachers via email and also provided trainee teachers with a survey link during face-to-face classes. Confidentiality and privacy of the data were maintained throughout the process. The total sample comprised 1,706 participants, classified according to the distribution shown in Table 1.

Table 1
Sample distribution

Collective	Educational stage	N (%)	Age
In-service teachers	Early Childhood Education	226(13.20)	42.56±11.29
	Primary Education	887(52.00)	41.75±10.78
Teachers in training	Early Childhood Education	139(8.10)	20.03±2.64
	Primary Education	253(14.80)	19.03±2.04
Higher Education Teachers	Teachers who teach in both grades	201 (11.80)	45.00±10.53

Source: created by the author

Instrument: To achieve the study's objectives, we utilized the instrument developed by Guillen-Gámez et al. (2023). This instrument consists of 13 items across three dimensions: Digital Communication Competence (DIM-1), which evaluates the ability to search for and select information through YouTube videos (e.g., item *CD-I2 – "I know how to use search filters to find more precise information"*; Digital Information Competence (DIM-2), focused on sharing information and interacting with other platform users (e.g., item *CD-I2 - "I know how to subscribe to a YouTube channel to receive alerts when the channel creator uploads a new video"*; Digital Competence in Content Creation (DIM-3), which assesses the ability to develop audiovisual educational materials using YouTube and its resources (e.g., item *CD-CC5 - "I know how to cut video segments and add transitions and text"*). The full version of the instrument is available in Open Access in Guillen-Gámez et al. (2023).

The items were measured using a 7-point Likert scale, with each value corresponding to a specific level of digital skill (1: I cannot do it; 2: I cannot do it without help; 3: I can do it alone with great difficulty; 4: I can do it alone with difficulty; 5: I can do it alone easily; 6: I can do it alone very easily; 7: I know how to teach it to others).

The instrument demonstrated adequate psychometric properties through both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). For the EFA, the Oblimin rotation method and the Principal Axes factorization method were employed. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.950, indicating excellent adequacy, and Bartlett's test of sphericity, which assesses the appropriateness of item-factor relationships and sample size (χ^2 = 33,379.971; df = 136; $p < .05$), also confirmed adequacy. These analyses revealed three latent dimensions (DIM-1, DIM-2, and DIM-3) that accounted for 75.41% of the total variance.

In terms of psychometric validity, the CFA performed on the three latent dimensions identified by the EFA showed a good structural fit, as detailed in Table 2. The observed coefficients met the criteria established by Bentler (1989).

Table 2
Goodness-of-fit indicators for the model

χ^2	C.M./df	CFI	IFI	TLI	NFI	RMSEA	SRMR
272.017	4.534	.979	.979	.973	.974	.060	.0385

Source: created by the author

The internal consistency of the instrument was assessed using Cronbach's Alpha, Spearman-Brown Coefficients, Guttman's two halves, McDonald's Omega, and Composite Reliability indices. All these measures yielded adequate coefficients, with values exceeding 0.80.

Procedure and Data Analysis: The following steps were undertaken:

- To address the first objective, a descriptive analysis by factor was performed, with separate figures created for each educational stage and each group of teachers.
- To achieve the second objective, the normality of the data was assessed using the Kolmogorov-Smirnov test. The results indicated that the data did not follow a normal distribution ($p < .05$). However, according to Srivastava (1959), non-normality is less likely to significantly impact data distribution in large samples.

Given the sample size in this study (n = 1,706), the F statistic remains robust. To examine whether there were significant differences in digital skills among teaching groups in the use of YouTube, various ANOVA models were applied. When an ANOVA model was significant, the effect size was evaluated using partial eta squared (η^2), where $\eta^2 = .01$ indicates a small effect, $\eta^2 = .06$ indicates a moderate effect, and $\eta^2 = .14$ indicates a large effect (Richardson, 2011).

- To address the third objective (O3), various multiple linear regression analyses were conducted.

