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YouTube as a source of professional development for kindergarten teachers: A quantitative analysis of micro-videos

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Abstract

YouTube has evolved into a global platform for formal and informal education. It has become one of the most important methods of digital transformation in educational and training institutions. The research aims to find out whether YouTube videos can be a useful source for the professional development (PD) of teachers, trainees and professionals in the field of kindergarten. 380 videos were selected; and sorted according to specific criteria. 94 videos were included finally. The video style, number of views, length, likes and comments are specified. The research used quantitative analysis of videos using the Instructional Design Quality Framework (IDQF). The beneficiary's response was compared using the Keller Learning Motivation Model (ARCS model), and the relationships between the variables of the two frameworks were determined using the Pearson correlation coefficient at a significance level (0.05). Correlation results indicated a strong negative relationship between video length and the number of views and likes. While a weak negative relationship was found between video length and comments on the IDQF design and the dimensions of the ARCS model, a strong positive relationship was found between summed IDQF assessment scores and liking. There was a strong positive relationship between evaluation of instructional design quality and positive comments on the IDQF items and dimensions of the ARCS model. The talking head was the most commonly used style in producing video clips. Beneficiaries preferred short video clips.

Keywords: YouTube, Micro-videos, Professional development, Kindergarten teachers, Quantitative analysis

Introduction

YouTube has evolved into a global platform for formal and informal education and professional development (PD). It is one of the most important methods of digital transformation. YouTube not only provides digital entertainment, but also provides a good



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environment for continuous learning and training (Yang et al., 2024). YouTube is a free service that allows users to upload, view, rate, share, interact, comment and like a variety of user-generated videos (Marcos, 2020; Portugal, 2018). Srinivasacharlu (2020) noted that YouTube supports microlearning with videos that help present complex procedures and demonstrations of specific skills in small quantities, which increases knowledge retention (Taylor & Hung, 2022).

A survey during the third quarter of 2023 found that approximately 46% of internet users are female. Their ages ranged between 16-24 years. They watched educational and guidance videos online. About 45% of male internet users in the same age group reported that they watch video content online for the purpose of learning. Men aged 45-64 are more likely than women in the same age groups to continue watching educational videos online (C. Laura, 2024).

In the third quarter of 2023, the number of active YouTube users reached more than two and a half billion monthly users (Stacy, 2024). A survey during the third quarter of 2023 found that about 46% of female internet users aged 16-24 watch YouTube videos for education and career development purposes. About 45% of males in the same age group reported watching online video content for education purposes as well. The survey also indicated that men aged 45-64 continue to watch educational videos online more than women in the same age groups (C. Laura, 2024). Eugelin et al. (2022) conducted a study, the results of which showed that 23% of students watch YouTube four to five hours a day; 13% between three and four hours a day; 40% watch two to three hours a day; 17% watch YouTube one to two hours a day; 7% of them stated that they had never watched any programmes on YouTube.

On the other hand, Abdulhadi and Fatma (2022) stated that although YouTube is a social platform with many features that make it valuable for continuing education and training, it is not clear how reliable its content is for professional development. Knowing the reliability of information on YouTube can be useful, especially when this information has the potential to provide ongoing solutions for individuals to improve their professional competence and prepare them to face new educational and practical developments (Xerri, 2014).

Support provided by YouTube users (teachers/experts) to kindergarten teachers before or in service is one good solution. Accessible information will therefore be a valuable asset. It can help in developing the knowledge and skills of kindergarten teachers. Therefore, the research seeks to understand and distinguish the reliable information found on YouTube through quantitative analysis of comments, likes, and views regarding PD videos for kindergarten teachers. The advantage of YouTube videos is that they are available everywhere and at any time. However, it is not always easy to distinguish which information can be drawn upon to enrich personal knowledge and practice. Relying on it

may be risky, especially if this information is constantly changing and evolving (Kohler & Dietrich, 2021). The content may not have an educational intent.

In a study conducted by TechSmith (2018), it included 552 people. She noted that the default answer regarding video length (VL) is that shorter is always better. However, it is not a given. But that doesn't mean it's impossible to keep someone watching even if the video is long. The reason you stop watching a video may have nothing to do with the length of the video. In fact, 83% of people surveyed continue to watch a video if they are interested in the topic. 42% of them stopped watching the video completely because they did not get the information they needed. 25% percent that the video was boring. But just because the subject of the video is boring does not mean that its design is poor. Video production quality can be poor and affect beneficiaries' ability to view it. However, it may be acceptable to watch (Majid et al., 2011). Therefore, the research aims to quantitatively analyze YouTube videos related to the PD of kindergarten teachers. Analyzing YouTube videos provides information about whether viewers can rely on the site for knowledge and PD. It can help teachers understand how well the content aligns with expert recommendations. Institutions and faculty can use this information to make decisions about using the site for their preschool teachers' PD efforts.

Literature review

YouTube videos and professional development

There are unlimited amounts of videos available online that can be used for PD, although the quality and quantity vary (Kohler & Dietrich, 2021). Web 2.0 has increased the use of videos in PD courses. PD involves many types of learning experiences related to an individual's work and career. Kindergarten teachers can expand their knowledge and develop their skills (Germuth, 2018). Doctors, teachers, and individuals from various professions and institutions can contribute to PD to learn and apply new knowledge and skills that will improve the performance of kindergarten teachers (Vukušić, 2018). PD aims to provide individuals with new skills and keep up with emerging trends and changes in the field. Professionals are people who work in the same field, who have been academically prepared, taken courses or received additional training to develop and improve their skills and expertise related to career advancement in a particular field outside of the classroom (Shiri et al., 2023).

Many development courses are now offered through online learning platforms. For example, MOOC platform includes 109 professional certification programmes (Ayse et al., 2020; Sobaih et al., 2022). Coursera offers free PD courses online for early childhood educators, elementary school teachers, and psychologists (Coursera, 2024). Udemy is a platform that has over 294,386 learners. It offers online video courses in Early Childhood

Education (Udemy, 2024). Advances in the internet and social media technology have led to the development of PD models that are interactive and effective in self-training (Timotheou et al., 2023). A survey conducted by TechSmith indicated that 87% of YouTube users found the site important in helping them learn how to do things they had not done before (TechSmith, 2024). It is noted from the above that organizations have realized the value of utilizing e-learning video courses, especially micro-video courses, to keep pace with the needs and pace of work. Micro-videos have become an essential component for employees seeking to gain instant knowledge even in the workplace (Shail, 2019). Hanshaw and Hanson (2019) studied leaders' perceptions of microlearning for professional development at work, and designed mobile-based micro-video modules in work settings. This resulted in: flexibility of time, presence of the leader at work and available to others, improved team cohesion, personalization of PD and recognition of needs, and choice of learning opportunities (Hanshaw & Hanson, 2019).

Analysis of micro-videos on YouTube

Frydenberg and Andone (2016) noted that micro-videos can have a significant impact on the learner including: increased social interaction; providing individualized learning environments; improving levels of motivation and concentration; taking into account the cognitive load of learners. On the other hand, Yerdelen et al. (2019) indicated that watching micro-videos is considered passive learning in one direction, and this results in retaining less of what is seen or heard. Therefore, L. Laura (2024) points out that holding week-long, or eight-hour, training sessions can be seen as a time-wasting investment with technological advances. She believes that micro-video opportunities fit the needs and pace of work, and a critical element for in-service workers looking for direct knowledge in the workplace. Imelda et al. (2019) found that video-based mobile learning is an effective method in enhancing learners' skills, provided flexible delivery of content, and met learners' needs for PD. Berk (2023) found that micro-videos were recognized as the most common component of microlearning (38%). Followed by static text (25%), and graphs (14%). The study also indicated that participants prefer short video clips that range in length from five to seven minutes, and that they are the most effective in learning.

YouTube's official blog indicates that more than five million clips are uploaded every minute (YouTube, 2022b). Anyone can access a YouTube video anytime, anywhere. But can the beneficiary learn a subject without feeling frustrated because it lacks the elements of instructional design (Morain & Swarts, 2012); or production techniques (Hansch et al., 2015). Here a question arises: Will the viewer continue to watch a poorly designed video? Or will he search for something that suits his needs? User-generated videos for YouTube should be impactful for all users. Studies using quantitative and qualitative analysis in multiple fields have been conducted on YouTube videos. Its results concluded that video

clips vary in their accuracy and clarity, which may lead to negative or positive effects on those interacting with them. Ranade et al.'s (2020) study indicated that YouTube videos may lack valid and reliable information, because videos can be published online without scientific review. Guo et al.'s (2020) study indicated that not all videos were appropriately accurate and clear, which could lead to significant negative effects if beneficiaries tried these methods. Michalovich and Hershkovitz's (2020) study examined users' comments, views, and dislikes on entertainment and political videos, but did not address the relationship between VL, design, or motivations with comments and ratings. As for the study by Wang and Chan-Olmsted (2020), the engagement framework was used to analyze brand marketing videos using four dimensions: interactivity, interest, emotion, and perception. Ledbetter (2018) noted that content creators may deviate from the guidelines for quality design of user-generated videos to meet the specific needs of their audience. Here, the content creator may use the YouTube platform to build identities using rhetoric and storytelling based on his or her experience to create influence on YouTube users and develop a personal ethic, in addition to achieving learning objectives.

At the educational level, YouTube videos were studied to determine their pedagogical benefits. One of these benefits was that beneficiaries preferred using short videos that were approximately five to 15 minutes in length; because it does not represent an excessive burden or lose focus (Dewi et al., 2024; Yang et al., 2024). These studies are rich in content analysis. However, they do not evaluate the quality of the instructional design of the video, or whether the beneficiary is satisfied or not satisfied with watching it. Therefore, the research aims to quantitatively analyze video clips using the Instructional Design Quality Framework (IDQF) in video production by Morain and Swarts (2012), finding a relationship with the beneficiary's response using Keller's model of learning motivation (ARCS model) (Keller, 1987) to provide insight into YouTube clips and PD for the kindergarten teacher. To achieve this, the research developed the following questions.

1. How available are IDQF features in micro-video?
2. How did the beneficiaries rate the video (likes)?
3. How many beneficiary comments related to the ARCS model?
4. How many beneficiary comments related to the IDQF?
5. What is the relationship between the video length and the number of views, likes, and positive comments?
6. What is the relationship between IDQF features and beneficiaries' likes and comments?

