

## Article

# YouTube Dominance in Sustainability of Gaining Knowledge via Social Media in University Setting—Case Study

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**Abstract:** The study deals with sustainability of social software applications in a university setting focusing primarily on the YouTube platform. The aim of this paper is to identify the potential of YouTube media in serving as a supportive educational tool. To meet the objective, researchers carried out an exploratory study based on mixed quantitative–qualitative methods. A mental knowledge model was designed as a starting point where crucial aspects of gaining knowledge were visualized. Sustainability of social media was analyzed in three defined sections encompassing three areas reflecting the needs of the educational process: social media as a tool of communication, repository of study materials and a tool for testing. The affective learning domain was highlighted in the study; one of the key explored categories was the category of satisfaction as a students’ motivation mover. Based on the findings, YouTube as an absolute winner was consequently analyzed in detail, focusing on three areas: satisfaction, kinds of activities on this platform and spent time. The discussion raises questions on pitfalls of social media utilization; this chapter also brings the latest experience from the time hit by coronavirus and related quarantine which showed incontestable benefits of social media in education and proved their irreplaceable role.

**Keywords:** social media; pedagogy; informal learning; LMS; YouTube; university setting; education; knowledge; satisfaction

## 1. Introduction

It is nearly impossible to say which spheres of private and professional lives social media have not entered and influenced. Most people use them on a daily basis. Various kinds of social media are already widely used for marketing, advertising, communication with customers, and have had great success in accomplishing their various goals, e.g., buying products for which people see ads is high, the popularity of companies and their credibility when using social networks is increasing. “Variety” is one of key words associated with the phenomenon of social media. As there is a variety in media, there is a variety in their utilization by various groups of people divided according to various criteria, e.g., Facebook is “getting old” as new teenagers prefer Instagram or Snapchat; LinkedIn is used by people with a higher income and Twitter by affluent millennials [1].

With respect to the shift of young people to Instagram and Snapchat, we can assume that they prefer visual transmission of information rather than textual.

Therefore, YouTube appears to be eligible for educational purposes. The brief characteristics justifying the suitability of YouTube are as follows: it is the second most used social software, the second most visited site after Google, it is localized in 80 languages, it is free, it is pictorial, it is used by various age groups, and it is not used purely for entertainment anymore [2].

If we pursue the efficient way to incorporate this kind of social media into the process of education, it is of vital importance to know and understand which sources students use and what the main aspects of their mental model connected with learning are.

How can the process of education be captured? See Figure 1, showing the visualization of crucial aspects of mental model of gaining knowledge divided into four segments:

- The upper half represents the closer surroundings which is the physical contact—for us, the real world,
- The lower half represents the outside environment where we even do not have to be physically present,
- The left part stands for the official sources—school, official media—CNN, BBC; that can be someone who is responsible for the information, someone who is supposed to be objective,
- The right part stands for the subjective, affective area encompassing the learner's interests, emotions, motivation, perceptions, aspirations and degree of acceptance.

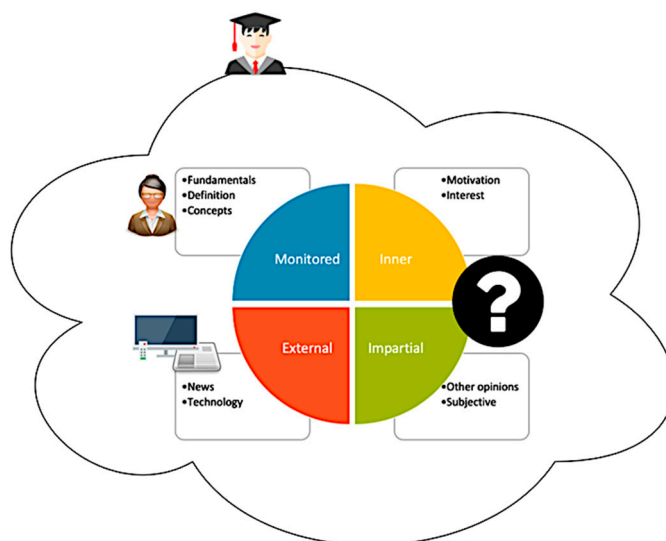


Figure 1. Mental model of knowledge.

Education, teachers, courses, etc. provide the monitored part of the mental model of knowledge; in other words, they provide the formal kind of gaining knowledge. Official media (BBC, CNN, NY Times, etc.) provide the external part.

However, where can students get more, where can they get the independent/informal part forming their view of the issue, which might even arouse deeper interest in it and stimulate deeper drive in gaining knowledge? Could that be YouTube?

The philosophy of the described mental map is close to Greenhow and Lewin's perceived role of social media and education. Based on the depiction and analysis of the development of formal and informal learning, they proposed a reconceptualization of their boundaries. [3]

The aim of this paper is to identify the potential of YouTube media serving as a supportive educational tool in the university setting.

## 2. State of the Art

This chapter brings a brief review on literature dealing with the role of social media in students' lives, highlighting its features as current, influential and natural. The other part of the chapter focuses on the YouTube platform as a key player on the global social media scene.

Whether the described tools are labelled as social media or defined as social software tools, popular press and scholarly research alike have discussed Millennials as digital natives [4,5] whereby

social media play a crucial role in students' lives [6,7]. However, authors have also debated the influence that social media, and the Internet in general, have on the well-being of students, with some detailing its negative impact on society as a whole, showing the increasing trend in disconnection with civic life leading to impoverishment of human lives [8,9]. With regard to students in particular, research by Eszter Hargittai and colleagues on the breadth and depth of social media knowledge by university students contested the homogeneity of social media usage across different groups of students and their familiarity with the broad range of social media tools (e.g., [10,11]). Furthermore, Greenhow and Burton documented how low-income students' use of social networks is positively associated with some forms of social capital—a factor that has been linked to educational attainment and achievement in recent literature [6]. The potential of social media in collaborative learning was discussed by Černá, where the features of activity, interaction and cooperation were highlighted [12]. Changes brought by social media into the process of education got reflected in formal and informal learning [3]. They claimed in their study that young people behave more like consumers than full participants. Based on their findings, they designed a social media model as a learning platform with incorporated attributes of formality and informality [3].