RESULTS

Descriptive and comparative analysis by multiple comparisons

Figure 1 illustrates the digital competencies of each teaching group, displayed according to the arithmetic mean for each factor of the instrument, as well as the overall score. Homoscedasticity was tested for each teaching group and educational stage using Levene's test (Table 3). For groups that did not meet the homoscedasticity assumption ($p < .05$), inter-subject multiple comparisons were conducted using the Games-Howell method. For groups that met the homoscedasticity assumption ($p > .05$), multiple comparisons were performed using the Tukey method.

Table 3
Levene's test

Dimension	Early Childhood Education				Primary Education			
	F	df1	df2	Sig.	F	df1	df2	Sig.
DIM-1	6.248	2	563	.002	1.041	2	1338	.353
DIM-2	31.931	2	563	.0001	50.165	2	1338	.001
DIM-3	12.922	2	563	.001	40.975	2	1338	.001
GLOBAL	15.588	2	563	.001	36.004	2	1338	.001

Source: created by the author

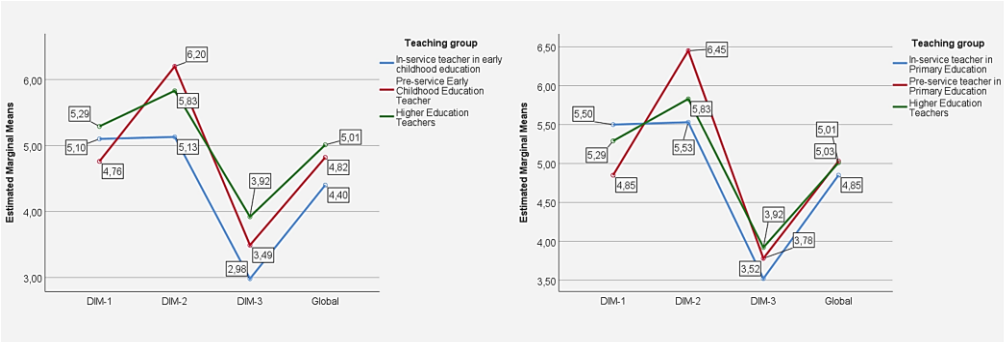
For the Early Childhood Education stage, Figure 1 reveals that self-perceptions are medium-high across the three teaching groups for DIM-1 and DIM-2, but very low for DIM-3.

In DIM-1, which measures digital skills for searching and selecting information through educational videos, the self-perceptions are generally favorable and medium-high. The group with the highest self-perception is Higher Education teachers (M = 5.29), followed by active teachers (M = 5.10), with future teachers reporting the lowest scores (M = 4.76). The ANOVA model for DIM-1 was significant, $F(2, 563) = 5.478$, $p < .05$, $\eta^2 = .019$, indicating significant differences between the teaching groups. Specifically, meaningful differences were found between Higher Education teachers and trainee teachers ($p = .003$). For DIM-2, which assesses self-perceptions of digital skills related to sharing information and interacting with users, both teaching groups rated themselves highly. Future teachers reported the highest score (M = 6.20), followed by Higher Education teachers (M = 5.83), whereas active teachers presented the lowest score (M = 5.13). The ANOVA model for DIM-2 was significant, $F(2, 563) = 21.609$, $p < .05$, $\eta^2 = .071$, with significant differences found between active teachers and future teachers ($p = .001$), as well as between active teachers and Higher Education teachers ($p = .001$). For DIM-3, which measures digital competence in content

creation, all teaching groups reported low scores. Among these groups, Higher Education teachers had the highest self-perception (M = 3.92), followed by future teachers (M = 3.49), with active teachers reporting the lowest scores (M = 2.98). The ANOVA model for DIM-3 was significant, $F(2, 563) = 14.943$, $p < .05$, $\eta^2 = .050$, indicating considerable differences in self-perceptions among the teaching groups. The multiple comparisons test revealed significant differences between active teachers and future teachers ($p = .025$), as well as between active teachers and Higher Education teachers ($p = .001$). Overall, the ANOVA model was also significant, $F(2, 563) = 10.627$, $p < .05$, $\eta^2 = .036$, with considerable differences found between active teachers and both future teachers ($p = .018$) and Higher Education teachers ($p = .001$). Table 4 provides a detailed summary of the multiple comparisons.