Research method

The research relied on the content analysis methodology. Content analysis is a method of drawing conclusions from the “text” while taking into account the contexts of its use (Bengtsson, 2016). Content analysis can be qualitative, quantitative, or a combination of both, depending on the research objectives (Kleinheksel et al., 2020). Text is “meaningful content”. The word “text” does not mean that it is limited to the analysis of the content of written materials only, but can also apply to “artworks, images, maps, and sounds” (Elo et al., 2014). Therefore, the content of the videos falls within the concept of “text”. Sharing information on the internet or creating digital content indicates the presence of an intended audience. Content analysis was the appropriate choice for this research because it provides a systematic procedure for analyzing YouTube videos (Shahbaznezhad et al., 2021). The research relied on collecting responses from individuals (monitoring the number of likes and classifying comments) who watched videos on YouTube and analyzing them in spreadsheets. In addition, a spreadsheet was used to rate videos in light of the IDQF to explore the data further to see if there was a relationship between them. The research used the basic processes identified by Neuendorf (2002) (see Figure 1); for quantitative analysis, small videos on YouTube related to the PD of kindergarten teachers.

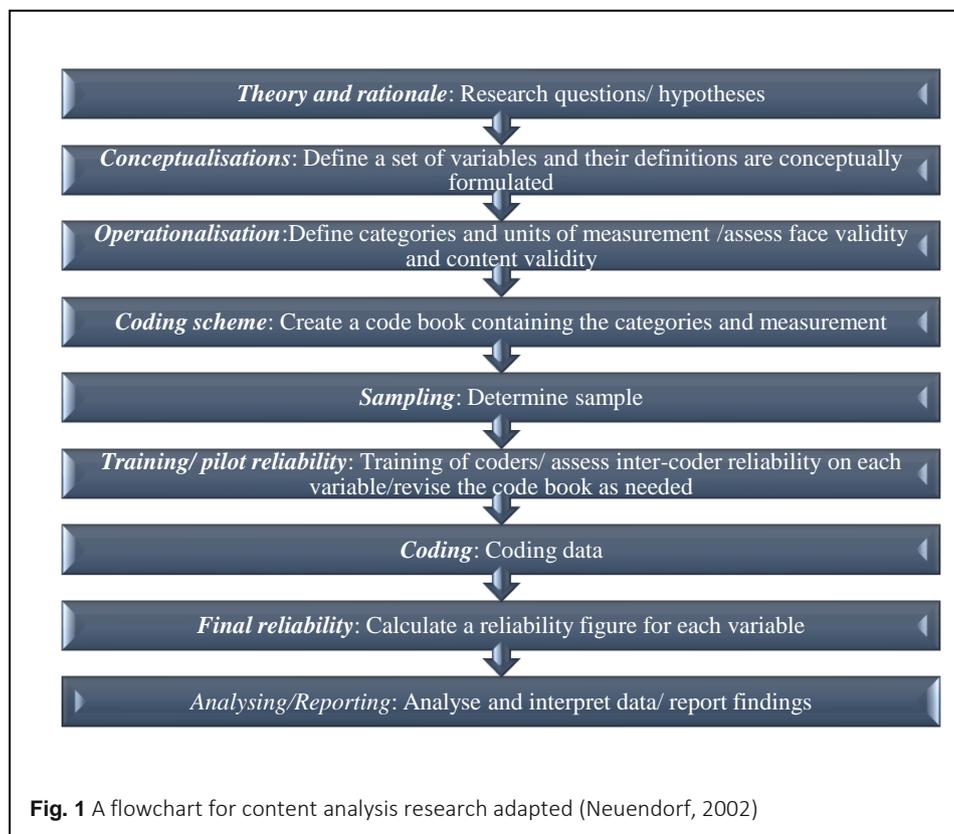


Fig. 1 A flowchart for content analysis research adapted (Neuendorf, 2002)

Procedures

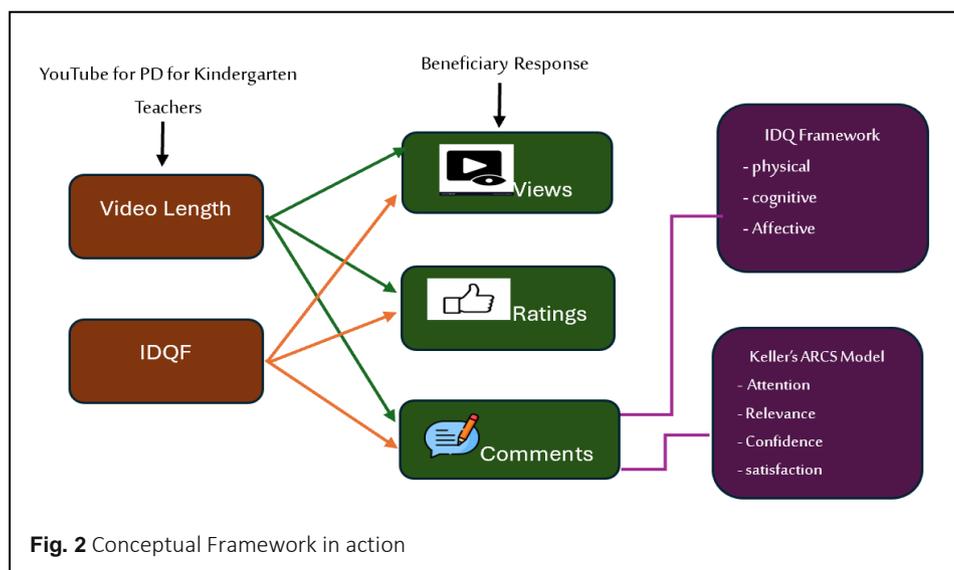
Theory and rationale

Morain and Swarts (2012) point out that if video production technology is available, the beneficiary will be able to gain the desired knowledge, experiences, and attitudes. Therefore, pedagogical and motivational strategies should be taken into consideration when learning from YouTube (Thompson et al., 2014). The research can provide insight for the technology developer to design good videos through the availability of high-quality educational video design (production), and to analyze beneficiaries' responses through evaluations (consumption) and comments (consumption). The research will follow the deductive approach that begins with the following hypotheses:

- There is no relationship between the length of the video and the number of views, likes, positive comments on IDQF, and positive comments on ARCS model.
- With increased scores for the instructional design quality (IDQ) of the micro-videos, likes and comments related to the ARCS model will increase.
- As IDQF scores increase, positive comments related to IDQF elements will increase.

Conceptual framework

Figure 2 shows the conceptual framework.



1. *IDQF*: Prepared by Morain and Swarts (2012). It consists of elements: Physical, Cognitive, and Affective design. Each of these designs has three sub-elements.
 - 1.1. *Physical design*: Its elements were: Accessibility- is the focus area on the screen relevant to learning; Viewability- relates to the quality of sounds, written texts, and audio; Timing- means adjusting the pace of the video to make it easier to follow the content.
 - 1.2. *Cognitive design*: Accuracy- presenting content without errors in fact or execution; Completeness- presenting content in an organized structure and with sufficient detail so that it can be accurately reproduced and widely applied; Pertinence- content related to the learning objective, and had a purpose.
 - 1.3. *Affective design*: Confidence- The narrator inspires trust by presenting himself as knowledgeable and skilled, and being associated with a reputable organization. Self-efficacy- The video convinces viewers that they can successfully complete the tasks that are the focus of the teaching. Engagement-The video is designed to interest and motivate users.
2. *ARCS model*: Prepared by Keller (2010) and consists of:
 - 2.1. *Attention (A)*, means how to attract the learner's attention, achieving this through active participation, the use of humor, conflict, diversity, and realistic examples.
 - 2.2. *Relevance (R)*, is achieved by using appropriate language, narrative style, examples, and practical models that can be related to the learners' prior experience; perceived current value; or future usefulness; or modelling.
 - 2.3. *Confidence (C)*, helps learners believe that they are capable of success by facilitating self-growth, meeting learning requirements, providing feedback, and giving learners control over the learning process.
 - 2.4. *Satisfaction (S)*, depends on two types of internal and external motivations. Internal satisfaction means the internal will of the learners and depends on reinforcement, such as praise or rewards. External satisfaction comes from doing something such as going to work to earn money.

Operationalisation

The researchers have sufficient experience and familiarity with the standards of television educational programmes. They participated in designing and developing educational videos. The researchers conducted this experiment to review user-generated content from YouTube videos. Videos were selected using advanced keyword search across YouTube. The goal is to examine the content related to the topic of PD using IDQF and ARCS model.

Coding scheme

The coding scheme provides coders with complete lists of each dimension to be used, and provides guidance on how to interpret the measurements (Neuendorf, 2002). Hansch et al. (2015) indicated that there are 18 common video production patterns (VPP). These patterns can help or hinder the achievement of educational goals, motivation and desire to learn (Hansch et al., 2015). Figure 3 shows the classification of online VPP.

A taxonomy of the 18 genres was created (Hansch et al., 2015) in order and assigned a number rather than writing the entire video genre to reduce cell space in a spreadsheet. (Series, Video Category, Name, URL, Download Date, Length, Total Comments, and Likes) were included in a spreadsheet. IDQF scores were recorded. There were three subcategories for each design. The rating ratio (thumbs up symbol) was calculated by dividing the number of likes for each video by the total number in a spreadsheet. User comments were captured in the relevant components of the ARCS model in a spreadsheet. Comments were noted on the IDQF dimensions. Comments were calculated as the number of positive, neutral, and negative comments, and the total number of both.