Weller discusses the role of social media's key features in her research on understanding users' behaviour, their motivation and usage scenarios [13]. Her concept of research is close to the here presented research whereby the affective learning domain is prioritized.

Social media are analyzed and discussed by academicians and practitioners as a general phenomenon. However, beside the general approach, there are plenty of studies on utilization of individual social media for educational purposes, e.g., Facebook [14–16], YouTube [17–20], learning management systems (LMS) and open resources [21–25], Wiki [26,27].

The view of social media in education is sometimes critical, keeping in mind not to over-privilege social media's role, e.g., the survey data on Facebook, social integration and informal learning at university describe Facebook as a part of the social glue that helped students settle in a new university setting [28]. Students themselves perceived Facebook as an important tool for social reasons, not for formal teaching purposes, although Facebook was from time to time incorporated into informal learning. Prescott focused in their study on how students perceive utilization of Facebook in learning environment and even raised a challenging question for discussion of whether students really want that [29]. Findings in our long-term university research come repeatedly to the similar conclusions. A significant deal of students claim that social media like Facebook are still primarily used for entertainment and personal usage. They cannot be perceived exclusively positively; social media can be distracting or they can bring too much simplification. With huge insensitive influx of social media into the learning process, students might become supersaturated with this phenomenon or get lost in a wide offer. We faced this problem of increasing study materials in the content of e-courses in Blackboard LMS resulting in a quite common problem of Decision paradox, connected with the affordances of current information technologies. We designed and introduced a Recommender system to master content overload in Blackboard LMS [30].

YouTube has just celebrated 15 years of its existence. YouTube is the world's second largest search engine and the second most visited site after Google. The width of its global influence rises every min; the main characteristics might be that it is *dynamic*, e.g., because 500 h of video are uploaded to YouTube every min (8 March 2020), the platform will soon reach 2 bn logged in monthly users, and it covers 95% of the Internet users. As of January 2020, the 93% of the most-watched videos were music videos and 70% of YouTube views come from mobile devices [31].

YouTube has become an inseparable part of lives, e.g., statistics from Pew research [32] claim that one in five YouTube users in the US say that YouTube helps them understand the things happening in the world. Adults are turning to YouTube for much more than just entertainment, music and films. YouTube was not developed as a news platform, but an increasing number of users search and get news content from YouTube platforms. An astonishing share, reaching half of YouTube users from a

Smith et al. survey, visit the site when they need to manage how to do things they have never done before [2].

Selected studies highlighting YouTube platform features follow as an illustration of development of this media research. Studies on implementation of YouTube into instruction encompass all levels of the educational system from primary schools, e.g., [33], to university settings [20]. Jones and Cuthrell discussed the potential of YouTube video technology integration into planning and instruction [33]. On one side, technology is catchy, but on the other side, teachers should be selective and mindful of the credibility of the videos played in the classrooms. Ten years ago, Zahn claimed that learning with multimedia elements is effective due to the possibility to incorporate visual and audio elements into learning activities so that learners would be able to see, hear and produce the required behaviors [34]. Three years later, DeWitt claimed that studies related to the use of YouTube in education were focused mainly on academic achievement [35]. They discussed in their study the suitability of using YouTube as a tool for teaching and learning in the performing arts, finding this tool beneficial in maintaining students' interest and pursuit of achievement. Jia made a literature review on benefits and limitations of YouTube in teaching activities, showing the increasing trend in research interest in YouTube platform [18].

### 3. Research Methodology

This paper is a part of the specific research project ICT as Support Tool for Cognitive Processes at the Faculty of Informatics and Management, University of Hradec Kralove, which is the main donator of scientific activity. Within the frames of this long-term research project lasting one decade, studies have been run annually on the utilization of ICT tools at various levels of education [12,14,23,36–39]. It follows the line dealing with utilization of social software applications in the university setting, this time focusing primarily on the YouTube platform.

#### 3.1. Research Sample

The research sample consisted of 40 students from the Faculty of Informatics and Management, University of Hradec Králové, and was conducted in April 2020 in the COVID-19 lockdown. The respondents were Czech students and foreign Erasmus study program, students attending both bachelor's and engineering study programs. The accessible sample of students consisted of Czech students attending a *Professional English* course and foreign students attending a *Human resources management* course or a *Czech language for foreigners* course. Convenience sampling was used; each student was allowed to participate in the research and it was up to the student to decide whether to participate or not. These courses were taught by researchers, who were in close contact on both professional and personal levels with the students. The contact gained a striking unexperienced dimension in the time of coronavirus social isolation.

Description of the research sample in detail was placed into the key section Findings as the introductory part of the questionnaire dealing with the basic demographic distribution of respondents covering Questions 1–3.

#### 3.2. Research Approach

The methodological part is divided into two parts: data collection methods and methods of the scientific approach.

The part dealing with the data collection methods [40] describes in detail how the data were collected; utilization of the questionnaire and gained data from it represent a kind of a formal part; the informal part is represented by a wider inquiry run in the form of an interview.

The part dealing with the method of scientific approach explains how the authors derived data and conclusions from gathered data and explains in more detail the smaller research sample size than what is common in questionnaire surveys.