Figure 1

Digital competencies of each teaching group in the use of YouTube



Source: created by the author

In the context of Primary Education, Figure 1 indicates that self-perceptions are generally quite positive across all three teaching groups for DIM-1 and DIM-2. However, perceptions are notably lower for DIM-3. Additionally, in-service teachers tend to have the lowest self-perceptions regarding YouTube use, except for DIM-1, where their scores are comparatively higher.

For DIM-1, the ANOVA model was significant, $F(2, 1338) = 25.555$, $p < .05$, $\eta^2 = .037$, indicating significant differences in the ability to search for and select information on YouTube among the teaching groups. Specifically, significant differences were observed between practicing teachers and prospective teachers ($p = .001$), as well as between prospective teachers and Higher Education teachers ($p = .001$). For DIM-2, the ANOVA model was significant, $F(2, 1338) = 38.587$, $p < .05$, $\eta^2 = .055$, showing significant differences in the ability to share information and interact with other users on the platform. Significant differences were found between active teachers and future teachers ($p = .001$), active teachers and Higher Education teachers ($p = .033$), and future teachers and Higher Education teachers ($p = .001$). Finally, for DIM-3, the ANOVA model was significant, $F(2, 1338) = 4.991$, $p < .05$, $\eta^2 = .007$. Significant differences were found between active teachers and Higher Education teachers ($p = .015$). Table 4 provides a detailed overview of the multiple comparisons.

Table 4
Multiple comparisons between educational groups, for each educational stage

		Early Childhood Education				Primary education			
Educational stage (i)	**Educational stage (j)**	**DIM-1**	**DIM-2**	**DIM-3**	**Global**	**DIM-1**	**DIM-2**	**DIM-3**	**Global**
Active teachers	Higher education teachers	.501	**.001***	**.001***	**.001***	.123	**.033***	**.015***	.325
	Teachers-to-be	.099	**.001***	**.025***	**.018***	**.001***	**.001***	.143	.164
Higher education teachers	Teachers-to-be	**.003***	.102	.084	.608	**.001***	**.001***	1.000	1.000

Determination of significant predictors

To address the third objective, we identified the variables influencing each group's digital competence in using YouTube for educational purposes through multiple linear regressions. Each regression was estimated using the ordinary least squares method and a forward selection approach. The specific variables examined are detailed in Table 5.

We verified the assumptions necessary for this type of statistical analysis. Collinearity diagnostics, obtained from multivariate Tolerance (TOL) and VIF techniques as shown in Tables 7 and 8, indicate that the predictor variables do not present collinearity issues. This is supported by TOL values greater than 0.6 and VIF values below 10 (Chan, 2004). Additionally, the independence of the residuals (Durbin-Watson test) was satisfactory, with values in the acceptable range of between 1.5 and 2.5. The specific Durbin-Watson values for each group were as follows: future Early Childhood Education teachers (DW = 2.078), future Primary Education teachers (DW = 1.978), Higher Education teachers (DW = 1.804), active Early Childhood Education teachers (DW = 1.668), and active Primary Education teachers (DW = 1.525).

Table 5
Description of variables

Variable	Description	Measuring scale	Categories
VD	Global digital competence	Nominal	0: Low 1: High
IV1	What level of proficiency do you consider you have in including music in a video?	Ordinal	10 points Likert
IV2	What level of proficiency do you feel you have in incorporating images when editing a video?	Ordinal	10 points Likert
IV3	What level of proficiency do you feel you have at including questions when editing a video?	Ordinal	10 points Likert
IV4	Do you have a YouTube channel with educational content?	Nominal	0: No 1: Yes
IV5	Do you subscribe to YouTube channels?	Nominal	0: No 1: Yes
IV6	Do you watch live on YouTube?	Nominal	0: No 1: Yes