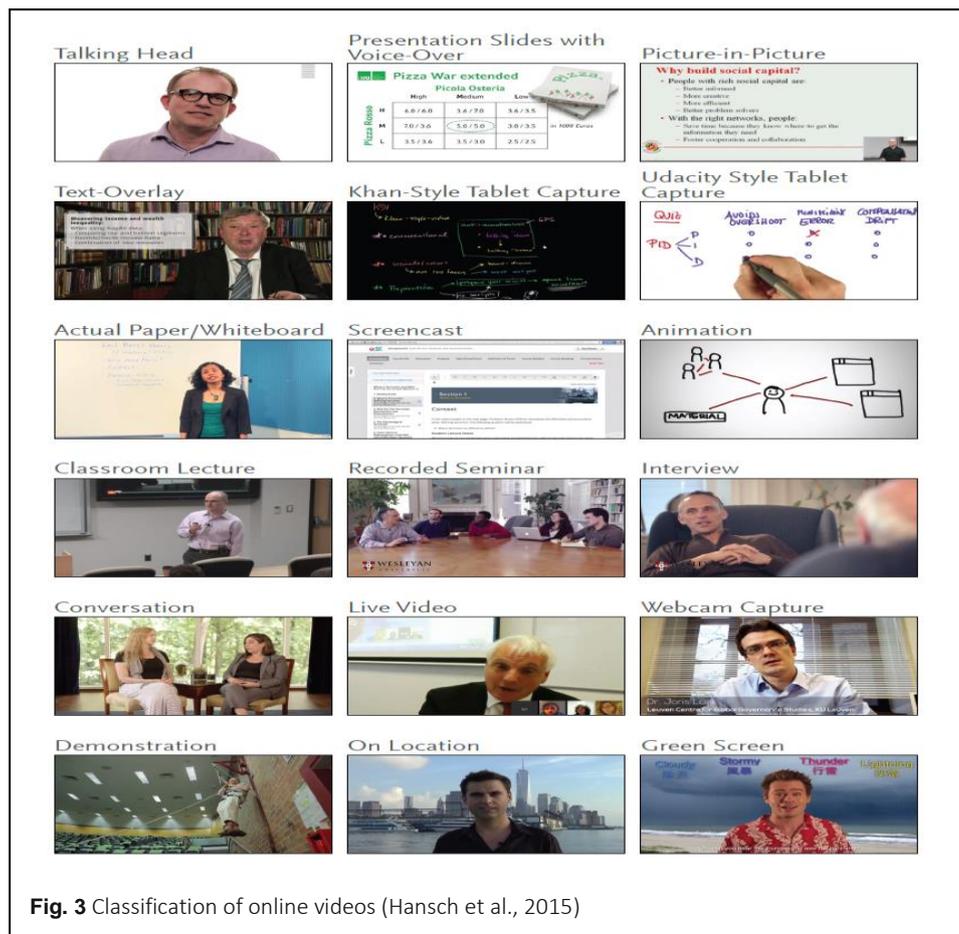


Fig. 3 Classification of online videos (Hansch et al., 2015)

Sampling

Determining sample size helps researchers select a specific number of units from the total population or a manageable subset (Martínez-Mesa et al., 2016). A sample that is too large, does not contain enough units of analysis, or is not specific, makes the study complex, time-consuming, and expensive, which negatively affects the results (Althubaiti, 2022). Since YouTube videos are popular, their content is available to any viewer, and viewers are not required to log in to watch them. There is no need for private information from their viewers. On the other hand, the research data is collected without interacting with anyone, whether the person who posted the video or watched it. In addition, videos are uploaded to YouTube daily on various topics. Therefore, there is no specific research community. Assuming the population is an unspecified number or unknown range. The sample size is calculated using a population size that achieves a 95% confidence level and a 5% margin of error. For example, if the population size is 200 items. To achieve a 95% confidence level and a 5% margin of error, the ideal sample size is 132 items. If the population size is 100 items. The appropriate sample is greater than 80 (Qualtrics, 2024a, 2024b).

The research involved selecting samples in the following steps: First, an advanced search on YouTube was conducted to identify microlearning videos from the past four years, 15 minutes or less in duration. The search terms included topics related to PD: “Communication skills in the classroom” or “Organizing the classroom” or “Planning the learning environment for the child” or “Educational media for the child (production, design and use of educational tools)” or “Designing learning styles” or “Technology for teaching children” or “Dealing with behavioral problems for children” or “Methods for motivating and reinforcing children”... with their URLs. They were recorded within an 18-day time frame in January 2024. These topics are relevant to the PD of kindergarten teachers (Andersson et al., 2022).

Second, each video was watched twice. The first time was to ensure that it achieves an educational goal and is not an advertisement or commercial and meets the criteria in Table 1. 286 videos were excluded from 380 collected. The included research sample was limited to 94 videos. The second time was to evaluate the video clips according to IDQF and analyze the comments according to Keller’s model.

Table 1 Acquisition and exclusion criteria

Source	Criteria
YouTube	Duration is a maximum of 15 minutes or less. Speak and write in Arabic. It was uploaded four years before 2024. Sample size range is from 80 to 132 videos. Minimum three comments per video. Improving communication skills, organizing and planning the child’s learning environment, designing learning methods, and using teaching aids for the child.
Video content	The content is developed by YouTube users only.

Validity/ Reliability

Validity and reliability were addressed in the research. Validation was achieved by incorporating Morain and Swarts’ (2012) IDQF rating model and the Video Production Patterns Taxonomy (Hansch et al., 2015) into the first coding guide. The second coding guide focused on beneficiaries’ interactions to the video. The coefficient of agreement was used to determine reliability in classifying items or categories (Kim & Kuljis, 2010). Two raters coded a random sample of video clips using a five-point Likert scale. The two raters watched 45 videos, 48% of the total videos, after coding them. The two evaluators met with the researchers. There was agreement of more than 91% between the assessments of the evaluators and researchers. The videos with the largest discrepancies are discussed. It was agreed to retain the frequency ratings. The inter-rater reliability score was 0.89, indicating high agreement.

Data analysis

IBM SPSS version 25 was used (IBM Corp., 2017). Quantitative descriptive statistics were used for all questions. Inferential statistics: Pearson’s correlation coefficient (r) was used to determine the relationship, its direction, and its strength between the variables. Table 2 shows the proportions of the variables – using ratios to create an acceptable, practical scale from zero to 100; because the data was variable and overloaded with results.

Results

Video length and views

Table 3 displays descriptive statistics for VL and views.

Table 2 The method for calculating the ratios of variables

Variables	Expression ratio number
Ratings/likes	= number of thumbs up/total number of likes x 100
Attention	= Total positivity of Attention /total number of ARCS x 100
Relevance	= Total positive Relevance /total number of ARCS x 100
Confidence	= Total positive Confidence /total number of ARCS x 100
Satisfaction	= Total positive Satisfaction /total number of ARCS x 100
Physical	= Total positive Physical design /total number of IDQ x 100
Cognitive	= Total positive Cognitive design /total number of IDQ x 100
Affective	= Total positive Affective design /total number of IDQ x 100

Table 3 Descriptive statistics for VL and views n=94

Variable	Min	SD	Mean	Max
Video Length	7.69	3.96	.33	15
Video views	87.88	131.39	158	582.686

The lowest video duration was 0.33 minutes; longest duration 15 minutes; average video duration 7.69 minutes. The number of views was 158 for the video. The video with the most views at 582.69. The average number of views was 87.88. Figure 4 shows the videos from shortest to longest, and the total number of videos for each category. Figure 5 shows the distribution of views for each video and the number of views. It is also clear from Table 3 that the standard deviation value in the number of video views is high. This is due to the large difference between the lowest number of video views (158 views) and the highest number of video views (582,686 views).

Video comments, ARCS and IDQF

Table 4 displays descriptive statistics for total comments.

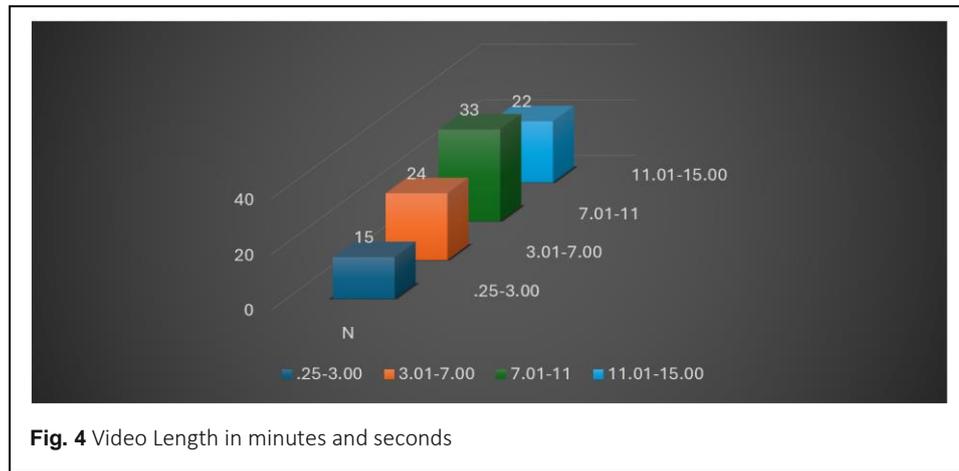


Fig. 4 Video Length in minutes and seconds

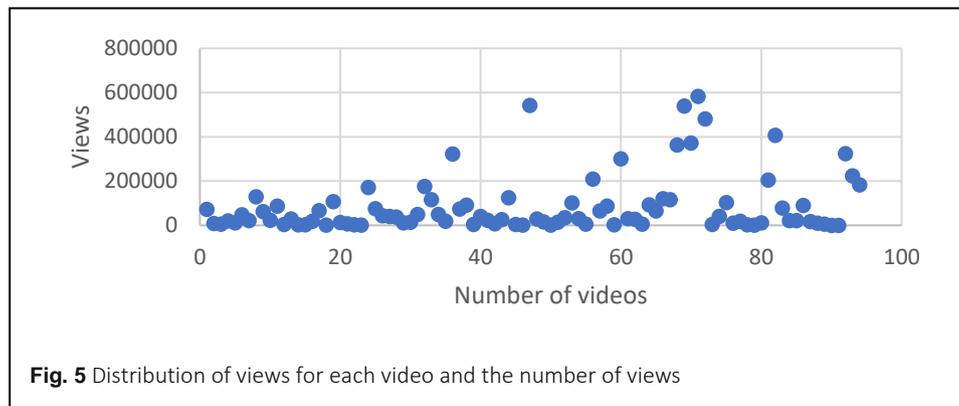


Fig. 5 Distribution of views for each video and the number of views

Table 4 Descriptive statistics for comments n=94

Comments	Mean	SD	Min	Max
Total	110.18	235.59	3	1561
ARCS Comments	90.08	206.18	1	1353
IDQF Comments	20.09	31.11	0	208

There were 10,357 comments. The minimum number of comments was 3. The largest number of comments for the video was 1,561. The mean of comments per video was 110.18. ARCS contained 8,468 comments, with mean at 90.08. IDQF contained 1,889 comments, with mean at 20.09. It is also clear from Table 4 that the standard deviation value is high. This is due to the large discrepancy between the smallest number of comments and the largest number of comments related to the IDQ and ARCS frameworks.