### 3.2.1. Data Collection Methods

The main research tool is a questionnaire survey, which is focused on three research areas: awareness, utilization and satisfaction with the YouTube platform. This platform is placed into a larger scene of selected social media with various mission of use.

Comparison of findings on individual most widely utilized social applications enables the creation of a comprehensive picture in a real case study in the local setting. This picture can be consequently compared to global findings so that similarities and differences could be identified and discussed.

The study builds on a long-term study, which examines the applicability of modern technologies. The research started ten years ago within two national projects; specific research no. 2145/2010—Construction of Identity and Contemporary Adolescent's Identity Experiments within the Framework of Social Networks and GAČR 406/09/0669 Evaluation of the modern technologies contributing towards forming and development university students' competences. A cooperating team of researchers from two faculties—Faculty of Informatics and Management and Faculty of Education, University of Hradec Kralove, conducted these extensive projects [23].

The discussed questionnaire survey, which was applied in the current specific research project *ICT as Support Tool for Cognitive Processes* at the Faculty of Informatics and Management, University of Hradec Kralove, focuses primarily on utilization of YouTube platform by university students. The questionnaire is divided into four parts. The first part deals with general demographic data: gender, year of studies and division of respondents into Czech students and foreign students, predominantly Erasmus students. The second part examines how students perceive the selected most common platforms; if they use them and how satisfied they are with them. The studied platforms are YouTube, Facebook, Instagram, LinkedIn, WhatsApp, Wiki, Blog and Skype, and finally, yet importantly, there is the Learning Management System Blackboard called OLIVA (the meaning of the abbreviation OLIVA is 'online education'). The other half of the questionnaire deals exclusively with YouTube. In the third part of the questionnaire, activities that students carry out on YouTube and time spent on YouTube are examined. The last part of the questionnaire is an open discussion where students can share any experience related to YouTube. Because all students replied that they knew and used YouTube, or at least had some experience with it, the researchers gained precious comments from all respondents.

The Computer-Assisted Web Interviewing (CAWI) method was used; students were given a questionnaire in electronic form. It proved beneficial to be organizing the survey with the assistance of the tutor who was present to answer and clarify potential specifying queries to avoid misunderstanding in any part of the questionnaire.

The structure of the questions was as follows:

- (1) Gender
- (2) Type of student (Erasmus student, full-time or part-time student)
- (3) Year of studies
- (4) Social media—Usage
- (5) Social media—Satisfaction
- (6) YouTube in detail—Satisfaction
- (7) Activity you do on YouTube.
- (8) Time on YouTube—Total time of watching a day
- (9) Time on YouTube—Number of Videos a day
- (10) Usage of YouTube
- (11) Additions on YouTube.

The first three questions (Q1–3) were part of the basic demographic distribution of respondents. All questions were closed-ended questions.

When it comes to social media as a whole, to questions Social media—Usage (Q4) and Social media—Satisfaction (Q5), the form of closed-ended questions was used again. Social media—Usage is



a matrix question; each platform matches following possible answers: “I know it”, “I use it for personal purposes”, “I use it for studying,” encompassing 3 subdivisions of “communication,” “study materials,” “revision and testing.” The question Social media—Satisfaction is a scaled question; a student has to choose a value from 1 to 5 for each platform, where 1 represents the highest level of satisfaction. In addition, students had the choice to mark that they had no experience with the platform.

The core part of the study is YouTube in detail, exploring Satisfaction (Q6), Activity you do on YouTube (Q7), Time on YouTube (Q8–9) and Usage of YouTube (Q10–11).

In the part analyzing YouTube utilization, there was one scaled question where students assessed level of satisfaction with stated aspects of YouTube. Students chose a value from the scale of 1 to 5, where 1 was the highest level of satisfaction. Explored aspects of YouTube satisfaction rating were as follows: Accessibility, availability (in sense that everyone knows/uses this media or that it is easy to share, etc.); Offer of topics (in sense that I can find there everything I need); Communication; Interface (in sense that I know how to find video, add comments, play video, easy to use); Others.

The next question on students’ activity on YouTube was in a multiple-choice form; students could select answers and add their own response. Possible answers were the following: I have a profile on YouTube; I add videos; I add comments; Like/dislike; I make playlist of videos; I share videos somewhere else (Facebook, etc.)

Questions dealing with ‘Time’ on YouTube were designed in a similar way. Time on YouTube referred to three defined groups: Music, Talk and others. Both questions were scaled-type questions where respondents could add answers to stated categories: Time span: 0 min, 1–30 min, 31–59 min, 1–2 h, 5+ h a day, and Number of watched videos: 0, 1–5, 6–10, 11–20, 21+ videos a day.

The Usage of YouTube question (Q10) was in the form of a multiple-choice question, where students could select an unlimited number of answers and also add their own answer: I use video for promotion of my own business; I use YouTube for studying languages; I use it to study compulsory subjects; I use it to study optional (voluntary) subjects; I use it to improve my skills; I use it when teachers ask me to do so (as an assignment, homework, etc.)

The Additions on YouTube question (Q11) was the only open-ended question where students could provide and share any knowledge, experience and comments on YouTube, as well as specify subjects and skills development where YouTube video is utilized.

### 3.2.2. Qualitative Research Methods

Unlike previous research where quantitative statistical methods were used extensively [12,23], qualitative methods predominate in this paper. Firstly, it was necessary to determine whether this research met the requirements of qualitative research. Ontological, epistemological, axiological, rhetorical and methodological assumptions were of key importance [41]. The ontological assumptions lie in the fact that we accept as a decisive reality constructed by the examined individuals; in this research, utilization of the questionnaire served as an entry into the issue. Epistemological assumptions are met by the selection of respondents, as they are current students of researchers. There is a mutual interaction outside the research, also at the personal level. The axiological preconditions were met before and after the research, when in the first phase the essence of this questionnaire was explained to the students. Students were acquainted with the studies that had already taken place and finally, at the end of the interview, they were informed about the responses of their classmates. Rhetorical assumptions in this case are connected with the epistemological assumptions as a lecture is held in an informal atmosphere with the use of everyday language. Methodological assumptions are based on a long-term investigation that enabled us to gain an insight into the utilization of social software applications in university setting and follow the development of trends and the potential of their implementation.

