VOL III

EDUCAÇÃO E ENSINO NA ERA DA INFORMAÇÃO

Luis Fernando González-Beltrán
(Organizador)

EDITORA ARTEMIS
2024

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Bibliotecário	Maurício Amormino Júnior – CRB6/2422

EDITORA ARTEMIS
2024

Editora Artemis
Curitiba-PR Brasil
www.editoraartemis.com.br
e-mail:publicar@editoraartemis.com.br

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Curitiba-PR Brasil
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e-mail:publicar@editoraartemis.com.br

Dados Internacionais de Catalogação na Publicação (CIP)
(eDOC BRASIL, Belo Horizonte/MG)

E24 Educação e ensino na era da informação [livro eletrônico] : vol. III / Organizador Luis Fernando González Beltrán. – Curitiba, PR: Artemis, 2024.

Formato: PDF
Requisitos de sistema: Adobe Acrobat Reader
Modo de acesso: World Wide Web
Inclui bibliografia
Edição bilíngue
ISBN 978-65-81701-32-1
DOI 10.37572/EdArt_291024321

1. Educação. 2. Sociedade da informação. 3. Tecnologias da informação. I. González Beltrán, Luis Fernando.

CDD 370.7

Elaborado por Maurício Amormino Júnior – CRB6/2422

Editora Artemis
Curitiba-PR Brasil
www.editoraartemis.com.br
e-mail:publicar@editoraartemis.com.br

PRÓLOGO

Los acelerados avances en las tecnologías de información y comunicación cambiaron el mundo en todas sus facetas, y la Educación no fue una excepción. De hecho, generó un alto nivel de expectativas, que no se cumplieron en el corto plazo. La posible razón incluye un uso simplista y literal de las TICs en la enseñanza: no porque los alumnos dediquen mucho tiempo a las redes sociales virtuales esto significa que preferirán una plataforma educativa al laboratorio de toda la vida. Ni que las habilidades digitales que desarrollaron las usarán con fines de aprendizaje. Tampoco es realista pensar que pasar los apuntes del profesor a una pantalla, generarán mayor interés en los estudiantes. Por ello es crucial saber los factores que permitan una mayor motivación y un mayor aprendizaje, las herramientas digitales más efectivas, las formas de su instrumentación, los modelos de aprendizaje y los ámbitos de actuación de las nuevas tecnologías.

Precisamente este tercer volumen de "Educação e Ensino na Era da Informação" intenta dar otro paso hacia las respuestas a estas interrogantes, descifrar como la educación debe enfrentar estos desafíos, y descubrir las mejores formas de aprovechar las numerosas oportunidades que se nos presentan. Las propuestas nos llegan de diversos laboratorios alrededor del mundo, con distintas ópticas que exploran las dimensiones multifacéticas de la enseñanza y el aprendizaje, que intentan reflejar la diversidad de perspectivas sobre cómo la educación puede adaptarse y prosperar en un mundo que cambia rápidamente.

Este volumen integra 15 capítulos en 3 rubros. En el primer apartado se presentan las Tendencias en la Educación por objeto de estudio, con un capítulo sobre las distintas carreras y las estrategias de aprendizaje, seguido de trabajos sobre Odontología; Arquitectura; Ingeniería y Administración. En la segunda sección, La instrumentación de la tecnología y su impacto en el aprendizaje, tenemos investigaciones que prueban las bondades del uso educativo de YouTube; Facebook y WhatsApp; Inteligencia Artificial; la plataforma Moodle; y otras estrategias didácticas como intercambios virtuales y storytelling digital. La última sección, Gestión del Conocimiento, modelos educativos y ámbitos de desarrollo e intercambios sociales, presenta estudios sobre Gestión del conocimiento; modelo educativo basado en competencias profesionales; Metamodelos; Desarrollo Sustentable; y sobre Intercambios sociales indeseables.

En conjunto, el libro incluye investigaciones pero también experiencias y reflexiones sobre prácticas pedagógicas efectivas. A través de temáticas que van desde la neuro tecnología hasta el uso de plataformas digitales, desde la educación sustentable hasta la formación de habilidades interpersonales, este volumen pretende ser un recurso valioso para educadores, administradores e investigadores. Agradecemos a todos los colaboradores que hicieron posible este trabajo y te invitamos a ti, lector, a profundizar en las páginas que siguen.

Dr. Luis Fernando González Beltrán
UNAM, México

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THE USE OF YOUTUBE IN FORMAL AND INFORMAL LEARNING CONTEXTS AMONG SLOVENIAN STUDENTS: DIFFERENCES BETWEEN TECHNOPHILES AND NON-TECHNOPHILES

Data de submissão: 26/09/2024
Data de aceite: 11/10/2024

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ABSTRACT: YouTube offers students many opportunities for self-directed learning. In this chapter, we examine the differences between technophiles and non-technophiles in their use of YouTube in formal and informal learning. To this end, we analysed the responses of about 300 Slovenian students in November 2023. The survey shows that there are differences between technophiles and non-technophiles in their opinion about YouTube as a learning platform, which is what we expected.
KEYWORDS: Learning. Learning platform. Non-native speakers of English. Slovenia. YouTube.