Video production patterns

Among 94 videos, only 13 of 18 (72%) of the classifications were used (Hansch et al., 2015). Table 5 displays the 13 commonly used VPP. 49 (52%) used a combination of two or three styles of video production. The most common VPP are talking head (23.4%), text overlay (18.1%), and presentation slides with voiceover (10.6%).

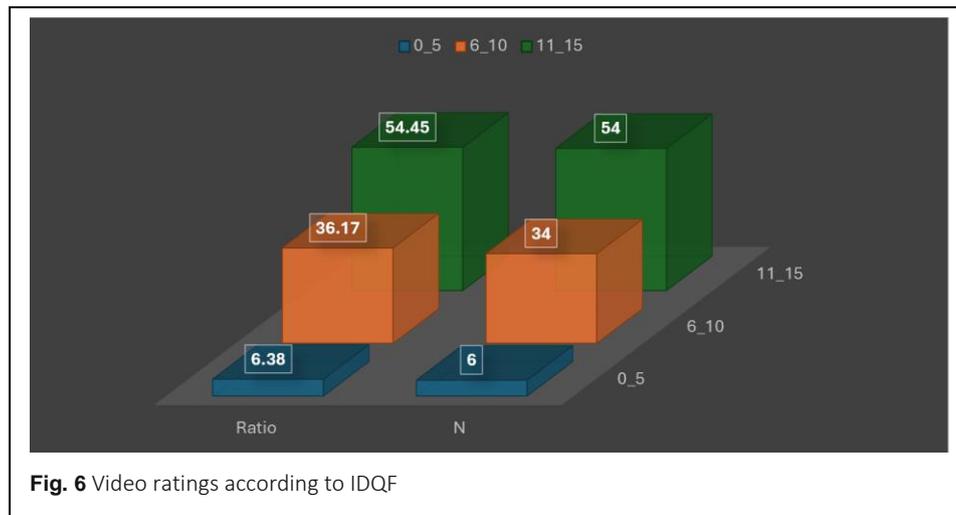
Results of research questions

First question

To answer the first question “How available are IDQF features in micro-video?”, Figure 6 shows IDQF evaluation scores. Among 94 videos. Nine videos (9.57%) received the maximum score of 15 points. The physical, cognitive, and affective design ratings were five for each domain. Five videos arrived, with a percentage of 5.32%. The cognitive design had a mean of five, while the physical and affective designs had a mean of four. 54 video clips (57.45%) were rated between 11-15 points. Therefore, these 54 videos are highly rated. It demonstrated high-quality video production at the IDQF in all three categories,

Table 5 The most common VPP on YouTube

Pattern	N	%	Rank
Actual paper/board	8	8.5	4
Animation	3	3.2	7
Class lecture	2	2.1	8
Conversation	0	0	0
Demonstration	8	8.5	4
Green screen	0	0	0
Interview	1	1.1	9
Chalk & talk	0	0	0
Live video	0	0	0
On location	7	7.4	5
Picture in picture	3	3.2	7
Presentation slides with voiceover	10	10.6	3
Recorded seminar	0	0	0
Screen recording	5	5.3	6
Talking head	22	23.4	1
Text overlay	17	18.1	2
Udacity style tablet recording	7	7.4	5
Webcam capture	1	1.1	9



with mode and medium scoring higher 11. Forty-five videos received a rating between 11-14 points (47.87%). 45 videos were rated well on the nine IDQF items. However, some factors were missing from the physical, cognitive, and affective designs. For example, a video received a rating of 5 points in both cognitive and affective design, for a total of 10 points. But it failed in accessibility, lacked sound quality, or couldn't adjust the video tempo. Forty-three videos (36.17%) received a rating between 6-10. The videos lacked some of the nine IDQF elements. Most videos did not score 5 on the IDQF elements. For instance, a video received a rating of 3 in the affective and cognitive designs, but it received a rating of only 1 in physical design. Examples included: the sound is bad; the presence of background noise; inappropriate content; the narration is disorganized which makes it difficult to follow; the narrator did not show confidence in the matter; weak methods of focusing attention on the text. Six videos received three points (6.38). Placed in the lowest rating category from 0-5. The mean IDQ was 10.67. Three videos received a rating of 1 for each field. These low scores indicate that none of the IDQF elements were considered.

Second question

To answer the second question "How did the beneficiaries rate the video (likes)?", Table 6 displays descriptive statistics for the liking response ratings. Out of 94 videos, there were 234,482 likes. The largest number of likes for one video was 27,000. The minimum number of likes was zero. The average of likes was 2494.48. It is also clear from Table 6 that the standard deviation value is high. This is due to the large discrepancy between the smallest number of likes and the largest number of likes, and because the research was limited to a number of comments of no less than 3 for each clip and not the number of likes.

Table 6 Descriptive statistics for Likes n=94

Likes	Mean	SD	Min	Max
Statistics	2494.48	4548.64	0.00	27000

Beneficiaries' responses to the likeability ratings on the videos varied. A numerical formula was used to calculate the percentage of likes for each video (see Table 2). The percentages ranged between 0% and 11.51%, meaning that the videos received a mixture of likes. A percentage of zero indicates that the video received fewer likes. A ratio of 11.51 indicates that the video received high likes. The thumb icon expresses beneficiaries' opinions, credibility, approval, and self-selection (Eugelin et al., 2022). Users are supposed to feel emotional about the video. However, since they are unknown, this can only be an assumption. On the other hand, the thumb symbol can be directly linked to the beneficiaries' need to express their opinions.

Third question

The third question referred to "How many beneficiary comments related to the ARCS model?" Table 7 shows the total number of positive, neutral, and negative ARCS model comments, and the percentages within each category. Commenting on videos is a form of interaction with user-generated content. Beneficiaries can self-select if they want to interact or not. Some of the comments identified were not placed in ARCS model categories, but in IDQF emotional design. For example, comments about the narrator's tone of voice, clothing, or makeup. They did not fit into the feedback categories in the ARCS model or the physical or cognitive designs in the IDQF.

Table 7 Descriptive statistics of comments according to ARCS dimensions

ARCS model	Feeling	N	%	Mean	SD	Ratios
Attention	Positivity	663	86.67	7.05	16.33	7.83
	Neutral	60	7.84	.63	1.62	0.71
	Negativity	42	5.49	.44	1.04	0.50
	Total	765				
Relevance	Positivity	2841	94.7	30.22	71.16	33.55
	Neutral	88	2.93	.93	2.63	1.04
	Negativity	71	2.37	.75	2.35	0.84
	Total	3000				
Confidence	Positivity	640	79.9	6.81	14.08	7.56
	Neutral	86	10.74	.91	2.80	1.02
	Negativity	75	9.36	.79	2.38	0.89
	Total	801				
Satisfaction	Positivity	3786	97.03	40.27	93.86	44.71
	Neutral	61	1.56	.65	2.48	0.72
	Negativity	55	1.41	.58	1.64	0.65
	Total	3902				
Total		8468				

Table 7 shows that there are 8,468 comments related to the ARCS model, with mean 90.80 per video. Satisfaction received 3,902 comments. 938 (96%) were positive, $m=40.27$, $SD=93.86$ for each video. Satisfaction comments such as “That was professional... and helpful...” or “Well done”, “Very clear...”, “Great video...” comments indicate the recipients’ desire to interact positively with the content creator. Response translates to their feeling of satisfaction using natural, positive results (Keller, 2010). Relevance received 2,841 positive comments. The mean was $m=7.05$, with $SD=16.33$. Data show beneficiaries’ self-selections. Comments were classified in this category, such as, “Super information...”, “All useful information...”, “Very sophisticated and important content...”, “We tried to apply it in our daily lives and it was a successful method...”. The videos explained current value, future benefit, matching needs, and modeling (Keller, 2010). Attention received 765 comments. There were 663 positive comments (86.67%). The mean was 7.05, with a standard deviation of 16.33. One example of comments tagged as “attention”. “I’ve been wanting to meet this type for a long time...”, “I’m re-watching the video..., great planning...”, “The video is short and contains very useful things. Keep it up...”. This comment fits the attention category best, because the beneficiary is tired of watching videos that are not related to the topic or are too long.

There were 640 positive comments (79.90%) related to confidence. The mean was 6.81, with $SD=14.08$. Comments referring to learning requirements and self-confidence were categorized as confidence, such as “I needed to know these methods so that people would not laugh at me...”, “After the video, I convinced my daughter, who is one year and 9 months old... and she understood and was convinced.”, “I hope you don’t make us late. Your videos helped me increase my self-confidence...”. Comments indicating error or shortcomings were classified as lack of confidence, such as “Frankly, your words are not correct in my opinion...”. Comments in these categories indicate beneficiaries’ desire to interact with the users-generated. It indicates the suitability of the video content to their professional development skills, and their satisfaction with it.

Fourth question

The fourth question was “How many beneficiary comments related to the IDQF?” Table 8 displays the number of IDQF comments and the percentages within each category. The total number of comments was counted, displayed, and placed into positive, neutral, or negative categories within the IDQF.

For positive comments in physical design, the mean was 2.50, with SD of 5.67 for each video. For positive comments in cognitive design, the mean was 4.36, with a SD of 8.40 for each video. For positive comments in the affective design, the mean was 9.62 with a SD of 14.11 for each video. This indicates that the videos positively impacted most beneficiaries. They wanted to express their feelings and emotions by taking the time to

Table 8 Descriptive statistics for IDQF comments

IDQF elements	Feeling	N	%	Mean	SD	Ratios
Physical	Positivity	235	64.38	2.50	5.67	12.44
	Neutral	57	15.62	.60	1.25	3.02
	Negativity	73	20.00	.77	1.16	3.86
	Total	365				
Cognitive	Positivity	410	78.24	4.36	8.40	21.70
	Neutral	62	11.83	.65	1.31	3.28
	Negativity	52	9.92	.55	.94	2.75
	Total	524				
Affective	Positivity	905	90.5	9.62	14.11	47.91
	Neutral	50	5	.53	1.63	2.65
	Negativity	45	4.5	.47	1.22	2.38
	Total	1000				
Total		1889				

write comments. The affective design received the most comments. The three categories within the affective design focused on the narrator's confidence and knowledge, self-efficacy to complete tasks, and the focus of learning; and whether the video is designed to motivate beneficiaries. From comments such as "Your style is beautiful and conveys information easily...", "The voice is clear and clear...", it is a prominent trait related to trust due to the tone and quality of voice. There were comments related to the cognitive and physical design, such as "I liked the way you presented the topics...", "Your style conveys the information with ease...", "Short and purposeful videos at the same time...", "The best Your topics are short and the information is delivered quickly...". Viewers commented on the user-generated and asked questions not related to the content of the video. Among the posts that are not related to creating and fulfilling expectations are "Your makeup is so beautiful...", "The jacket caught my eye so much...".