The first research outcomes were published in 2011. Two faculties of the University of Hradec Kralove, Faculty of Informatics and Management and Faculty of Education, cooperated in the joint project within their own national projects mentioned in Section 3.2.1. Over 300 respondents from the

Faculty of Education and Faculty of Informatics participated in the research, 272 questionnaires were administrated and processed [23].

Since the first run of the research on utilization of software application with dominating quantitative research methods, the research has widened its foci, it continued monitoring the utilization of the defined set applications [42], but also focused on individual applications [14], international dimension [37,39] and appropriateness for cooperation in the learning and teaching process [12].

Reflecting the development of the research, applied research methods have changed. From dominating quantitative methods, the research has shifted towards qualitative methods which corresponds to the deeper pedagogical approach of current research. Specifically for this research, inquiry narrative was used with narrative analysis, and particularly discourse analysis. Narrative research is highly applied in social research as it aims at description and discussion of the meaning of individuals' stories based on their experience; in the here presented paper, experience with social media is researched [43].

Discursive analysis does not aim at testing certain hypotheses, but it strives to find out and interpret information about how subjects form the meaning and significance via use of language, in this case how they transfer the knowledge [44,45].

## 4. Results

### 4.1. Demographic Distribution of Respondents

The research sample consisted of students attending courses where utilization and further incorporation of YouTube as a supportive tool in the learning process seemed beneficial and appropriate. They represented the target group fitting the focus of the here presented case study. About half of them were Czech full-time students from the Faculty of Informatics and Management and the other half were faculty students from foreign countries. As for the distribution of years, first-year students formed the largest share representing one third of the sample, second-year students formed a nearly one-fifth share and students of the third and fourth year of studies reached 24% each. As far as the gender distribution is concerned, women represented almost two thirds of the sample. The demographic distribution is visualized in Figure 2.

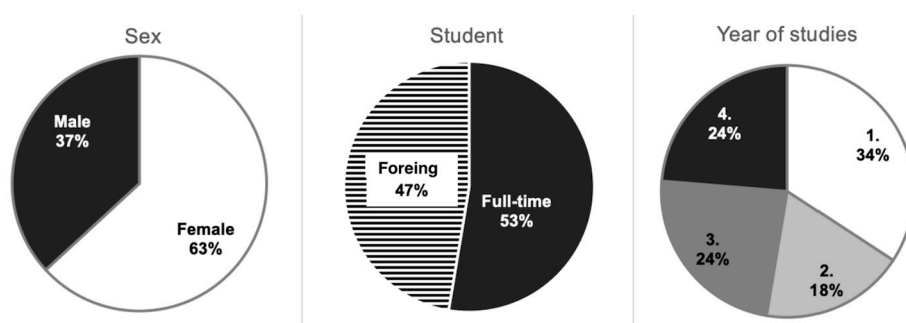


Figure 2. Demographic distribution of students.

### 4.2. Utilization of Social Media

Findings from this part of the questionnaire confirmed that social networks and other platforms are widespread among students and that students are already accustomed to using them for study purposes.

Statistics on awareness and widespread use of social networking, especially YouTube, Facebook and Instagram, correspond to Czech and foreign statistics. Every respondent knew these platforms; there was also 100% awareness in the case of Skype. As for WhatsApp, Wiki and Blog platforms, awareness of these media was above 90%. When it comes to learning management systems (LMS), the awareness of this virtual learning platform was surprisingly lower, only three quarters of respondents knew some

LMS. The least knowledge relates to the social network LinkedIn, only two thirds of respondents knew of this network.

Regarding personal use, YouTube and Facebook had a 89% lead again. Of the respondents, 79% stated that they used Instagram for personal use. More than half of the respondents used WhatsApp and Wiki for personal purposes while Blog and Skype were used only by a quarter of respondents. The LMS learning management system platform is designed for study purposes; it was interesting to find out that 18% of students used that also for personal use. Surprising statistics may be that the popular network LinkedIn was used by only 5% of respondents.

The use of researched platforms for learning was considerably smaller, but approximately half of the respondents used YouTube, Facebook, WhatsApp, Wiki and LMS for at least one of the defined study purposes. These researched study purposes were divided into the following categories: Communication, Study materials and a tool for Revision and testing of study content.

Facebook was the most popular tool for communication; Facebook was used by 61% of respondents for study purposes, in two remaining areas it was used by a minimum of respondents. Half of the respondents also used WhatsApp for communication. Of the respondents, 55% stated that they used LMS when revising and testing their studies. Surprisingly, 47% of the students who were surveyed used YouTube for this activity of revising and testing as well, which is not the kind of difference one would expect. Even more surprisingly, YouTube was even used by slightly more students in terms of study materials than LMS; the proportion was 68% to 66%. However, the Wiki platform was the best performer in this category; Wiki was marked by 84% of respondents as a source of study materials.

Overall, YouTube was the winner as the widely utilized platform for study purposes; YouTube was used by at least half of the respondents in each of the explored areas (communication, source of study materials and revision of knowledge).

Based on the findings, YouTube appears to be a justified appropriate learning and teaching tool. Utilization of YouTube could be a promising good way to improve learning outcomes and increase interest in subjects and their understanding, because most students already perceive it as a suitable tool.