Variable	Description	Measuring scale	Categories
IV7	Do you interact with YouTube live?	Nominal	0: No 1: Yes
IV8	Gender	Nominal	0: female 1: Male
IV9	Age	Scale	-

Source: created by the author

Table 6 shows that for pre-school teachers, the highest percentage of explained variance (54.30%) is obtained in the second step. The regression model is statistically significant, $F(1, 224) = 251.077$, $p < .01$. For active Primary Education teachers, the most parsimonious model is in the sixth step, explaining 44.90% of the variance, and is also significant, $F(6, 880) = 121.147$, $p < .01$. For Higher Education teachers, the model is significant in the second step, with 48.80% of the variance explained, $F(2, 198) = 96.497$, $p < .01$. Regarding future teachers, the model for the Early Childhood Education group is significant in the third step, explaining 30.80% of the variance, $F(3, 135) = 21.484$, $p < .01$. For the Elementary Education group, the model is significant in the fifth step, explaining 32.60% of the variance, $F(5, 247) = 25.429$, $p < .01$. Notably, the Primary Education stage groups have the greatest number of significant variables.

Table 6
Significant models for each group

Typology	Models	R	R^2	Corrected R^2	Standard error
DAEI	1: IV1	.727	.528	.526	1.089
	2: IV1 + IV2	.740	.547	.543	1.069
DAEP	1: IV1	.615	.379	.378	1.076
	2: IV1+IV5	.647	.418	.417	1.041
	3: IV1+IV5+IV3	.662	.438	.436	1.024
	4: IV1+IV5+IV3+IV2	.665	.442	.440	1.021
	5: IV1+IV5+IV3+IV2+IV8	.669	.448	.445	1.016
	6: IV1+IV5+IV3+IV2+IV8+IV6	.673	.452	.449	1.013
ES	1: IV2	.669	.448	.445	1.018
	2: IV2+IV5	.703	.494	.488	.978
DFEI	1: IV2	.526	.276	.271	.911
	2: IV2+IV6	.546	.299	.288	.899
	3: IV2+IV6+IV3	.568	.323	.308	.888
DFEP	1: IV2	.486	.236	.233	.779
	2: IV2 + IV5	.543	.294	.289	.750
	3: IV2 + IV5+IV4	.560	.314	.306	.741
	4: IV2 + IV5+IV4+IV6	.572	.327	.316	.735
	5: IV2 + IV5+IV4+IV6+IV3	.583	.340	.326	.729

Note: DAEI: In-service teachers (Early Childhood Education); DAEP: In-service teachers (Primary Education); DFEI: Trainee teachers (Early Childhood Education); DFEP: Trainee teachers (Primary Education); ES: Higher Education teachers.

Table 7 presents the standardized factor weights for each type of student, along with their levels of significance. For active Early Childhood Education teachers, the only significant predictor with a moderate and positive effect is IV1, which represents the skills to edit YouTube videos and include music ($\beta = .451$; $t = 4.464$; $p < .05$). In contrast, for future teachers at this stage, the two significant predictors are IV2 (ability to incorporate images in YouTube videos) and IV3 (ability to incorporate questions in

YouTube videos). These predictors have small to moderate effect sizes: IV2 (β = .305; t = 2.403; p < .05) and IV3 (β = .268; t = 2.024; p < .05).

For the group of Higher Education teachers, the number of significant predictors is similar to the previous group, though the specific predictors differ somewhat. The most influential predictor is IV2, with a positive and small-to-moderate effect size (β = .352; t = 2.821; p < .05). The predictor IV5, related to YouTube channel subscription, has a smaller influence (β = .192; t = 3.519; p < .05). Considering the standardized coefficients for each group, the success rate in achieving adequate digital competence in using YouTube as an educational resource will vary based on these coefficients and the values each group assigns to each predictor. The regression equations for these three groups are as follows:

$Y_{IN\text{-}EC} = 2.039 + .451*(IV1)$
$Y_{Pre\text{-}EC} = 2.253 + .305*(IV2) + .268*(IV3)$
$Y_{HET} = 3.132 + .352*(IV2) + .192*(IV5)$