Fifth question

The fifth question addressed "What is the relationship between the video length and the number of views, likes, and positive comments?" Table 9 shows the results of inferential statistics for the relationship between VL, views, likes ratings, and positive comments for the IDQ and ARCS.

Table 9 Statistics results Pearson correlation n=94

Variables		Comments IDQ	Comments ARCS	Views	Likes
Video Length	r	-.128	-.103	-.334**	-.228*
	Sig. (2-tailed)	.218	.323	.001	.027

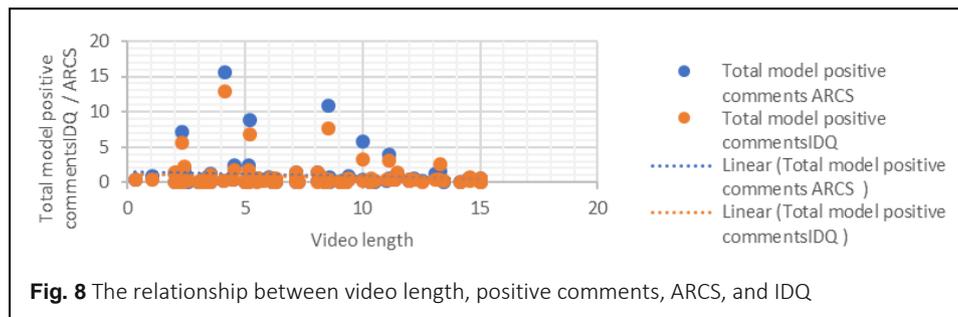
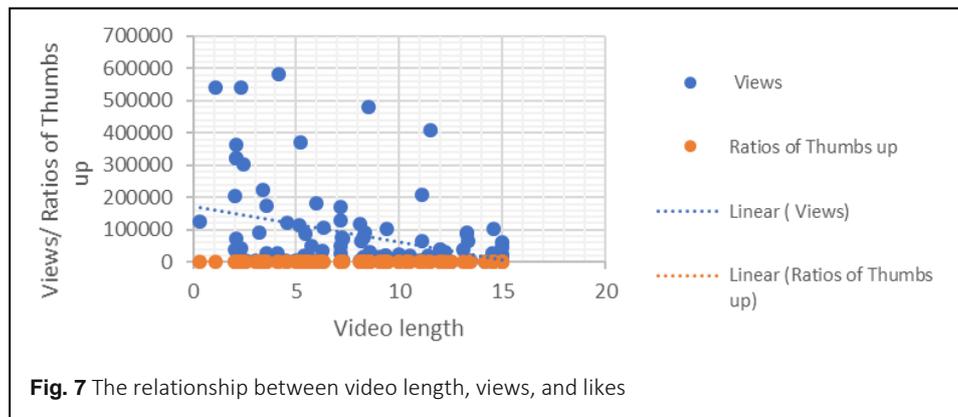
** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The results concluded that there is a strong negative relationship between VL and views. Value of $r=-0.334$, significant at 0.01. A strong negative relationship was found with VL and likes. Value of $r=-.228$, significant at 0.05. The results showed that when the length of the video increases, likes and views decrease significantly. The data indicate that there is sufficient evidence of a relationship between the number of individuals who watched the video and who clicked the thumbs-up and the length of the video. Figure 7 shows the scatterplot of VL, likes, and views, which indicates the strong negative relationship.

The relationship between VL and positive comments for both the ARCS and IDQF items. There was a weak negative correlation that was not statistically significant. The data showed that when the VL increased, positive comments for both the ARCS and IDQF items decreased. The data could be interpreted as insufficient evidence of a relationship between the number of individuals who registered comments and the VL. Figure 8 shows the scatterplot of VL ratings, positive comments, ARCS, and IDQ.

The first hypothesis was that there is no relationship between VL and the amount of views, likes, and positive comments (IDQ) and ARCS. The null hypothesis is rejected, because there is a strong negative relationship between VL and views and likes. There is a weak negative relationship between VL and positive comments. This indicates the need for further studies to further understand the association between VL and positive comments, ARCS, and IDQ.



Sixth question

The sixth question referred to “What is the relationship between IDQF features and beneficiaries’ likes and comments?” The first correlation was between video IDQF ratings and liking rate. The results indicated a strong positive relationship between the total IDQF score (first question) and liking ratings (second question). The value was $r=0.870$, statistically significant at 0.001. The result indicates that when IDQF scores increase, the rate of liking increases strongly. This indicates that there is sufficient evidence of a relationship between the individuals who watched the video and those who clicked the thumb sign. Figure 9 displays the scatterplot of the combined IDQF ratings and percentage of likes, indicating the strong positive relationship.

Table 10 indicates the results of the correlations between the collected IDQ specific characteristics (the first question) and the positive comments of the ARCS dimensions (the third question). In general, the results showed a strong, positive relationship between positive comments for all dimensions of the ARCS model and DIQF ratings. Pearson value (r) was statistically significant at 0.001.

The presence of a strong correlation and positive trend indicates that the variables move in one direction with the IDQ. This indicates that when IDQF ratings increase, positive ARCS comments increase. The data show that there is sufficient information to measure the accuracy of these results; Especially with the increase in the number of positive comments. However, more studies are needed to understand the interrelationship between

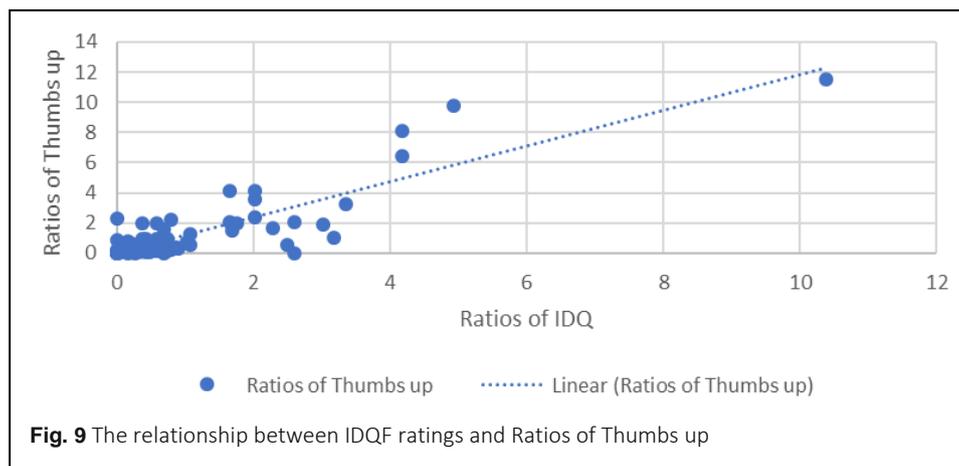


Table 10 Statistics results Pearson correlation $n=94$

Variable	r	Sig. (2-tailed)
Attention	.916**	.001
Relevance	.932**	.001
Confidence	.896**	.001
Satisfaction	.932**	.001

IDQF results and comments on the dimensions of the ARCS model. Especially with the scarcity of these studies in Arab environments, so that there is a framework for broad generalization of the results. This indicates acceptance of the second hypothesis; because there is a strong positive relationship between the combined IDQF scores and the likes and positive comments ARCS. Figure 10 displays the dispersion of the aggregated IDQF ratings and positive comments for the ARCS dimensions.

Table 11 shows the results of Pearson correlations between the pooled IDQF (first question) and positive comments for the IDQF items (fourth question). The results show that there are positive and strong relationships between increasing positive comments for the physical design ($r=0.808$), the cognitive design ($r=0.87$), and the affective design ($r=0.815$), all of which are significant at 0.001 and the increase in IDQF scores. Figure 11 displays the dispersion of the combined IDQF ratings for positive comments for designs in



Fig. 10 The relationship between IDQF ratings and Ratios of ARCS dimensions

Table 11 Statistics results Pearson correlation $n=94$

Variable	r	Sig. (2-tailed)
Physical	.808**	.001
Cognitive	.873**	.001
Affective	.815**	.001

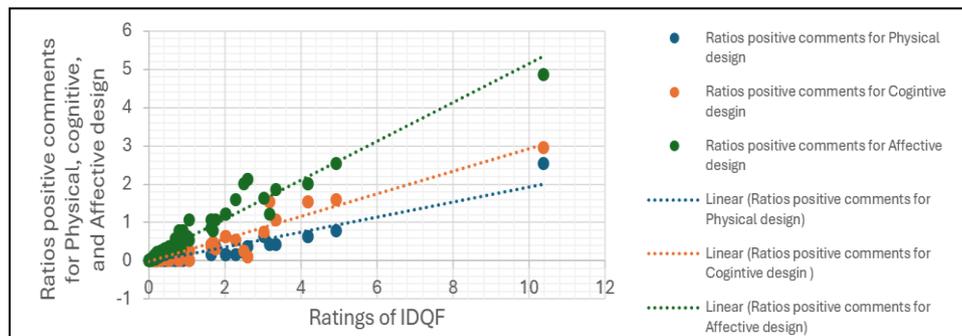


Fig. 11 The relationship between IDQF ratings and IDQF positive comments

IDQF. The third hypothesis was accepted. It indicates that as high IDQF scores (production) are achieved, beneficiaries' positive comments (consumption) related to IDQF items will increase.

Discussion

The research results showed that the response to likes was greater than writing comments. There was an inverse relationship between video length and the number of views, likes, and positive comments. Strong positive relationships were found between high ratings of instructional design quality (IDQ) and likes and comments related to the ARCS model. A strong positive relationship was also found between increasing IDQF scores and positive comments related to IDQF items.