Figure 3 brings visualization of findings on awareness of social media and their use for personal and study purposes explored in three categories: communication, study materials and revision of knowledge. The scale shows the frequency of chosen option in individual categories. Respondents could mark more than one option. The maximum for one category was 40 as a number of respondents.

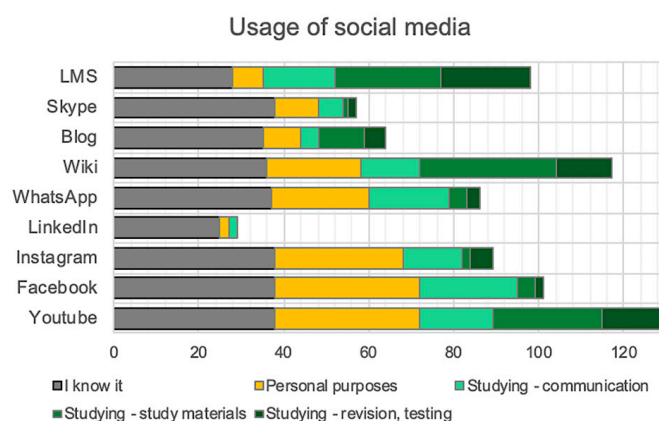


Figure 3. Usage of social media.

#### 4.3. Satisfaction

The suitability of the YouTube platform as another learning and teaching tool is also confirmed by the statistics on satisfaction with individual platforms. Based on the findings, YouTube was the winner, whereby almost 70% of respondents rated it with the highest possible grade. The worst grade was 4, which is the second-worst grade on the scale, however, it was marked by a marginal amount



of students. Moreover, every respondent had some experience with this platform. Each interviewed student also had some experience with Facebook, but there was much less satisfaction with this network. The most common grade was 3, chosen by more than half of the respondents. Another very positively rated platform was Wiki, which achieved very good results in usage statistics for study materials. The worst results were gained by the Skype and LinkedIn platforms, with which many respondents had no experience and those who had some experience with them rated them rather negatively. Findings calling for further exploration relate to LMS. It is interesting that one third of respondents stated that they had no experience with LMS. However, LMS serves as a priority university platform, which provides source of materials for a large number of subjects. Teachers design supportive e-courses accompanying their subjects and place study content materials and instructions there.

Figure 4 clearly shows individual platforms and reached levels of satisfaction on the 5-level scale, where 1 stands for the best and 5 for the worst. Beside these 5 categories, there is a category showing a share of respondents who have no experience with the explored platforms.

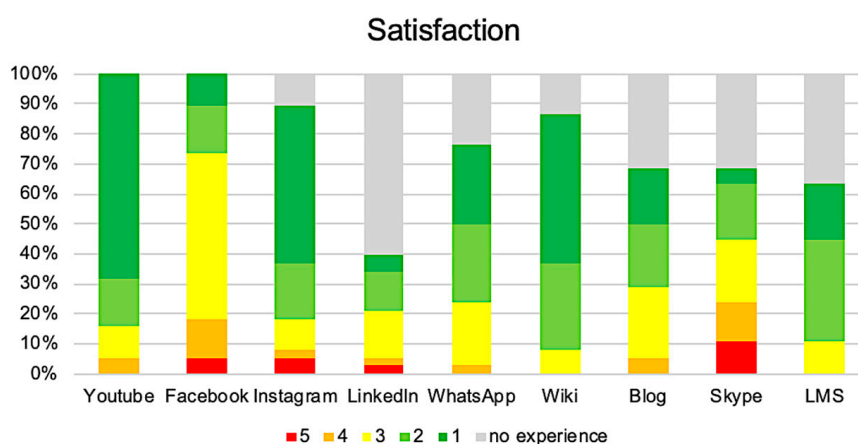


Figure 4. Satisfaction with platforms.

#### 4.4. YouTube in Detail

After the results of the questionnaire survey showed that the YouTube platform is also popular with students for study purposes, it justified the next step in focusing on this social media in detail. A closer examination showed that most respondents were very satisfied with this platform in three out of five researched aspects (Accessibility, Topics, Communication, Interface and Others).

In terms of Accessibility, 90% of respondents rated YouTube with the highest mark, in terms of the Range of topics, almost 80% of respondents were fully satisfied and more than 90% rated the Interface with the mark 2, which is the second highest mark. Communication, however, is quite questionable on this platform; one respondent even gave the worst possible mark, and more than half of the respondents did not give a better mark than 3. Nevertheless, for our research purposes, this platform was not even intended for communication, so this result was not considered so significant. The Others category did not turn out very well; less than half of the respondents rated that category with a better mark than 3. In the follow-up discussion with the respondents, we spoke about this category Others which covers the operator's policy regarding content control, use and amount of advertisements and various complaints regarding mobile applications. Overall, these data showed that the interviewed students were very satisfied with this platform, as visualized in Figure 5.

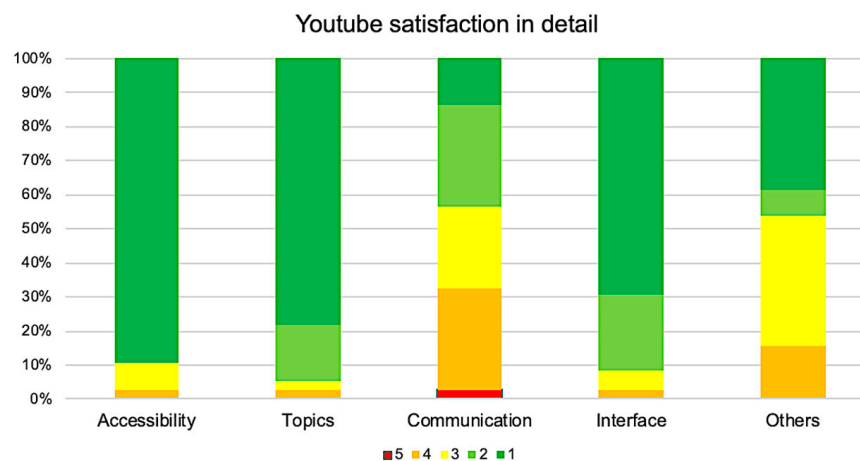


Figure 5. YouTube satisfaction in detail.