O USO DO YOUTUBE EM CONTEXTOS DE APRENDIZAGEM FORMAL E INFORMAL ENTRE ESTUDANTES ESLOVENOS: DIFERENÇAS ENTRE TECNÓFILOS E NÃO TECNÓFILOS

RESUMO: O YouTube oferece aos estudantes muitas oportunidades de aprendizagem autodirigida. Neste capítulo, examinamos as diferenças entre tecnófilos e não tecnófilos no uso do YouTube em aprendizagem formal e informal. Para isso, analisamos as respostas de cerca de 300 estudantes eslovenos em novembro de 2023. A pesquisa mostra que há diferenças entre tecnófilos e não tecnófilos em relação à opinião sobre o YouTube como plataforma de aprendizagem, o que era esperado.
PALAVRAS-CHAVE: Aprendizagem. Plataforma de aprendizagem. Falantes não nativos de inglês. Eslovênia. YouTube.

EL USO DE YOUTUBE EN CONTEXTOS DE APRENDIZAJE FORMAL E INFORMAL ENTRE ESTUDIANTES ESLOVENOS: DIFERENCIAS ENTRE TECNÓFILOS Y NO TECNÓFILOS

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PALABRAS CLAVE: Aprendizaje. Plataforma de aprendizaje. Hablantes no nativos de inglés. Eslovenia. YouTube.

1 INTRODUCTION

With the current widespread Internet use, video and other multimedia content is more easily and globally available than ever. As one of the most popular social media platforms for sharing videos, YouTube hosts millions of videos on a vast range of topics. As such, it has become a significant platform for students to seek additional educational content outside of traditional classroom settings. We argue that it is possible to find educational videos on YouTube for almost any professional or scientific field or any given area of general or specialised interest. It is accessible, easy to use and practically cost-free for the users. A growing body of literature presents the use of video content, including the use of YouTube videos, for learning purposes, be it in formal educational settings or informal educational settings. Today's generations of students, who are considered digital natives, are the ones who are quite used to watching video content daily, also for self-directed learning.

This chapter addresses university students' use of YouTube videos in the context of their self-directed learning (related to their selected study field or any other personal interest) on the case of university students in Slovenia. It seeks to determine the students' perceptions of using YouTube content for their personal educational growth. More specifically, it seeks to give insights into students' opinions about the quality and credibility of videos for educational purposes, their satisfaction with the educational content found on YouTube, the perceived cost and ease of using YouTube as an educational platform, the benefits that watching YouTube videos may have on their intellectual competencies development, the very usefulness of YouTube as a complementary educational tool and as a source of information, and their intentions of using YouTube for self-directed learning also in the future.

It is generally believed that current generations of students are well-versed in the use of technology. However, not everyone is the same, and there are, on the one hand, those who more readily embrace and integrate the use of technology in their daily lives and for study purposes (i.e. the technophiles) and, on the other hand, there are those who do not have such a positive inclination towards the use of modern technology for the mentioned purposes (i.e. the non-technophiles). Based on that, the specific objective of this study is to explore the differences in the use of YouTube videos for the above-stated purposes between these two groups of students.

The continuation of the chapter proceeds as follows. First, we lay out the theoretical framework for our study in a brief literature review, followed by the methodology used in the study. Next, we give the results of our quantitative research, which are then analysed and discussed. The final section includes a discussion of our findings, implications for the field of knowledge, and some recommendations for education practice and further research.

2 THEORETICAL FRAMEWORK OF THE STUDY

Studies on the use of multimedia, which can also be applied to YouTube videos, focus on various aspects, including blended learning, information processing and memory, skills development, diversity of content, and the variety of learning needs (Fleck et al., 2014). Within the context of formal and informal learning, YouTube videos have become, without doubt, almost an indispensable complementary learning tool. To date, a growing body of literature from around the world has reported on the use of YouTube videos for education purposes, either in a formal setting (e.g. teacher-directed use of YouTube content in class to supplement teaching materials, course assignment work) or in an informal setting (e.g. students' self-directed learning based on their personal interest in educational content on YouTube for either study-related purposes or for the broadening of their knowledge not necessarily related to their formal education). According to researchers, YouTube videos play a vital role in self-directed learning. The content is easy to use and practically available at one's fingertips regardless of the time and place (Liu, 2010), which enables students to organise their learning at their own pace and at their own convenience.

Summarising previous research, Tariq, Khan and Araci (2020) established that YouTube is a user-friendly platform which allows its users to access up-to-date content in a vast array of subjects, ranging from natural sciences to social sciences and arts and humanities. As such, it is a good platform for self-directed learning as it allows its users (students) complete control over the selection of content based on their needs and

preferences in the context of formal and informal education. These findings are supported by a study on why university students use YouTube videos for their learning. It was found that students mainly use YouTube videos because of their individual learning needs, the manageability of the pace of content delivery, the drawbacks related to face-to-face instruction in class, and the overall availability of the content regardless of the time and location (Burhanli & Bangir-Alpan, 2021). Namely, students tend to use YouTube videos as support during exam preparation, to learn about subjects related to their studies, or to learn about subjects outside their professional field.