This can be attributed to the fact that most beneficiaries interactions were by clicking on the thumbs up icon () instead of writing comments. This self-reaction may be due to: that most beneficiaries would not have engaged if they were not interested or watched the video until they bothered to click the thumb icon. Clicking the thumb icon takes less time than writing a comment. Beneficiaries may be reluctant to comment on social platforms because of their digital footprint or because beneficiaries feel anxious when writing their comments in social media. The most common patterns of video production were talking head, text overlay, and presentation with sound. This may be due to its ease of use and low production costs. There may be a relationship between the person in front of the camera and the beneficiaries. Seeing the presenter visually rather than just listening to him motivates beneficiaries to watch the entire video (Afify, 2020). In addition, using a talking head-based production pattern shows beneficiaries their confidence in the subject matter and motivates them to complete learning-focused tasks or maintain their interest. This is what was indicated by the IDQF affective design comments, and the satisfaction and suitability comments in the ARCS model. On the other hand, it allows the beneficiaries to know if the narrator is nervous and speaks too quickly or if the task has been presented or not (Beege et al., 2022). On the other hand, the talking head and overlapping text patterns allow audiences to visually see the presenter in the video, giving beneficiaries the ability to decide whether or not to trust them. Feeling confident can help foster social partnerships that can lead to deeper learning (Mayer, 2014). This may be because the beneficiaries seek to establish a social relationship through social media with the narrator. Their responses with a thumbs up icon and comments reflected the extent of their engagement (Abbas & Qassim, 2020).

Results showed that beneficiaries preferred micro-video for learning in small chunks (Huang, 2020; Javorcik & Polasek, 2018; Mohammed et al., 2018). However, some of them had the opposite effect. Some comments did not like the speed of the video, such as "I think the video needs to be a little longer, minus the voting section...". It suggests that

beneficiaries are unable to retain what they learn and may find it difficult to learn from the short video. In this case, if the vision slows down, as suggested by the beneficiaries, the timing will be adjusted. This makes it easier to follow the video. This is an element of physical design (Harskamp et al., 2007). Beneficiaries express their opinions and reactions when the video creator is present in the interaction interface (Çoklar & Cihangir, 2021). There were comments that could help improve user-generated content, such as “You gave examples with each item...closer to reality...far from theoretical talk...”, “You focused on important points...and their importance lies in their simplicity...”. These can be understood as developing content or clarifying how learning is carried out. These comments fall into the appropriateness category of the IDQF, since the content should focus on educational practices. The comment indicates a disconnect between theory and practice. If these elements are integrated, the beneficiary may find the content appropriate for satisfaction.

Accessibility scored highly for video; because it allowed users to focus on learning the physical design. On the other hand, the beneficiary may lose focus on learning. If the video footage is large, it reveals a lot of unnecessary information or is inconsistent with the shooting angle. Viewability received a high score, since videos have a good mix of audio, images and text makes the content highly watchable (Çoklar & Cihangir, 2021). Timing was rated as high, because it made it easier for beneficiaries to follow the video content. Timing is related to the speed at which actions are presented and described by the video presenter. Voiceover can become a problem if the narration is too fast or too slow (Izci et al., 2019). Cognitive design, defined as content presented without errors. Examples of the video trying to complete a task but not succeeding, such as “I think the video is incomplete...”. This would negatively affect the beneficiary’s ability to apply what has been learned. Structuring content in the video presentation, utilizing introductory slide features, and projected objectives help the user follow the content easily (Huang, 2020). Positive comments were related to the narrator showing confidence by presenting himself as knowledgeable and skilled. The narration rate was well written. As well as emotional design – the sound quality and tone showed confidence in the subject such as “The sound is clear and clear...”, which helped build their credibility with the beneficiaries. Self-efficacy was demonstrated as the video convinced beneficiaries to complete tasks that were the focus of learning. The task was easy for the beneficiaries to experience, such as “The topic is really simple, but I previously found it difficult to understand...”.

Beneficiaries’ positive reactions were recorded by clicking on the thumb icon. A higher number indicates that beneficiaries responded by approving the video. The beneficiaries’ approval of the video is due to reasons including content, background setting, duration, introduction, or desire to express their acceptance (Singh & Banathia, 2019). However, the assumption is that beneficiaries provided honest feedback. This has been proven to be true.

There may be factors that prompt beneficiaries to click on the thumb icon, such as the quality of the educational design, its subject matter, and its presentation style.

For comments related to Keller's model of learning motivation, we found large comments on most videos. While we found some videos that did not have such many comments, the largest number of comments was related to affective design. Low comments related to cognitive and physical design can be explained by viewers not being interested in commenting on the production quality of the videos to a large extent, or the accuracy of the information and content provided, or that the content does not achieve a direct educational goal. This is consistent with what the study Ledbetter (2018) indicated that there are other dimensions that should be considered, such as rhetoric and storytelling, in addition to the guiding framework IDQ. Viewers may not be willing to share their opinions for other reasons that are difficult to pinpoint, especially since YouTube does not share identifiable private information (Mayrhofer et al., 2019). High number of positive comments related to affective design aspect may be due to the video presenters themselves being able to inspire trust, persuade viewers to complete a task that is the primary focus of the video, or create reasonable expectations for viewers (Hanson & Haridakis, 2008). This data showed that viewers approved of and acknowledged the creator's work by taking the time to provide positive written comments.

On the other hand, the comments related to the emotional design of the kindergarten teacher's PD videos did not go beyond the ethical value framework and there were no negative comments as topics such as news and politics (La Gatta et al., 2023; Shevtsov et al., 2023), marketing (Xiao, 2023), and myths and folklore (Zarenti & Katsadoros, 2023); which receive higher trolling with sarcastic or suspicious comments according to YouTube (YouTube, 2022a). This is consistent with Cook et al. (2023) who indicated that social media, including YouTube, is always a target for trolls. Additionally, the most popular videos are entertainment, show business, horror movies, pranks, gender identity, and game creators (Campbell et al., 2012); since the topics of PD for kindergarten teachers are not classified into these categories. This could be explained by the fact that viewers are looking for what they want to learn and practice. This could be because PD videos are created by experts in the subject or individuals who share their expertise, experience, advice and methods. Most of the viewers' comments were related to the presenter's appreciation for his expertise, the importance of his topic and his method.

The research used two conceptual frameworks. The quality design elements framework was found to be helpful in predicting higher scores with increased viewer engagement through likes and comments. This is consistent with studies that have shown that students perform better when using multimedia (Hayikaleng et al., 2017; Huang, 2020; Istifci & Dogan, 2021). In addition, micro-videos are used to gain knowledge and information in a short time and quickly (Giurgiu, 2017; Javorcik & Polasek, 2019). In addition, viewer

engagement depends on the narrator's content, personality, and speech performance (Evans, 2014). Keller's model of learning motivation was the second framework. It was useful, especially in the categories of relevance and satisfaction, in predicting the results of IDQ. It had greater engagement with likes and comments. The research findings are consistent with the literature in which thumbs-up or other compliments and appreciations have been used to elicit immediate feedback (Jha et al., 2018).

Conclusion

When the COVID-19 pandemic swept, there was an exponential increase in individuals and organizations creating and watching videos as a source of education and learning, with the end of the pandemic and the return to normal regionally and globally. There is an urgent need to create user-generated content that enables viewers to interact with content that achieves a degree of satisfaction and helps them develop their knowledge and skills. Therefore, the aim of the research was to quantitatively analyze the micro-videos related to the PD of kindergarten teachers on YouTube. The IDQF ratings were used in the video production and the number of positive, neutral, and negative comments within the ARCS model using a five-point Likert scale. The number of likes, number of views, and length of the video clip were recorded. The research did not analyze the content of the videos (meanings, words, concepts, themes, and their relationships). The research sought to understand the relationships between these variables. There were six research questions that the research attempted to answer and three hypotheses. Descriptive quantitative statistics were used for each question, and the hypotheses were tested using Pearson's correlation coefficient.

The first hypothesis stated that "There is no relationship between the length of the video and the number of views, likes, positive comments IDQF, and positive comments ARCS model". The null hypothesis was rejected due to the presence of a strong inverse relationship between the length of the video and the number of views, likes, and positive ratings. This meant that viewers preferred and liked short videos (less than 15 minutes), and this was clearly shown by writing feedback (comments). The second hypothesis stated that "With increased scores for the instructional design quality (IDQ) of the micro-videos and likes and comments related to the ARCS model will increase". This hypothesis means that is that if the ratings in the IDQF (production) are high, then the number of likes and comments from viewers (usage) should have more positive results. The hypothesis was accepted due to the strong positive relationship between the aggregated scores of the IDQF and the ratings/likes ratios. This indicates that the availability of quality elements in the educational design of videos increases the liking, satisfaction and interest of viewers. While the third hypothesis stated that "As IDQF scores increase, positive comments related to IDQF elements will increase." This means that as the IDQF ratings increased, the positive

comments of the viewers would be rated more positive than negative. The hypothesis was accepted, as there was a strong positive correlation between the aggregated IDQF scores and the positive comments of the Keller Model (ARCS) dimensions. This means that with high scores on the IDQF items, the positive comments of the viewers associated with the dimensions of the Keller Model (ARCS) of Learning Motivation would increase. In addition, the research showed that viewers preferred the creator to appear in the interaction interface, as the talking head rating showed credibility when viewers could see who they interacted with.

The practical importance of this research lies in its focus on the basic dimensions of kindergarten teacher professional development. By examining the quality of the educational design of YouTube videos, the longest of which is the quality of the videos. Analyzing viewer responses through their likes and comments. Determining whether there are any relationships. This research provided a focused look for designers and developers on technological communication to develop their own mini-videos related to the professional development of kindergarten teachers. In addition, the results of this research can help serve as a guide for those in charge of using mini-videos or anyone interested in developing a mini-educational video to keep viewers (self-learners) motivated to learn the subject throughout the duration of the video.

Statement of limitations

As of 2024, there are 3.9 billion videos on YouTube. In 2023, 2.4 million videos were uploaded to YouTube every day. That equates to 100,000 videos per hour, 1,750 videos per minute, and 29 videos per second (Photutorial, 2024). Therefore, content creators need to describe the videos they create well using titles, descriptions, and thumbnails. And make sure that the YouTube search engine can search for this description. In the absence of a good description, the user will not reach the content they are looking for. Therefore, it is difficult to find potentially valuable content, especially since more than 2 million are uploaded daily. The research was conducted on YouTube videos. The research did not include any videos from other platforms. Therefore, the research sample (94 videos) does not fully represent the research population. However, a larger sample size would strengthen this research.