As for Satisfaction in terms of origin of the student and gender, women were generally more satisfied with the platform than men were, where the average gradea for Accessibility (A) and Others (O) was rated the best possible grade by women. Women who are Erasmus students and men from the Czech faculty were more satisfied with the Offer of topics (OoT).

There is a significant difference between Satisfaction and Communication (C), where the average mark for Erasmus students was more than one point better on average than for Czech students. When it comes to Interface (I), it was again rated by women better than by men. Foreign students regardless of gender rated this aspect slightly worse. The biggest discrepancy between men and women was in rating the Communication and Others categories. Women gave the worst average mark to Communication, compared to men, who rated the category Others worst, which women from both groups rated 1, see Table 1.

Table 1. Satisfaction according to sex and origin of student.

	A	OoT	C	I	O
Erasmus	1.20	1.29	2.21	1.46	2
Female	1	1.11	2	1.33	1
Male	1.60	1.60	2.60	1.75	3.00
Full-time	1.20	1.20	3.30	1.25	2.38
Female	1	1.36	3.45	1.18	1
Male	1.44	1	3.11	1.33	3.20
Total	1.20	1.24	2.85	1.33	2.30

Questions dealing with satisfaction with YouTube were used to check the consistency of students' answers. Using a paired *t*-test, respondents' answers to the question about general satisfaction with YouTube were compared with the average satisfaction from YouTube satisfaction in detail. It was assumed that the satisfaction in these two analyzed sections would not differ and thus a null hypothesis with a significance level of  $\alpha = 0.05$  will be accepted.

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 \neq \mu_2$$

As can be seen in Table 2, the test criterion did not exceed the critical value, so a null hypothesis could be accepted. The values of both satisfactions can be described as the same, so the respondents were consistent in their answers.

**Table 2.** *t*-test: Paired two sample for means.

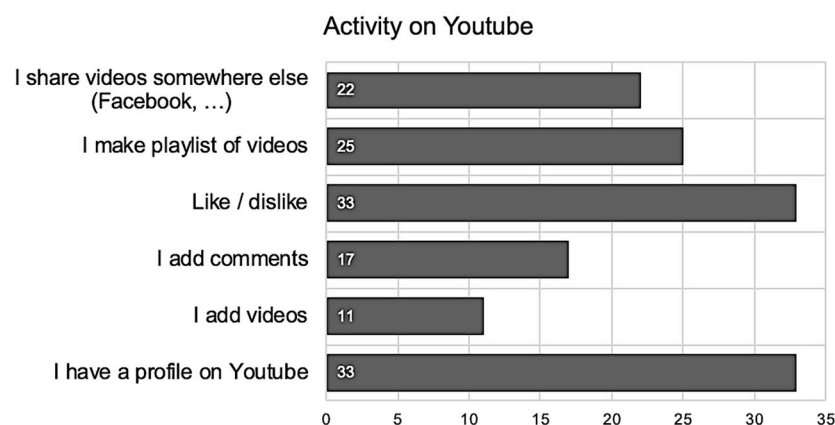
	YouTube Satisfaction	YouTube in Detail
Mean	1.459459459	1.685585586
Observations	40	40
Hypothesized mean difference	0	
df	39	
t Stat	−1.784733543	
P(T ≤ t) one-tail	0.041366926	
t Critical one-tail	1.688297714	
P(T ≤ t) two-tail	0.082733853	
t Critical two-tail	2.028094001	

Another researched aspect in YouTube were activities of students on this platform, see Figure 6:

- Almost 90% of respondents have a profile on YouTube and rate videos with “like” or “dislike.”
- Creating playlists is also very common, which is also perfectly suitable and desirable for our purposes, as well as sharing on other platforms.
- Fewer than half of respondents make comments, and only a quarter add videos.

Nevertheless, it is confirmed that the platform is widely used and that most students use more options that this platform offers.

The scale shows the frequency of chosen option in individual categories. Respondents could mark more than one option. The maximum for one category was 40 as a number of respondents.

**Figure 6.** Activity on YouTube.

Time spent on this platform showed that the vast majority of interviewed students watched YouTube daily. At least one video is watched daily by 95% of respondents, and most respondents spend more than an hour a day on this social network. The popularity of videos focused on music and talk is relatively balanced. Other content like crafting videos, cooking videos, etc., is slightly less watched and most respondents watched them minimally or not at all. Gained data can be seen in Figure 7.

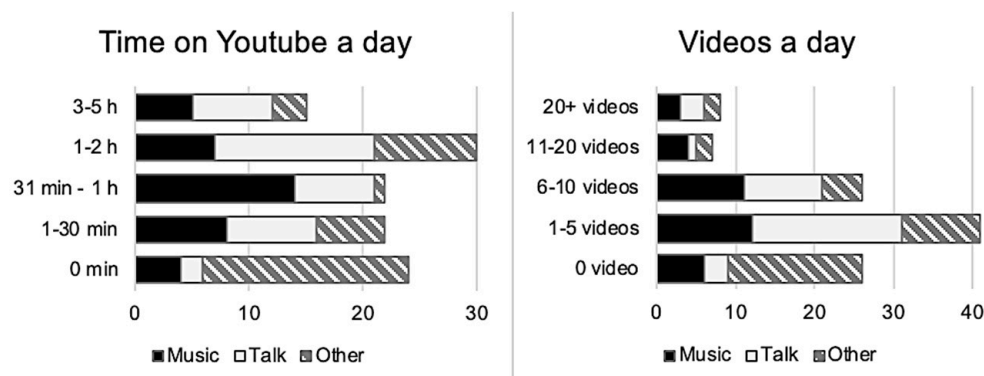


Figure 7. Time on YouTube per day.