Regarding the manageability of content use, the technology allows for a number of adjustments, including re-watching and pausing of content, which cannot be done in a face-to-face class situation. Additionally, YouTube videos are seen as a source of additional information, visual explanation and simplicity of explanation, which may sometimes be lacking in a classroom setting. Furthermore, YouTube videos are available "around the clock", which gives students flexibility, convenience and time efficiency when it comes to their learning (Burhanli & Bangir-Alpan, 2021). Also, video tutorials on YouTube give learners access to information and resources that might not be available locally (Lange, 2019).

Focusing on the benefits of YouTube videos as a source of educational (information) content, it has been found that they come with several benefits. Students resort to YouTube videos for answers to their study-related questions. Also, they see them as an additional tool for learning about their academic subjects, as the visual representation of content makes the subject matter more understandable (Moghavvemi et al., 2018). A study about using YouTube as an information resource for university-level courses established that, overall, students viewed YouTube videos for course activities positively and believed that YouTube videos should be an important tool for supplementing their course activities. It was established that by including YouTube video content in their formal learning context, students become more deeply engaged in the subject, which, in turn, results in better learning (Almobarraz, 2018). A study carried out with the performing arts students showed that students mainly saw the benefits of YouTube videos when it came to the promotion of the field among students, the raised attention and interest of students due to visual elements in the videos, the increased efficiency of learning (DeWitt et al., 2013). Another study on the usefulness of YouTube in academic contexts showed a positive correlation between students' perceived usefulness of technology for learning and their positive attitude towards the use of YouTube, in particular. The same applied for the ease of use, i.e. students are likely to use YouTube as a source of educational content as it is an easily accessible platform (Maziriri et al., 2020).

Students can watch YouTube videos for their formal learning as well as general purposes. An interesting study into the length spent watching videos for these two purposes on the case of business, communication and education students has shown that students tended to watch videos for general purposes more often than for academic purposes (Mady & Baadel, 2020).

Although YouTube offers a vast array of videos for students to choose from, students nevertheless need to be aware that not all content is of good quality, credible or reliable. This has been proven in several studies, including those related to the use of YouTube videos in medicine or health studies. To illustrate, Aldallal, Yates and Ajrash (2019) established that videos posted on YouTube have no quality assurance, which they demonstrated in the case of oral surgery content. Further, they found that even students who could potentially watch such videos for educational purposes prefer not to do so as the content is not aligned with the information they receive during lectures. A similar observation was made concerning the quality of clinical skills video content on YouTube and the pitfalls related to students' ability, as self-directed and independent learners, to evaluate the video content's accuracy and applicability (Duncan et al., 2013).

The importance of good quality content was also addressed in a study performed on a sample of MBA students, which showed that they highly emphasise content usefulness, accuracy and quality found in YouTube videos when it comes to their academic achievements (Roy, 2023). Therefore, when it comes to self-regulated learning by using YouTube videos, students need to be able to discern between valid and invalid content (Colás-Bravo & Quintero-Rodríguez, 2023). These examples serve as a reminder that users of YouTube video content should view it with caution.

When discussing the aspects of YouTube videos for educational purposes, we should not overlook the emotional side of learning. It has been established that YouTube videos give viewers a sense of entertainment and usefulness (Colás-Bravo & Quintero-Rodríguez, 2023). In addition to that, students are empowered via the autonomy to select the content they wish to watch and engage with at their own pace, which adds to the sense of enjoyment and fun regarding their (formal and informal) learning (Lange, 2019). Having established that independent learning or learner autonomy is another aspect important in the context of our study.

In principle, independent learning and learner autonomy are two interrelated concepts that refer to students being in charge of their learning and the choice of what and when to learn. To be more precise, independent learners take responsibility for their learning, which involves identifying their learning needs, their planning and organising

of learning, their attention to learning and the reflection of learning, and their right to determine what they will learn. Independent learners also have intrinsic motivation, a proactive approach to learning, and the skills to learn independently (Dickinson, 1995; Smith, 2015; Trebbi, 2008).

Both intrinsic and extrinsic motivation have proven to be an important element of learner autonomy. To illustrate, a study performed with university students showed that students who are more likely to see the value of learning something, who have self-confidence and who are oriented towards achieving their learning goals show a higher level of autonomy, which is reflected in their readiness ability and responsibility to learn. On the other hand, the increased sense of autonomy in their learning context increases their (intrinsic) motivation to learn (Okumus Ceylan, 2021; Spratt et al., 2002).

Learner autonomy is also linked to student competence (i.e. confidence in their ability to be successful learners) and their ability to make personal choices regarding their learning, which is consequently linked to their levels of academic engagement. A study undertaken with a group of Gen Z students showed a positive correlation between their self-perceived competence and their academic engagement and a positive correlation between their autonomy and their academic engagement (Cliff, 2020).

Our brief literature review underpinning the study presented in this chapter would not be complete without addressing the population our study is based on, i.e. the Gen Z, and their attitude towards the use of modern technology. It is a well-known fact that these students are the true digital natives as they have been engaged with digital technologies from an early age. They are also enthusiastic users of social media (Rue, 2018). Furthermore, due to their familiarity with modern technology, Gen Z students can quickly and easily look for information on social media, including YouTube (Dolot, 2018). They are accustomed to multiple information channels and fast access to and engagement with online content. They also prefer such technological and collaborative experiences which provide clear goals, include authentic materials and increase their motivation (Szymkowiak et al., 2021).