The research was based on a quantitative analysis of viewers' experiences by monitoring their likes and writing their comments, and therefore the research does not represent a deep analytical analysis to understand viewers' thoughts when they respond. Therefore, using qualitative analysis methods (focus groups, interviews, and observations) alongside quantitative analysis can give richer results. The number of likes (thumbs up) and positive comments for the videos was 94. There may be many reasons for this, on the one hand, and on the other hand, we cannot verify the truthfulness and reliability of these responses or

understand their nature. The research also did not monitor the completion of watching the videos by viewers and the time taken to write comments, since YouTube does not share this information. The research was limited to the quantitative analysis of YouTube clips related to professional development in the Arabic language. Therefore, future studies can address other languages.

Suggestions

Based on the research results, we present some suggestions. Those responsible for communicating through social media, in the field of PD for the kindergarten teacher, consideration should be given to using the talking head technique and text overlay – since it is the simplest and most cost-effective video format. Thumbnail videos in small chunks can keep beneficiaries engaged in using the IDQF elements and the ARCS model dimensions as indicators for designing effective videos. Beneficiaries preferred the content creator to appear in the interaction interface. The talking head rating showed credibility when beneficiaries could see who they interacted with. The visibility level, position, and size of the screen can be checked.

Abbreviations

PD: Professional development; IDQF: Instructional Design Quality Framework; ARCS: Keller Learning Motivation Model (Attention, Relevance, Confidence, Satisfaction); VPP: Video production patterns; VL: Video length.

Acknowledgments

We are indebted to Dr. Abdel Khaleq Zaqzouq, Dr. Mohamed Hudhayfah, and Dr. Abbas El-Ganzouri for their assistance in conducting the pilot study.

Authors' contributions

The authors jointly designed and conducted the study. The second author compiled the videos related to kindergarten teacher professional development. Each author analyzed the data independently and in collaboration with the pilot participants. The first author wrote the manuscript. Both authors critically reviewed and edited the manuscript. The second author supervised the study.

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Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Availability of data and materials

The datasets used and/or analyzed during the current study may not be shared due to data privacy and protection policies. Some processed datasets/results other than those already included in the manuscript may be made available by the corresponding author on reasonable request.

Declarations

Competing interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Received: 29 June 2024 Accepted: 15 January 2025

Published online: 1 January 2026 (Online First: 3 June 2025)

References

- Abbas, F., & Qassim, A. (2020). Investigating the effectiveness of YouTube as a learning tool among EFL students at Baghdad University. *Arab World English Journal*, 2, 91–115. <https://doi.org/10.31235/osf.io/myqde>
- Abdulhadi, S., & Fatma, M. (2022). YouTube and education: A scoping review. *IEEE Access*, 10, 125576–125599. <https://doi.org/10.1109/ACCESS.2022.3225419>
- Afify, M. (2020). Effect of interactive VL within e-learning environments on cognitive load, cognitive achievement and retention of learning. *Turkish Online Journal of Distance Education*, 21(4), 68–89. <https://doi.org/10.17718/tojde.803360>
- Alfayez, H. (2021). Designing educational videos for university websites based on students' preferences. *Online Learning*, 25(2), 280–298. <https://doi.org/10.24059/olj.v25i2.2232>
- Althubaiti, A. (2022). Sample size determination: A practical guide for health researchers. *Journal of General and Family Medicine*, 24(2), 72–78. <https://doi.org/10.1002/jgf2.600>
- Andersson, K., Sandgren, O., Rosqvist, I., Lyberg Åhlander, V., Hansson, K., & Sahlén, B. (2022). Enhancing teachers' classroom communication skills – Measuring the effect of a continued professional development programme for mainstream school teachers. *Child Language Teaching and Therapy*, 38(2), 166–179. <https://doi.org/10.1177/02656590211070997>
- Ayse, S., Rabeeh, A., Hugh, D., Su W., & Naif, A. (2020). Modelling MOOC learners' social behaviours. *Computers in Human Behavior*, 107, 105835. <https://doi.org/10.1016/j.chb.2018.12.013>
- Beege, M., Felix, K., & Caroline, A. (2022). How instructors influence learning with instructional videos - The importance of professional appearance and communication. *Computers & Education*, 185, 104531. <https://doi.org/10.1016/j.compedu.2022.104531>
- Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, 2, 8–14. <https://doi.org/10.1016/j.npls.2016.01.001>
- Berk, U. (2023). Investigating impacts of using mobile video lectures on student satisfaction and academic achievement in blended learning. *Malaysian Online Journal of Educational Technology*, 11(3), 199–210. <https://doi.org/10.52380/mojet.2023.11.3.474>
- Campbell, R., Martin, R., & Fabos, B. (2012). *Media and culture: An introduction to mass communication* (8th ed.). Bedford/St. Martin's.
- Çoklar, A. N., & Cihangir, H. H. (2021). Using YouTube as an education environment: Examining. *International Technology and Education Journal*, 5(1), 50–60. <https://dergipark.org.tr/en/pub/itej/issue/75132/1233250>
- Cook, C. L., Tang, S. Y.-C., & Lin, J.-H. T. (2023). Comparing shades of darkness: Trolling victims' experiences on social media vs. online gaming. *Frontiers in Psychology*, 14, 1163244. <https://doi.org/10.3389/fpsyg.2023.1163244>
- Coursera. (2024, September 5). *Professional Development Courses Online*. <https://www.coursera.org/courses?query=professional%20development>
- Dewi, R. C., Hidayati, I., & Supriadi. (2024). Youtube video as a media to improve English vocabulary mastery of children aged 4 – 6 years at Bina Jaya Kindergarten. *Journal Pendidikan Islam Anak Usia Dini*, 5(1), 113–129. <https://doi.org/10.19105/kiddo.v5i1.11598>
- Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *Sage Open*, 4(1). <https://doi.org/10.1177/2158244014522633>
- Eugelin, S., Iis, A., Desta, S., & Genoveva, E. (2022). Correlation study between frequency of viewing YOUTUBE and students' listening comprehension. *EduLangue*, 8(2), 14–27. <https://jurnal.unimor.ac.id/index.php/JEL/article/view/3597>
- Evans, K. (2014). An experimental investigation of videotaped lectures in online courses. *TechTrends*, 58(3), 63–70. <https://doi.org/10.1007/s11528-014-0753-6>
- Frydenberg, M., & Andone, D. (2016). Creating micro-videos to demonstrate technology learning and digital literacy. *Interactive Technology and Smart Education*, 13(4), 261–273. <https://doi.org/10.1108/ITSE-09-2016-0030>
- Germuth, A. (2018). Professional development that changes teaching and improves learning. *Journal of Interdisciplinary Teacher Leadership*, 1(3), 77–90. <https://doi.org/10.46767/kfp.2016-0025>

- Giurgiu, L. (2017). Microlearning an evolving elearning trend. *Scientific Bulletin*, 22(1), 18–23. <https://doi.org/10.1515/bsaft-2017-0003>
- Guo, J., Yan, X., Lin, S., Van der Walt, J., Guan, G., & Mei, L. (2020). Quantitative and qualitative analyses of orthodontic-related videos on YouTube. *The Angle Orthodontist*, 90(3), 411–418. <https://doi.org/10.2319/082019-542.1>
- Hansch, A., Hillers, L., McConachie, K., Newman, C., Schildhauer, T., & Schmidt, P. (2015). Video and online learning: Critical reflections and findings from the field. HIIG Discussion Paper Series. *SSRN Electronic Journal*, (2). <https://doi.org/10.2139/ssrn.2577882>
- Hanshaw, G., & Hanson, J. (2019). Using microlearning and social learning to improve teachers' instructional design skills: A mixed methods study of technology integration in teacher professional development. *International Journal of Learning and Development*, 9(1), 145–173. <https://doi.org/10.5296/ijld.v9i1.13713>
- Hanson, G., & Haridakis, M. (2008). YouTube users watching and sharing the news: A uses and gratifications approach. *Journal of Electronic Publishing*, 11(3). <https://doi.org/10.3998/3336451.0011.305>
- Harskamp, G., Mayer, E., & Suhre, C. (2007). Does the modality principle for multimedia learning apply to science classrooms? *Learning and Instruction*, 17(5), 465–477. <https://doi.org/10.1016/j.learninstruc.2007.09.010>
- Hayikaleng, N., Nair, M., & Krishnasamy, N. (2017). Using YouTube to improve EFL reading comprehension among vocational. *Proceedings of the ICECRS*, 1(1). <https://doi.org/10.21070/picecrs.v1i1.507>
- Huang, H.-W. (2020). The effectiveness of using YouTube videos to teach grammar for EFL Students with learning disabilities. In *IC4E '20: Proceedings of the 2020 11th International Conference on E-Education, E-Business, E-Management, and E-Learning* (pp. 234–239). ACM. <https://doi.org/10.1145/3377571.3377616>
- IBM Corp. (2017). *IBM SPSS Statistics for Windows*, Version 25.0; IBM Corp.
- Imelda, C., Bambang, Y., & Astuti, P. (2019). Effect of process writing approach combined with video-based mobile learning on Indonesian EFL learners' writing skill across creativity levels. *International Journal of Instruction*, 12(3), 325–340. <https://doi.org/10.29333/iji.2019.12320a>
- Istifci, I., & Dogan, A. (2021). A review of research on the use of social media in language teaching and learning. *Journal of Educational Technology and Online Learning*, 4(3), 475–488. <https://doi.org/10.31681/jetol.922968>
- Izci, B., Jones, I., Özdemir, B., Alktebi, L., & Bakir, E. (2019). Youtube and young children: Research, concerns, and new directions. *Children, families and technology in today's society* (pp. 81–92). Escola Superior de Educação do Instituto Politécnico de Lisboa, Portugal. <https://doi.org/10.34629/jpl.eselx.cap.livros.017>
- Javorcik, T., & Polasek, R. (2018). The basis for choosing microlearning within the terms of e-learning in the context of student preferences. In *Proceedings of 16th International Conference on Emerging eLearning Technologies and Applications* (pp. 237–244). IEEE. <https://doi.org/10.1109/ICETA.2018.8572183>
- Jha, N., Sareen, P., & Potnuru, R. (2018). Employee engagement for millennials: Considering technology as an enabler. *Development and Learning in Organizations*, 33(1), 9–11. <https://doi.org/10.1108/DLO-05-2018-0057>
- Keller, J. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development*, 10, 2–10. <http://doi.org/10.1007/BF02905780>
- Keller, J. (2010). *Motivational design for learning and performance the ARCS model approach*. Springer New York. <http://doi.org/10.1007/978-1-4419-1250-3>
- Kim, I., & Kuljis, J. (2010). Applying content analysis to web-based content. *Journal of Computing and Information Technology*, 18(4), 369–375. <http://doi.org/10.2498/cit.1001924>
- Kleinheksel, A. J., Rockich-Winston, N., Tawfik, H., & Wyatt, T. R. (2020). Demystifying content analysis. *American Journal of Pharmaceutical Education*, 84(1), 7113. <https://doi.org/10.5688/ajpe7113>
- Kohler, S., & Dietrich, C. (2021). Potentials and limitations of educational videos on YouTube for science communication. *Frontiers in Communication*, 6, 581302. <https://doi.org/10.3389/fcomm.2021.581302>
- La Gatta, V., Luceri, L., Fabbri, F., & Ferrara, E. (2023). The interconnected nature of online harm and moderation: Investigating the cross-platform spread of harmful content between YouTube and Twitter. In *Proceedings of the 34th ACM Conference on Hypertext and Social Media, Article 39* (pp. 1–10). ACM. <https://doi.org/10.1145/3603163.3609058>
- Laura, C. (2024). *Learning videos: Global audience reach 2023, by age and gender*. <https://www.statista.com/statistics/1288840/age-gender-reach-worldwide-learning-videos/>
- Laura, L. (2024). How can you deliver microlearning when learners don't want it? Designing microlearning for socially oriented learners. *Educational Technology & Society*, 27(1), 147–165. [https://doi.org/10.30191/ETS.202401_27\(1\).SP03](https://doi.org/10.30191/ETS.202401_27(1).SP03)
- Ledbetter, L. (2018). The rhetorical work of YouTube's beauty community: Relationship- and identity-building in user-created procedural discourse. *Technical Communication Quarterly*, 27(4), 287–299. <https://doi.org/10.1080/10572252.2018.1518950>
- Majid, S., Khine, K., Oo, C. & Lwin, M. (2011). An analysis of YouTube videos on information literacy. In K. Thaug (Ed.), *Advanced Information Technology in Education. Advances in Intelligent and Soft Computing*, vol 126 (pp. 143–151). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-25908-1_20
- Marcos, M. (2020). Coronavirus bingeing: Youtube trends show spike in every-day task tutorials. *USA Today*. <https://www.usatoday.com/story/tech/2020/05/01/coronavirusyoutube-task-tutorials/3044564001/>