The last closed-ended question was a question on ways of YouTube usage. According to the tree map (see Figure 8), YouTube is used most in cases when study materials in formal educational process are insufficient to understand the issue and to study languages, which was stated by more than 85% of respondents. More than 80% of respondents also stated that they use YouTube to improve their skills, find out more information about an interesting subject, and more than half of the students use YouTube to study individual subjects, both compulsory and optional. Less than a third of students then use YouTube at the instigation of their teacher and 10% use videos to promote their business.

An open question and a follow-up discussion on this topic showed that the most popular study content on YouTube concerns economics, mathematics and English, these subjects might be considered demanding because they often need further explanation and practice. However, cooking, baking, graphics, drawing and make-up skills, or sport (fitness, squash) belong to the most favorite topics, as well. It may also be interesting to mention that several students stated that they did not like YouTube's policy on controlling content. Moreover, Czech students had a complaint about an overly strict policy towards content creators, while Erasmus students required more sensitive approaches towards content and comments on the platform.

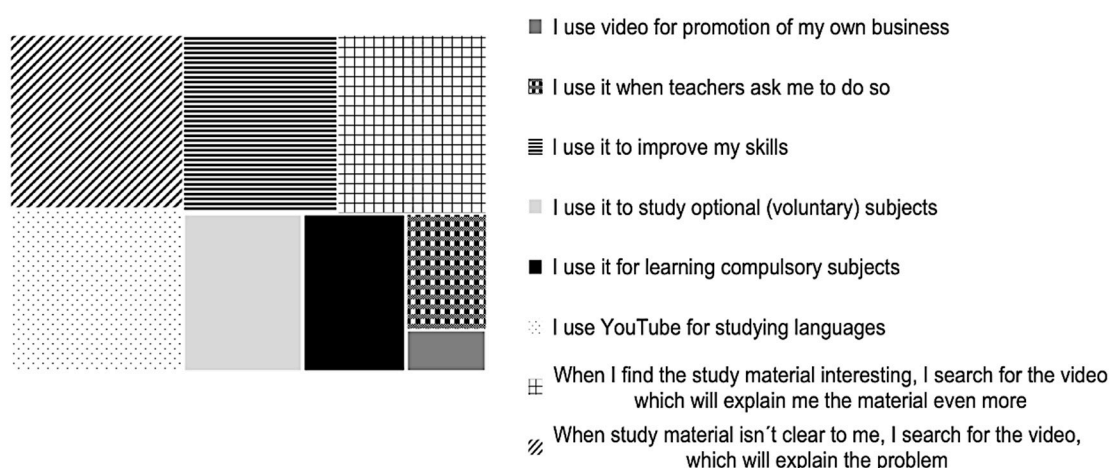


Figure 8. Usage of YouTube.

## 5. Discussion

There are several aspects to investigate when considering whether YouTube is an appropriate tool for study purposes. The advantage of using YouTube in education is, among other things, that it can guarantee the three dimensions of learning activity that Jia and Yu talk about in their study. These three dimensions of Learning Activity are adequacy, efficiency and accuracy [46]. To achieve adequacy, learners should complete enough activities to reach learning goals. If we want to achieve efficiency,

learners should master the expected skills. Last but not least, accuracy lies in the ability of students to complete activities in fair quality. If we talk about this concept in the context of YouTube, then if there is enough material on the topic, it is possible to meet these aspects. The authors also design and propose the Learning Activity Index to combine and quantify the three dimensions of learning activity so that students' learning activity could be better depicted. Online platforms offer more convenient ways to assess all three dimensions. In a traditional learning environment, the efficiency is often lack of evidence [46].

On our local scene (Czech Republic), videos via YouTube are widely used at the secondary level of education and especially at tertiary education. This way of formal and informal learning has found its place especially when studying economics or mathematics, where videos can enrich classes with visual and audio perception, replace some form of consultation, offer extra lectures, and provide another interpretation or perspective for a better understanding of the issue. The effort of educationists to provide students with another channel of conveying study materials faces pitfalls that call for further discussion. Firstly, the effort to provide material that is adapted to be easily understood by students can result in the decrease of the level of expertise and bring a considerable simplification and associated inaccuracies. An increasing amount of more or less professionally worked out video study material requires a key for how to select the optimal one to avoid the problem of study overload, potentially resulting in the decision paradox. Another problem is linked to the previous one and is connected with a certain oversaturation by social media and the fact that social media are still primarily conceived as a means of entertainment.

However, the current situation with the coronavirus outbreak and related quarantine has also shown the incontestable benefits of social media in education and proved their irreplaceable role. During the first coronavirus wave, all social media and other online tools were widely used, in some cases, the increase in the use of the media was more than 50%. It could be seen that in states which were more deeply hit by the crisis and consequently hit by the more strict regulations and length of quarantine, e.g., Italy, the utilization of social media was higher than in other countries [47,48]. The increase in utilization of social media led to the increase in technical troubles, which companies providing online services face (like YouTube) [49]. The servers of these companies were not able to ensure the required quality of those services [50].