Table 7
Predictors and collective factorial weights (part 1/2)

	DAEI				DFEI				ES			
	β	**t**	**Tol.**	**VIF**	**β**	**t**	**Tol.**	**VIF**	**β**	**t**	**Tol.**	**VIF**
Constant	2.039	6.018*			2.235	3.143*			3.132	8.187*		
IV1	.451	**4.464***	.597	3.071	.038	.324	.371	2.699	.102	.881	.189	5.292
IV2	.177	1.246	.699	4.056	.305	**2.403***	.614	3.182	.352	**2.821***	6161	6.194
IV3	.105	1.024	.691	4.224	.268	**2.024***	.689	3.462	.161	1.516	.223	4.486
IV4	-.022	-.451	.831	1.203	.067	.894	.916	1.092	.025	.466	.877	1.140
IV5	.079	1.598	.817	1.223	.103	1.402	.942	1.062	.192	**3.519***	.848	1.179
IV6	.021	.407	.761	1.313	.153	1.920	.800	1.249	.076	1.346	.780	1.281
IV7	.069	1.386	.803	1.245	-.025	-.317	.799	1.252	.040	.688	.741	1.350
IV8	-.050	-1.077	.938	1.067	.075	.986	.886	1.128	-.062	-1.161	.880	1.136
IV9	-.009	-.184	.913	1.095	-.002	-.020	.866	1.154	-.015	-.282	.912	1.096

Note: DAEI: Active teachers (early childhood education); DFEI: Teachers in training (early childhood education); ES: Higher education teachers; * Predictor variables at 95% confidence level.

Table 8 shows that there are more significant predictors in the Primary Education groups, with some overlapping with those analyzed previously. For active teachers, the most significant predictor is the ability to incorporate images into YouTube videos (IV2), with a small positive coefficient (β = .272; t = 3.090; p < .05). This is followed by the ability to maintain one's own channel with educational content on YouTube (IV4, β = .189; t = 3.481; p < .05). Other significant predictors with positive but small coefficients include the skills to incorporate questions into YouTube videos (IV3, β = .175; t = 1.997; p < .05) and subscription to YouTube channels (IV5, β = .134; t = 2.501; p < .05). For future teachers, there are five significant predictors, with two of them coinciding with those of active teachers (IV2 and IV5). Specifically, the predictor with the greatest influence was the skill to add images to YouTube videos (IV2), with a small positive coefficient (β = .209; t = 7.628; p < .05). This was followed by the skill to incorporate music into videos (IV1), which also had a positive coefficient (β = .203; t = 3.229; p < .05). Slightly lower coefficients were observed for the skills to include questions in YouTube videos (IV3) (β = .198; t = 3.433; p < .05) and to subscribe to YouTube channels (IV5, β = .157; t = 3.033; p < .05). The predictor with the least influence, though still significant, was live viewing on the platform (IV6, β = .064; t =

2.357; p < .05). Finally, it is notable that the gender of the future Primary Education teacher significantly and negatively affects YouTube skills (IV8, β = -0.090; t = -3.435; p < .05). Considering the standardized coefficients, the two regression equations are as follows:

$Y_{Pre\text{-}PE}$= 2.816+.272*IV2 + .175*IV3 + .189*IV4 + .134*IV5
$Y_{Pre\text{-}PE}$= 3.101 + .203*IV1 + .209*IV2 + .198*IV3 + .157*IV5 + .064*IV6 - .90*IV8

However, since the gender predictor was significant in this group, the regression model equation must be divided into two, with one for each gender, as follows:

$Y_{Pre\text{-}PE\_male}$ = 3.101 + .203*IV1 + .209*IV2 + .198*IV3 + .157*IV5 + .064*IV6 - .90*0
$Y_{Pre\text{-}PE\_female}$ = 3.101 + .203*IV1 + .209*IV2 + .198*IV3 + .157*IV5 + .064*IV6 - .90*1