Because of their frequent exposure to multimedia content, Gen Z students prefer visual forms of learning (which they also consider more effective than auditory learning) and have, consequently, increased cognitive abilities in visual learning. Further, they prefer practical experience and personalisation of learning (Cickovska, 2020; Mohr & Mohr, 2017).

Based on the above, we formulated the following research questions for our study:

- RQ1: How do Slovenian students perceive the use of YouTube videos in the context of their formal and informal learning?

- RQ2: To what extent does one's enthusiasm about new technology impact the use of YouTube videos for formal and informal learning?

3 METHODOLOGY

3.1 STUDY PARTICIPANTS

Our research sample consisted of 313 respondents. Less than three-quarters of them (73%) were female and the rest (27%) were male students studying at different Slovenian faculties. Their average age was 20.9 years (*SD* = 1.79).

3.2 STUDY DESIGN AND DATA COLLECTION AND ANALYSIS

To investigate our research questions, we employed a quantitative, questionnaire-based approach to gather the data. We collected the data via an online survey by using the 1KA, an open-source application for online surveys (www.1ka.si). Survey data were collected between 24th November 2023 and 29th November 2023. The survey was structured into eight main sections covering the following sets of items: (1) the perceived quality, breadth, and credibility of educational content on YouTube, (2) the satisfaction with the educational content on YouTube, (3) the perceived benefits of YouTube as an educational platform, (4) the perceived ease of using YouTube for educational purposes, (5) the relevance of YouTube as an educational platform, (6) the perceived benefits of educational content on YouTube for the development of intellectual competencies, (7) the perceived usefulness of YouTube as a complementary educational tool, and (8) the intent of using YouTube for educational purposes in the future. For these items, the participants were asked to respond using a 7-point Likert scale ranging from 1 = "I totally disagree" to 7= "I totally agree".

Apart from the above, we collected demographic data on the respondents' gender, age, and area of residence (i.e. urban or rural). As it was essential for our study, we also collected data on the scope of time the participants spent watching YouTube content in general and the time they spent watching YouTube content for educational purposes. Finally, to acquire our main differentiative variable, we asked our respondents whether they identify as technophiles or not.

We received a total of 401 responses. However, 88 surveys had to be discarded due to incomplete information, which gave us 313 valid and fully completed surveys. After performing the necessary data preparation, we proceeded with data analysis. Descriptive statistics analysis was performed for the overall sample and for the two

sub-groups of students (i.e. technophiles and non-technophiles), factor analysis was employed to analyse the latent structure of our items, and independent samples t-tests were carried out to test our hypothesis. We present and discuss the results in the continuation of the chapter.

4 RESULTS

In this section, the results of our study are presented in detail. First, we give our descriptive statistics analysis regarding the sample. Next, we show results per each of the eight sections of the survey as outlined in the Methodology section. Following the descriptive analysis, we present the results of our factor analysis. In the final part, the independent samples t-test results are given.

4.1 DESCRIPTIVE STATISTICS ANALYSIS

4.1.1 Analysis of the sample

As stated above, the data included responses from 313 students. As regards the respondents' attitude toward the use of technology and, more specifically, the use of YouTube for educational purposes, it was established that 37.4% of them identified themselves as technophiles and as many as 62.6% identified themselves as non-technophiles. On average, our respondents spent 47.8 minutes per day watching YouTube videos (*SD* = 51.7). Regarding the time the respondents spent watching YouTube videos for educational purposes, the mean value obtained from the survey was 17.0 minutes per day (*SD* = 23.0). Table 1 presents our research sample characteristics. Apart from the basic demographic data (i.e. age and gender) of our respondents, our survey showed that 51.1% live in an urban environment and 48.9% come from a rural environment.

Table 1. Sample characteristics.

	f	%	Cumulative %
Gender			
Female	227	72.5	72.5
Male	83	26.5	99.0
Other/No response	3	1.0	100.0
Age (*M* = 20.85; *SD* = 1.79)			
18 – 20	152	48.6	48.6
21 – 23	133	42.5	91.1
24 +	28	8.9	100.0

	f	%	Cumulative %
Residence			
Urban	160	51.1	51.1
Rural	153	48.9	100.0
Technophile			
Yes	117	37.4	37.4
No	196	62.6	100.0
YouTube viewing (in min per day) (*M* = 47.83; *SD* = 51.74)			
0 – 30	171	54.6	54.6
31 – 60	75	24.0	78.6
61 – 90	22	7.0	85.6
91 – 120	32	10.2	95.8
121 +	13	4.2	100.0
YouTube viewing educational content (in min per day) (*M* = 17.03; *SD* = 23.05)			
0 – 15	208	66.5	66.5
16 – 30	68	21.7	88.2
31 – 45	9	2.9	91.1
46 – 60	18	5.8	96.9
61 +	10	3.2	100.0

In line with our research focus, i.e. the differences between respondents who identify as technophiles and those who do not, we also show our sample characteristics based on this classification (Table 2).

Table 2. Characteristics of the two sub-groups – technophiles and non-technophiles.