The time of the coronavirus crisis put forward the situation when it was necessary to apply a purely distant form of teaching and learning [51]. In our country, a total quarantine was introduced in the period from approximately mid-March to mid-May without any face-to-face classes. During this period, students and teachers were forced to use only online tools (LMS, Microsoft Teams, e-mail, WhatsApp, etc.) and occasionally both teachers and students faced some technical challenges [52]. However, there were also other issues, which seriously hit the common way of life, such as anxiety, social isolation and deprivation of social contacts, no possibility to travel, which in case of foreign students even multiplied the unknown oddity. Our own experience from this time of restrictions is connected with both areas. Firstly, that was the connection to the Internet; Czech students stayed at home where they all had Wi-Fi, but foreign students who did not manage to leave for home before the close of the borders, stayed in dormitories and they were complaining about poor Wi-Fi connection. The issue was that using data was rather expensive in our country. As for technical challenge teachers faced, they had to be flexible and quickly adapt individual e-courses, which they use as supportive tools accompanying their subjects to a fully distant form with modified structure and content and revision of study materials, etc. The other challenge educationalists faced was managing various kinds of media tools. Czech university students quickly switched to the Microsoft Teams platform from occasionally using Skype in the time before the coronavirus outbreak because Teams became an unofficial standard platform at the university [53]. When it comes to foreign students in our research sample, the use of communication platforms was quite adventurous. An example from Czech language classes follows as an illustration. Two students from South Korea voted for WhatsApp and used it all the time until the end of the semester. One student from Spain started with Skype, and then we shifted to WhatsApp

and finally used Zoom. Then there were five students from Colombia, two girls used WhatsApp and Zoom, the rest of the Colombian students continued using purely our e-course in Blackboard and started to use communication platforms two weeks later, voting for Zoom. Foreign students of the Czech language subject were offered in the Blackboard LMS a wider offer of YouTube videos because the standard list of audio and video recordings in the e-course content was designed only as a supportive study reservoir. Students needed more sources to practice a language so every week a new playlist of videos was added into the e-course. Students were engaged into the creation of the playlists, which proved to be highly motivating and inspiring for our discussions online, reflecting three various backgrounds of students. Beside technical challenges, the time of the coronavirus lockdown required from teachers a much more sensitive and supportive approach to students and readiness to provide them with extra deal of time needed to talk not only on study matters.

The potential of social media is more closely characterized by user satisfaction with this social software application and its appropriateness for study purposes, which is why the category of satisfaction is of key importance and is systematically analyzed, discussed and visualized. In the following phase of the research, the issue of learner's satisfaction might be approached utilizing a novel method to measure learner's satisfaction in online collaborative learning systems designed by Elia et al. (2019). In their innovative archetype called RAMS (RAPid Monitoring of learners' Satisfaction) big data analytics techniques are implemented so that monitoring of the level of learners' satisfaction in real time and along the entire learning process is possible [54].

Utilization of social media was analyzed in three defined sections encompassing three areas reflecting the needs of the educational process: social media as a tool of communication, social media as a reservoir or repository of study materials and social media as a tool for revision and testing. The affective learning domain was in the study highlighted; one of the key explored categories was the category of satisfaction as a student motivation mover. Based on the findings, YouTube as an absolute winner was consequently analyzed in detail focusing on three areas, which were satisfaction with stated aspects of YouTube platform, kinds of student activities on this platform and time spent on this platform daily.

## 6. Conclusions

The aim of this paper was to identify the potential of YouTube media serving as a supportive educational tool in university setting with respect to sustainability. Sustainability refers not only to economic and natural resources, but it refers to social resources, as well. This paper contributes to sustainability of knowledge in the social sphere discussed within the frames of university setting. With respect to the shift of young people to pictorial media like Instagram and Snapchat, we could assume that they prefer visual transmission of information rather than textual; that is why we focused on the YouTube platform. The importance of visualization as a trend in online platforms was already discussed by researches who had focused on alternative platforms over mainstream platforms, e.g., Collaborative Computer-Supported Argument Visualization in construction of shared knowledge [55].

To find out the potential of YouTube, following steps were made.

A study on utilization of YouTube on the varied social application scene was conducted to define its current and actual role both globally and locally and what part of the mental model of knowledge the YouTube platform should saturate. To accomplish the research target, a questionnaire survey was designed covering awareness, utilization and satisfaction with selected social media and with the YouTube platform in detail. Based on our mental model of knowledge, it can be stated that unlike the left part, where all materials of formal learning are official and available, the student may have trouble gaining sufficient resources for the right part of the mental model. The question therefore remains of what appropriate means to deliver these materials to the student might be used. This right part of the mental model is the part where affective segment dominates. It is worth considering whether to use existing and widespread ways of communication and acquiring content that do not have to be necessarily entirely formal and verified. Due to the specifications of this part of the mental model,



social media with which the current generation is growing up and their use are completely natural and literally on a daily basis could be used for informal learning purposes.

Based on the findings, YouTube proved to be a justified appropriate learning and teaching tool. Overall, YouTube was the winner as the widely utilized platform for study purposes; YouTube was used by at least half of the respondents in each of explored areas which were: communication, source of study materials and revision of knowledge. Beneficial and further applicable findings related to the activities of students on this platform were that nearly 90% of respondents had a profile on YouTube and rated videos, more than half of them created their own playlists and shared videos on other platforms and every fourth student added videos.

To summarize the findings that came out very positive, we conclude the study that YouTube's usability in education is primarily related to the acquisition and transfer of study materials. There are better and more effective tools available fitting the areas of educational process such as communication, revision and testing.

The initiative of educationalists does not lie in creation of own videos, the teachers' role is a role of facilitators, so it is much more desirable for them to focus on creation of video or channel playlists that are worth watching based on criteria reflecting cognitive and affective targets of the teaching and learning process. There are many channels even on our local scene that are made up by people with considerable expertise and talent for an excellent explanation of the issue (economics, mathematics, English). Our idea brings the concept of sharing knowledge and enthusiasm.

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