Table 8
Predictors and various collective factorial weights (part 2/2)

	DFEP				DAEP			
	β	**t**	**Tol.**	**VIF**	**β**	**t**	**Tol.**	**VIF**
Constant	2.816	5.498*			3.101	17.155*		
IV1	.075	.932	.416	2.404	.203	**3.229***	.657	3.358
IV2	.272	**3.090***	.644	2.904	.209	**7.628***	.832	1.202
IV3	.175	**1.997***	.646	2.891	.198	**3.433***	.687	4.342
IV4	.189	**3.481***	.904	1.106	.020	.780	.924	1.082
IV5	.134	**2.501***	.928	1.078	.157	**3.033***	.634	4.281
IV6	.084	1.421	.757	1.321	.064	**2.357***	.849	1.178
IV7	.098	1.672	.780	1.283	.010	.379	.869	1.151
IV8	.017	.318	.912	1.097	-.090	**-3.435***	.905	1.105
IV9	.062	1.149	.906	1.104	.014	.557	.944	1.060

Note: DFEP: Teachers in training (primary education); DAEP: Teachers in service (primary education); * Predictor variables at 95% confidence level.

DISCUSSION

This study has focused on assessing the digital competencies of pre-school and primary school teachers, both in training and in-service, as well as university teachers, for the didactic use of YouTube.

Regarding the first objective (O1), differences in competencies were observed among various types of teachers. Pre-school and primary school teachers-in-training achieved medium to high levels in searching/selecting information and sharing and interacting on YouTube. However, they were found to have low competencies in content creation (Watt, 2019). This highlights the need for an overhaul of the initial training of future teachers, as emphasized by Snelson (2015), who advocates prioritizing digital literacy (García-Sampedro et al., 2024) and incorporating digital content creation into the curriculum. Active teachers in both stages reported similar challenges, particularly in content creation, aligning with findings from other studies (Basgall et al., 2023; Tomczyk et al., 2023). These findings highlight the challenges teachers face in designing and developing their own digital materials (Watt, 2019), which impacts the personalization of training processes. Despite the abundance of available content (Pattier & Ferreira, 2022), existing materials may not meet the specific needs of students. Additionally, university teaching staff share similar perceptions compared to the other teaching groups analyzed, though they believe they

have stronger digital competencies for content creation. As there are no prior studies focusing on university teachers, these results will serve as a precursor and reference for future research in this area.

Regarding the second objective (O2), significant differences were found globally in the tool, with active pre-school teachers scoring notably lower than university lecturers and future teachers. This result contrasts with Yang et al. (2022). In terms of searching and selecting information, university teachers outperformed teachers in training at both the pre-school and primary stages, consistent with findings by Guillén-Gámez and Mayorga-Fernández (2020). Additionally, at the primary stage, active teachers performed better than teachers in training, aligning with Polly et al. (2023). These findings suggest a need for specific training for future teachers on how to search for and select appropriate educational information (Guillén-Gámez, Colomo-Magaña et al., 2024), focusing on both the quality of resources and the techniques used, such as search filters and keywords. Regarding sharing information and interacting on YouTube, in-service teachers at both the pre-school and primary levels scored significantly lower than pre-service and university teachers. These findings do not align with some studies where no differences were found (Linde-Valenzuela et al., 2022) or where in-service teachers had higher scores (Yang et al., 2022). Moreover, at the primary school stage, teachers in training scored significantly higher than university teachers, which contradicts the findings of Guillén-Gámez and Mayorga-Fernández (2020). This suggests that trainee teachers, who are generally younger than their university counterparts, are utilizing YouTube's social features more effectively. Consequently, there is a need to provide older teachers with training on how to use and apply YouTube's interactive elements (Colás-Bravo & Quintero-Rodríguez, 2023; Dubovi & Tabak, 2020) and to evaluate whether this training positively impacts their use of the platform. As to content creation, university teachers scored significantly higher than in-service teachers at both stages. Additionally, university teachers outperformed future teachers at the early childhood stage, consistent with Guillén-Gámez and Mayorga-Fernández (2020). This is likely because university teachers are expected to create digital content as part of their roles and need to improve their assignments (e.g. managing editing software, ensuring video aesthetics and coherence, and enhancing visual and auditory quality) to better teach their students (Castillo et al., 2021).