Technophile	**Yes**		**No**	
	f	%	f	%
n	117	37.4	196	62.6
Gender				
Female	62	27.3	165	72.7
Male	54	65.1	29	34.9
Other/No response	1	33.3	2	66.6
Age				
18 – 20	55	36.2	97	63.8
21 – 23	47	35.3	86	64.7
24 +	15	53.6	13	46.4
Residence				
Urban	65	55.5	95	48.5

Technophile	Yes		No	
Rural	52	44.5	101	51.5
YouTube viewing (in min per day)				
0 – 30	53	31.0	118	69.0
31 – 60	27	36.0	48	64.0
61 – 90	12	54.5	10	45.5
91 – 120	17	53.1	15	46.9
121 +	8	61.5	5	38.5
YouTube viewing educational content (in min per day)				
0 – 15	60	28.8	148	71.1
16 – 30	28	41.2	40	58.8
31 – 45	6	66.7	3	32.3
46 – 60	15	83.3	3	16.7
61 +	8	80.0	2	20.0

The two sub-groups are similar only when it comes to the average age of respondents (i.e. technophiles = 21.05; non-technophiles = 20.72; $t = 1.57$; $p > 0.05$) and the place of residence ($\chi^2 = 1.47$; $p > 0.05$). Male students more frequently identified themselves as technophiles than female students (65.1% and 27.3%, respectively; $\chi^2 = 37.02$; $p < 0.001$). Technophiles stated to spend significantly more time viewing YouTube videos per day (61.2 min) than those who do not identify as technophiles (39.9 min; $t = 3.25$; $p < 0.001$), which is also true for viewing educational content on YouTube (technophiles = 26.8 min; non-technophiles = 11.2 min; $t = 5.278$; $p < 0.001$).

4.1.2 Analysis of the responses per individual section of the survey

Here, we present the results for each of the eight sections of our survey, as presented in the Methodology section above. For all the items pertaining to each section, we give the sample means and standard deviations alongside the averages for both sub-groups, i.e. the technophiles and the non-technophiles.

Section 1: *The perceived quality, breadth, and credibility of educational content on YouTube*

Concerning the respondents' perception of the quality, breadth, and credibility of educational content found on YouTube, we give the results for the nine items included in this section in Table 3 below.

Table 3. Comparison of the mean values for perceived quality, breadth, and credibility of educational content on YouTube between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
Educational content on YouTube is good.	5.21	1.23	5.49	5.05
Educational content on YouTube is clearly defined.	4.44	1.34	4.70	4.49
Educational content on YouTube is clearly displayed.	4.63	1.34	4.85	4.49
Educational content on YouTube is clearly presented.	4.82	1.42	4.96	4.74
Educational content on YouTube is informative.	5.40	1.40	5.54	5.32
Educational content on YouTube is varied.	6.00	1.28	6.05	5.96
Educational content on YouTube is understandable.	5.29	1.27	5.42	5.22
Educational content on YouTube is truthful.	4.35	1.13	4.45	4.28
Educational content on YouTube is accurate.	4.29	1.13	4.44	4.21

The comparison of the mean values for perceived quality, breadth, and credibility of educational content on YouTube between technophiles and non-technophiles indicates that technophiles view educational content on YouTube more favourably than non-technophiles. Compared to non-technophiles, technophiles were more likely to agree with the statements that educational content on YouTube is good, clearly defined, clearly displayed, clearly presented, informative, understandable, as well as truthful, and accurate. Based on the results presented in Table 3, technophiles and non-technophiles have almost the same opinions regarding the variety of educational content on YouTube.

Section 2: *Students' satisfaction with educational content on YouTube*

Turning to our respondents' satisfaction with educational content on YouTube, we established the differences between the two sub-groups of students. Although both technophiles and non-technophiles agreed that the educational content found on YouTube is interesting, technophiles exhibited higher overall satisfaction than non-technophiles. The most notable difference was determined about the trustworthiness of the content since technophiles trusted the educational content much more than non-technophiles (i.e. technophiles = 5.27; non-technophiles = 4.96). A close inspection of the data in Table 4 below also shows that out of all statements in this section, both groups of students find the educational content on YouTube quite interesting (M = 6.27). (See Table 4 for a detailed presentation of the results for this set of statements.).

Table 4. Comparison of the mean values for satisfaction with the educational content on YouTube between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
Educational content on YouTube is in line with my needs.	5.58	1.29	5.67	5.52

Educational content on YouTube is in line with my expectations.	5.58	1.20	5.75	5.47
Educational content is in line with my requirements.	5.49	1.20	5.60	5.43
Educational content on YouTube is interesting.	6.27	1.06	6.32	6.23
Educational content on YouTube is trustworthy.	5.08	1.19	5.27	4.96

Section 3: Students' perceived benefits of using YouTube content for educational purposes

Focusing on our respondents' perceived benefits of YouTube content for educational purposes, we found that, overall, technophiles view the use of YouTube for educational purposes as a way of saving time, work, money, and trouble to a greater extent than non-technophiles (see Table 5). Moreover, this set of statements revealed the most significant differences in average values between the opinions of technophiles and non-technophiles regarding the perceived benefits of YouTube as an educational platform.