- Martínez-Mesa, J., González-Chica, A., Duquia, P., Bonamigo, R., & Bastos, L. (2016). Sampling: How to select participants in my research study? *Anais Brasileiros de Dermatologia*, 91(3), 326–330. <https://doi.org/10.1590/abd1806-4841.20165254>
- Mayer, E. (2014). Principles based on social cues in multimedia learning: Personalization, voice, embodiment, and image principles. In R.E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge Handbooks in Psychology (pp. 345–368). Cambridge University Press. <https://doi.org/10.1017/CBO9781139547369.017>
- Mayrhofer, M., Matthes, J., Einwiller, S., & Naderer, B. (2019). User generated content presenting brands on social media increases young adults' purchase intention. *International Journal of Advertising*, 39(1), 166–186. <https://doi.org/10.1080/02650487.2019.1596447>
- Michalovich, A., & Hershkovitz, A. (2020). Assessing YouTube science news' credibility: The impact of web-search on the role of video, source, and user attributes. *Public Understanding of Science*, 29(4), 379–391. <http://journals.sagepub.com/doi/10.1177/0963662520905466>
- Mohammed, S., Wakil, K., & Nawroly, S. (2018). The effectiveness of microlearning to improve students' learning ability. *International Journal of Educational Research Review*, 3(3), 32–38. <https://doi.org/10.24331/ijere.415824>
- Morain, M., & Swarts, J. (2012). YouTutorial: A framework for assessing instructional online video. *Technical Communication Quarterly*, 21(1), 6–24. <https://doi.org/10.1080/10572252.2012.626690>
- Neuendorf, A. (2002). A flowchart for the typical process of content analysis research. In *The content analysis guidebook* (pp. 50–51). SAGE. https://academic.csuohio.edu/neuendorf_ka/content/flowchart.html
- Photutorial. (2024). *How many videos are on YouTube?* <https://photutorial.com/how-many-videos-on-youtube/>
- Polasek, R., & Javorcik, T. (2019). MicroLearning approach to e-learning course creation and reasons for it. *AIP Conference Proceedings*, 2186, 060015. <https://doi.org/10.1063/1.5137969>
- Portugal, K. (2018). Free-choice teaching: How YouTube presents a new kind of teacher. *Revista Electrónica de Enseñanza de las Ciencias*, 17(1), 183–199.
- Qualtrics. (2024a). *Determining sample size: How to make sure you get the correct sample size.* <https://www.qualtrics.com/experiencemanagement/research/determine-sample-size/>
- Qualtrics. (2024b). *Sample size calculator.* <https://www.qualtrics.com/blog/calculating-sample-size/>
- Ranade, S., Belthur, V., Oka, A., & Malone, D. (2020). YouTube as an information source for clubfoot: A quality analysis of video content. *Journal of Pediatric Orthopedics B*, 29(4), 375–378. <https://doi.org/10.1097/BPB.0000000000000694>
- Shahbaznezhad, H., Dolan, R., & Rashidirad, M. (2021). The role of social media content format and platform in users' engagement behavior. *Journal of Interactive Marketing*, 53(1), 47–65. <https://doi.org/10.1016/j.intmar.2020.05.001>
- Shail, S. (2019). Using micro-learning on mobile applications to increase knowledge retention and work performance: A review of literature. *Cureus*, 11(8), e5307. <https://doi.org/10.7759/cureus.5307>
- Shevtsov, A., Oikonomidou, M., Antonakaki, D., Pratikakis, P., & Ioannidis, S. (2023). What tweets and YouTube comments have in common? Sentiment and graph analysis on data related to US elections 2020. *PLoS ONE*, 18(1). <https://doi.org/10.1371/journal.pone.0270542>
- Shiri, R., El-Metwally, A., Sallinen, M., Pöyry, M., Härmä, M., & Toppinen-Tanner, S. (2023). The role of continuing professional training or development in maintaining current employment: A systematic review. *Healthcare (Basel, Switzerland)*, 11(21), 2900. <https://doi.org/10.3390/healthcare11212900>
- Singh, N., & Banathia, M. (2019). Micro-learning: A new dimension to learning. *International Journal of Scientific and Technical Advancements*, 5(1), 141–144. <https://www.ijsta.com/papers/IJSTAV5N1Y19/IJSTAV5N1R48Y19D1.pdf>
- Sobaih, E., Palla, A., & Baquee, A. (2022). Social media use in e-learning amid COVID 19 pandemic: Indian students' perspective. *International Journal of Environmental Research and Public Health*, 19(9), 5380. <https://doi.org/10.3390/ijerph19095380>
- Srinivasacharlu, A. (2020). Using YouTube in colleges of education. *Shanlax International Journal of Education*, 8(2), 21–24. <https://doi.org/10.34293/education.v8i2.1736>
- Stacy, D. (2024). *Global social networks ranked by number of users 2024.* <https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/>
- Taylor, A., & Hung, W. (2022). The effects of microlearning: A scoping review. *Education Technology Research and Development*, 70(2), 363–395. <https://link.springer.com/article/10.1007/s11423-022-10084-1>
- TechSmith. (2018). *Video viewer habits, trends, and statistics you need to know.* https://assets.techsmith.com/docs/techsmith-video-viewer-habits-trends-stats.pdf?utm_source=lead&utm_medium=event&utm_campaign=brandexp&utm_content=itdx
- TechSmith. (2024). *How to make a YouTube video.* <https://www.techsmith.com/blog/make-youtube-video/>
- Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, V., Giannoutsou, N., Cachia, R., Monés, M., & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, 28(6), 6695–6726. <https://doi.org/10.1007/s10639-022-11431-8>
- Udemy. (2024, September 3). *Early childhood education courses.* <https://www.udemy.com/topic/early-childhood-education/>
- Vukušić, A. (2018). Professional development of kindergarten and elementary school teachers for collaboration with parents. *Croatian Journal of Education*, 20(1). <https://doi.org/10.15516/cje.v20i0.3046>

- Wang, R., & Chan-Olmsted, S. (2020). Content marketing strategy of branded YouTube channels. *Journal of Media Business Studies*, 17(3-4), 294–316. <https://doi.org/10.1080/16522354.2020.1783130>
- Xerri, D. (2014). Teachers' use of social networking sites for continuing professional development. In G. Mallia (Ed.), *The social classroom: Integrating social network use in education* (pp. 441–464). IGI Global. <https://doi.org/10.4018/978-1-4666-8614-4.ch077>
- Xiao, M. (2023). Engaging in dialogues: The impact of comment valence and influencer-viewer interaction on the effectiveness of YouTube influencer marketing. *Journal of Interactive Advertising*, 23(2), 166–186. <https://www.tandfonline.com/doi/full/10.1080/15252019.2023.2167501>
- Yang, W., Wang, C., & Bautista, A. (2024). A YouTube video club for teacher learning: Empowering early childhood educators to teach STEM. *British Journal of Educational Technology*, 55(2), 1–20. <https://doi.org/10.1111/bjet.13396>
- Yerdelen, S., Osmanoglu, A., & Tas, Y. (2019). The influence of a teaching practice course with video-case enriched microteaching on prospective teachers' self-efficacy for teaching. *International Journal of Research in Education and Science*, 5(2) 560–573.
- YouTube. (2022a). *YouTube for press*. YouTube Official Blog. <https://blog.youtube/press/>
- YouTube. (2022b). YouTube culture and trends report 2022. *YouTube Culture and Trends*. <https://www.youtube.com/trends/2022/us/>
- Zarenti, M., & Katsadoros, G. (2023). Trolls: From mythology and folklore to the internet. *Asian Journal of Language, Literature and Culture Studies*, 6(2), 75–85. <https://journalajl2c.com/index.php/AJL2C/article/view/131/255>

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The Asia-Pacific Society for Computers in Education (APSCE) remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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