The final objective (O3) focused on identifying significant predictors of YouTube use. For university teachers, subscribing to YouTube channels and including images in their videos had a positive impact, as suggested by Snelson (2015). At the early childhood stage, active teachers benefited from incorporating music into their video edits, while trainee teachers were positively influenced by including images and questions in their videos, as noted by Alabsi (2020). At the primary stage, including images and questions in video editing was a positive predictor for both in-service and pre-service teachers, along with subscribing to educational YouTube channels. Additionally, introducing questions into videos and viewing live streams were actions positively associated with trainee teachers. Gender also emerged as a negative predictor for women, consistent with findings by Guillén-Gámez, Gómez-García and Ruiz-Palmero (2024). For active teachers, having their own YouTube channel also had a positive impact, as recommended by Dwiyogo (2013). Although each teaching group has its own specific predictors, the results suggest that it is crucial to encourage teachers to monitor educational content channels and create their own channels. This allows them to explore and share various materials, which can serve as resources or

inspiration for their own design and creation. Future research could explore the impact of teachers creating their own channels and examine factors that might hinder this process, such as lack of knowledge, heavy workload, or limited time (Domínguez & Murillo-Estepa, 2018; Tomczyk et al., 2023). Additionally, enhancing video editing skills, as suggested by Alabsi (2020), requires the development of targeted courses (Guillén-Gámez et al., 2023). It is essential to monitor progress through audiovisual projects and their integration into YouTube.

CONCLUSIONS

Educational technologies have transformed teaching and learning, with the YouTube video platform standing out due to its multiple pedagogical benefits (Ríos Vázquez & Romero Tena, 2022). Its impact on performance (Laugerman & Saunders, 2019; Mohammed & Ogar, 2023) and learning significance (Tiernan & O'Kelly, 2019) highlights its potential as a powerful didactic resource. Therefore, the emphasis should be on developing teachers' digital competencies to use YouTube effectively. This includes enabling them to find relevant audiovisual content for their classes, interact with other YouTube users, and create content that aligns with their subject matter (Guillén-Gámez et al., 2023; Guillén-Gámez, Colomo-Magaña et al., 2024).

The findings of this study reveal that all teaching groups across both stages demonstrated medium to high competencies in searching for and selecting information, sharing videos, and interacting with other YouTube users. However, they encountered greater difficulties in content creation. The variations in digital competence levels and the different predictors identified suggest the need for tailored approaches to professional development, considering the unique characteristics and needs of each type of teacher.

Regarding limitations and future research directions, it is important to address the areas for improvement that impact the results and their generalizability. Proposing future actions to enhance the usefulness and validity of the findings is essential. One limitation of the current instrument is that it relies on self-perception, which provides a fragmented view of reality. It reflects teachers' beliefs about their digital competencies rather than concrete evidence of their actual skills. To address this, practical activities could be implemented to assess their digital skills, such as creating live streams, editing and uploading videos, or participating in live interactions.

Additionally, future research could focus on evaluating training processes for different types of teachers, made available by MOOCs or SPOCs for example, and their impact on digital competence in using YouTube. This could involve conducting pre-test and post-test analyses to measure improvements in digital skills.

Regarding the sample, several considerations should be noted. First, the non-probabilistic sampling method used limits the generalizability of the results and the study's replicability across different populations. Future research should employ random sampling techniques to address these limitations. Additionally, increasing the number of participants would help reduce disparities between groups and allow for a more in-depth exploration of the relationship between university teachers and their students in training. This could allow students to evaluate the digital competencies of their university instructors based on their personal experiences. Furthermore, it is important to address confounding variables that were not allowed for in this study, as they could have influenced the results. Future research should carefully consider and account for any variables that might affect the internal validity of the study.

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