Table 5. Comparison of the mean values of the perceived benefits of YouTube as an educational platform between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
Using YouTube for (additional) education saves me time.	5.56	1.38	5.83	5.39
Using YouTube for (additional) education saves me work.	5.42	1.45	5.63	5.30
Using YouTube for (additional) education saves me money.	5.68	1.58	5.96	5.51
Using YouTube for (additional) education saves me the trouble.	5.23	1.49	5.49	5.07

Section 4: Students' opinions regarding the ease of using YouTube for educational purposes

Compared to the differences between the two groups of students regarding their perceived benefits of YouTube use for educational purposes (as presented in Table 5 above), their opinions about the ease of using YouTube in the context of their learning are quite similar. That is, technophiles and non-technophiles agree to a great extent that YouTube is easy to use and does not require much knowledge, experience, or money.

Table 6. Comparison of the mean values of the perceived ease of using YouTube for educational purposes between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
YouTube is easy to use.	6.79	0.74	6.85	6.76
One doesn't need a lot of knowledge to use YouTube.	6.71	0.84	6.68	6.73

One doesn‘t need a lot of experience to use YouTube.	6.66	0.84	6.63	6.68
One doesn‘t need a lot of money to use YouTube.	6.67	0.86	6.68	6.67

Section 5: Students' views regarding the relevance of YouTube as an educational platform

According to our survey results, there are significant differences between the two groups of students regarding their views on the relevance of YouTube as an educational platform. That is, technophiles appear to have a much stronger affinity towards YouTube as a source of knowledge (*M* = 5.72) compared to non-technophiles (*M* = 5.02). Also, they view YouTube as an important source of educational content, experience, and information to a greater extent than non-technophiles. However, both groups of students share similar opinions about YouTube providing them with opportunities for additional knowledge in the sphere of their non-formal education and YouTube being suitable for their additional education. Notably, these two statements received the highest average scores in this set of statements (M = 6.04 and M = 6.03, respectively).

Table 7. Comparison of the mean values regarding the relevance of YouTube as an educational platform between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
YouTube is suitable for (additional) education.	6.03	1.07	6.15	5.95
YouTube is an important source of information.	5.30	1.37	5.53	5.16
YouTube is an important source of educational content.	5.33	1.30	5.66	5.13
YouTube is an important source of knowledge.	5.28	1.36	5.72	5.02
YouTube is an important source of experience.	5.26	1.37	5.56	5.08
YouTube gives me the opportunity for my (additional) education within the context of formal education.	5.23	1.47	5.36	5.15
YouTube gives me the opportunity for my (additional) education within the context of non-formal education.	6.04	1.14	6.17	5.96

Section 6: Students' views about the benefits of educational content on YouTube for the development of their intellectual competencies

A similar trend continued when we asked our respondents about the perceived benefits of educational content on YouTube for the development of their intellectual competencies. The highest total average was linked to YouTube's benefits for personal proactiveness (*M* = 5.77), and the lowest total average to YouTube's benefits for self-control (*M* = 5.09). In all cases, technophiles evaluated YouTube's benefits more favourably than non-technophiles.

Table 8. Comparison of the perceived benefits of educational content on YouTube for the development of intellectual competencies between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
YouTube allows me to (additionally) educate myself as it encourages my proactiveness.	5.77	1.23	5.99	5.64
YouTube allows me to (additionally) educate myself as it encourages my self-criticism.	5.46	1.34	5.69	5.33
YouTube allows me to (additionally) educate myself as it encourages my self-control.	5.09	1.42	5.44	4.88
YouTube allows me to (further) educate myself, with a focus on promoting my self-formation.	5.57	1.34	5.88	5.38
YouTube allows me to (further) educate myself, with a focus on promoting my self-responsibility.	5.37	1.37	5.65	5.20
YouTube allows me to (further) educate myself, with a focus on promoting my self-understanding.	5.68	1.35	5.84	5.59
YouTube allows me to (further) educate myself, with a focus on promoting my self-discovery.	5.52	1.38	5.79	5.36
YouTube allows me to (further) educate myself, with a focus on promoting my self-empowerment.	5.23	1.39	5.44	5.10
YouTube allows me to (further) educate myself, with a focus on boosting my self-confidence.	5.22	1.34	5.56	5.02

Section 7: Students' perceived usefulness of YouTube as a complementary educational tool

The discrepancy in the favourability of YouTube as a complementary educational tool between technophiles and non-technophiles was also evident. Technophiles gave higher ratings in all cases, although high levels of agreement were also reported by non-technophiles. See Table 9 for a detailed comparison.

Table 9. Comparison of perceived usefulness of YouTube as a complementary educational tool between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
YouTube enables me to keep up to date with developments in all areas of social sciences.	5.64	1.29	5.81	5.54
YouTube enables me to keep up to date with developments in all areas of the natural sciences.	5.63	1.27	5.83	5.51
Using YouTube for (additional) education increases the effectiveness of my education.	5.54	1.36	5.94	5.31
Using YouTube for (additional) education increases the success of my education.	5.40	1.39	5.68	5.24
Using YouTube for (additional) education increases my joy for learning.	5.62	1.45	5.91	5.44

Section 8: Students' expressed intent to use YouTube for educational purposes in the future

When asked whether they wish to and intend to use YouTube videos for educational purposes in the future, both groups of students agreed that they would continue to do so with almost the same average rate of agreement. However, technophiles were more likely to indicate their intent to use YouTube for educational purposes in the future and more likely to express the desire to do so than non-technophiles.

Table 10. Comparison of the intent of using YouTube for educational purposes in the future, between technophiles and non-technophiles.

Item	*M*	*SD*	$M_{technophiles}$	$M_{non\text{-}technophiles}$
I wish to keep using YouTube for (additional) education.	5.93	1.39	6.26	5.74
I intend to keep using YouTube for (additional) education.	5.94	1.35	6.22	5.78

All the results, including the reported differences between the technophiles and non-technophiles are purely descriptive. To explore whether the differences are statistically significant, we analysed the data further by adopting a factor analysis and an independent samples t-test. The results of these analyses are given next.

4.2 FACTOR ANALYSIS

In the second step, we conducted a factor analysis to investigate the latent structure of our items. Looking into KMO statistic (0.931) and the results of Bartlett's test of sphericity ($p < 0.001$), we established that our data is suitable for factor analysis. We used a principal components method, which, through several iterations, revealed a 7-factor solution with 35 items, which explains 70.9% of cumulative variance. The results are shown in Table 11.

Table 11. Results of principal components analysis with Varimax rotation.

Component	Item	α	Commu.	Loadings
Competences	YouTube allows me to (further) educate myself, with a focus on boosting my self-confidence.	0.941	0.768	0.811
	YouTube allows me to (further) educate myself, with a focus on promoting my self-empowerment.		0.722	0.803
	YouTube allows me to (further) educate myself, with a focus on promoting my self-discovery.		0.720	0.796
	YouTube allows me to (further) educate myself, with a focus on promoting my self-responsibility.		0.728	0.786
	YouTube allows me to (further) educate myself, with a focus on promoting my self-understanding.		0.738	0.779
	YouTube allows me to (additionally) educate myself as it encourages my self-control.		0.738	0.775
	YouTube allows me to (further) educate myself, with a focus on promoting my self-formation.		0.727	0.762
	YouTube allows me to (additionally) educate myself as it encourages my self-criticism.		0.609	0.666
Satisfaction	Educational content on YouTube is interesting.	0.922	0.662	0.745
	Educational content on YouTube is in line with my expectations.		0.689	0.694
	Educational content on YouTube is informative.		0.669	0.692
	Educational content on YouTube is varied.		0.604	0.685
	Educational content on YouTube is in line with my needs.		0.650	0.671
	Educational content on YouTube is understandable.		0.635	0.666
	Educational content on YouTube is good.		0.670	0.654
	Educational content is in line with my requirements.		0.700	0.641
	Educational content on YouTube is clearly presented.		0.693	0.635
	Educational content on YouTube is clearly displayed.		0.695	0.598
Attitudes	YouTube is an important source of knowledge.	0.886	0.805	0.772
	YouTube is an important source of educational content.		0.825	0.757
	YouTube is an important source of information.		0.685	0.701
	YouTube is an important source of experience.		0.650	0.651
Benefits	Using YouTube for (additional) education saves me time.	0.858	0.796	0.772
	Using YouTube for (additional) education saves me time.		0.739	0.733
	Using YouTube for (additional) education saves me the trouble.		0.751	0.728
	Using YouTube for (additional) education saves me money.		0.607	0.686

Ease of use	One doesn't need a lot of knowledge to use YouTube.	0.820	0.768	0.859
	One doesn't need a lot of experience to use YouTube.		0.684	0.810
	YouTube is easy to use.		0.719	0.787
	One doesn't need a lot of money to use YouTube.*		0.521	0.679
Credibility	Educational content on YouTube is accurate.	0.881	0.826	0.770
	Educational content on YouTube is truthful.		0.767	0.755
	Educational content on YouTube is trustworthy.		0.755	0.720
Breadth	YouTube enables me to keep up to date with developments in all areas of the natural sciences.	0.823	0.767	0.732
	YouTube enables me to keep up to date with developments in all areas of social sciences.		0.729	0.695

To corroborate our factor structure, we conducted a confirmatory factor analysis using AMOS 29. The results of CFA indicate that our proposed factor structure fits the data well (χ^2/df = 2.138; *CFI* = 0.925; *IFI* = 0.926; *TLI* = 0.917; *RMSEA* = 0.060; *SRMR* = 0.052). The additional inspection of the composite reliability index (*CR*) showed that all constructs exhibit sufficient reliability (*CR* > 0.7), and satisfactory convergent validity (*AVE* > 0.5). Following the Fornell-Larcker Criterion, we were also able to confirm the discriminant validity of our measurement model, since all values of $\sqrt{AVE}$ exceed the squared inter-correlations between the constructs (Table 12).

Table 12. Composite reliabilities, average variances extracted, and Fornell-Larcker criterion.

	CR	AVE	1	2	3	4	5	6	7
1. Competencies	0.940	0.663	**0.814**	-	-	-	-	-	-
2. Satisfaction	0.920	0.536	0.581	**0.732**	-	-	-	-	-
3. Benefits	0.864	0.619	0.585	0.669	**0.786**	-	-	-	-
4. Ease-of-use	0.844	0.643	0.125	0.366	0.144	**0.802**	-	-	-
5. Attitudes	0.890	0.672	0.663	0.589	0.566	0.045	**0.820**	-	-
6. Credibility	0.885	0.721	0.556	0.703	0.570	0.163	0.544	**0.849**	-
7. Breadth	0.823	0.700	0.623	0.546	0.488	0.138	0.593	0.488	**0.837**

4.3 INDEPENDENT SAMPLES T-TEST

Finally, we carried out an independent samples t-test to answer our second research question. Table 13 displays our results.

Table 13. The results of an independent samples t-test with Cohen's d statistics.

	Technophiles		t-test		Effect size		
	Yes	No	*t*	*p*	*d*	Low 95 %	Up 95 %
Competencies	5.66	5.23	3.24	0.00	0.39	0.147	0.609
Satisfaction	5.56	5.34	1.93	0.05	0.23	-0.004	0.455
Attitudes	5.62	5.10	3.92	0.00	0.46	0.225	0.689
Benefits	5.73	5.32	2.97	0.00	0.34	0.106	0.567
Ease-of-use	6.72	6.72	-0.02	0.98	-0.00	-0.232	0.226
Credibility	4.72	4.48	1.96	0.05	0.23	-0.001	0.459
Breadth	5.82	5.52	2.18	0.03	0.26	0.025	0.484

Results presented in Table 13 show that technophiles and non-technophiles significantly ($p < 0.01$) differ from one another, especially in terms of perceived competencies developed using YouTube as an educational platform when it comes to their attitudes towards the use of YouTube for educational purposes. That is, they differ regarding the perceived benefits and breadth of the educational content available on YouTube. Our results also indicate minor differences between the two groups of students in their perceived satisfaction with the use of YouTube for educational purposes and their perceived credibility of the educational content available on YouTube. However, these differences do not appear statistically significant even at $p < 0.05$. Finally, we found no differences in the perceived ease of use, as both groups find YouTube exceptionally easy to use for educational purposes.

5 DISCUSSION AND CONCLUSION

The present study aligns with the growing body of literature that highlights the significant role of YouTube as an educational tool, both in formal and informal learning contexts. As earlier studies indicate, YouTube provides students with easy access to educational content and facilitates self-directed learning (Liu, 2010; Burhanli & Bangir-Alpan, 2021). This research builds upon prior findings by specifically examining the differences between "technophiles" and "non-technophiles," expanding on how technology enthusiasm impacts YouTube's educational use.

The primary aim of this study was to explore the differences in how technophiles and non-technophiles among Slovenian University students use YouTube for learning, both in formal educational settings and for informal self-directed learning. By analysing their opinions on the various aspects of YouTube and its content, this study aimed to shed light on whether one's attitude toward technology influences the perceived value of YouTube as an educational resource.

The results indicate that students have rather favourable views towards YouTube as an educational platform. They see it as beneficial for the advancement of their competencies, as a means of saving time, money, and effort while learning. It is also very easy to use and it enables access to a broad range of topics and themes. However, we also identified clear differences between the students who identified as technophiles and those who did not. Technophiles spent significantly more time on YouTube for educational purposes and perceived the content as more beneficial and valuable for their development compared to non-technophiles. Notably, technophiles viewed YouTube as a platform that enhances their competencies, such as self-discovery and personal responsibility, more strongly than non-technophiles. While both groups agreed on the ease of using YouTube, reported similar satisfaction with its content, and provided comparable credibility assessments, technophiles consistently reported more positive attitudes toward YouTube and the benefits of its use. We also noticed a slight difference in the perceived credibility and satisfaction with YouTube; however, these results were not statistically significant ($p = 0.05$).

The results of this study further reinforce the role of video-based learning in both formal and informal settings. Previous studies have established that YouTube provides an accessible, flexible, and effective medium for self-directed learning (Liu, 2010; Tariq Khan & Araci, 2020). Consistent with Burhanli & Bangir-Alpan (2021), this research confirms that students frequently turn to YouTube for its many benefits (time, effort, money savings), ease of use, and the ability to meet diverse learning needs. The perceived ease of use for educational purposes, a point of strong agreement among both technophiles and non-technophiles in this study, follows the conclusions of Maziriri et al. (2020), who emphasise that students appreciate the simplicity and accessibility of YouTube as a learning tool. Students in our study also reported high satisfaction with YouTube content's quality and presentation, paralleling the work of DeWitt et al. (2013), where YouTube's visual elements enhanced student engagement and learning efficacy.

The main differences between technophiles and non-technophiles may come from the difference in abilities to filter and select high-quality and more valuable content, a skill highlighted by Colás Bravo & Quintero-Rodriguez (2023) in their discussion on the importance of critical digital literacy.

The study's key strength lies in its quantitative approach, a reliable and valid measurement instrument, applied to a sizable sample of Slovenian university students, which enables generalisability to similar demographics. However, one limitation is the reliance on self-reported data, which may introduce bias, particularly in the categorisation

of students into technophiles and non-technophiles. Another limitation is that the study does not account for variables like the quality of the specific content consumed, student's school performance, or the remaining resources that they might (not) use for learning.

Future research could explore content quality in greater detail, examining how specific video types or channels contribute to learning outcomes. Additionally, longitudinal studies could investigate whether technophiles achieve better academic results due to their more frequent and positive engagement with YouTube as a learning tool. From a policy perspective, educators could focus on developing student's digital literacy skills, ensuring they are equipped to critically evaluate and effectively use digital platforms like YouTube. Incorporating YouTube into formal education, while promoting strategies for discerning credible content, could further enhance its utility as a complementary educational tool.

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