Critical Thinking on TikTok

Bachelor thesis

(200600042)

Pedagogische wetenschappen

Universiteit Utrecht

2019-2020

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06/2020

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Abstract

Studies on critical thinking show that youth find it difficult to evaluate information critically. TikTok however, might be a platform that could provide youth to practice critical thinking. This study seeks to answer the question: 'Does TikTok teach young people to think critically, If so, how?'. The research population is youth aged 13 till 21 but the interviewed youth are aged 16 till 21. The online interviews have been done through video calls and are supported by observations of informational videos to provide context to the interviews. First, the results show that youth tend to research more about a topic when they are interested in the topic. However, the direction of this relationship remains unclear. It also became clear that youth tend to critically observe the reliability of others by going through the comments and by looking at the creator. Furthermore, the participants generally think critically about the behavior of others, e.g., hateful comments. Secondly, it became clear that the participants varied in ways in how they thought critically about their own behavior, namely self-reflexivity. The association between critical thinking and TikTok cannot fully be made, but it can be said that TikTok could be a place where critical thinking could be taught. The limitations of this study include: a non-representative research group, non-random selection of participants, and colored interview questions. Thus, more research is needed. Future research should objectively focus on the learning opportunities on TikTok as well as the findings from this study.

Keywords: critical thinking, self-reflection, TikTok, subjectification, online learning, qualitative research

Critical Thinking on TikTok

Over the last few years, social media have played an increasing part of the lives of youth (Chassiakos, Radesky, Christakis, Moreno, & Cross, 2016; King et al., 2013; Sampasa-Kanyinga & Lewis, 2015; Twenge, Martin, & Spitzberg, 2019). On average, a 15-year-old roughly spends two hours online per day (O'Neill, Livingstone, & McLaughlin, 2011). Teens use these social media platforms to interact, explore, and learn in different ways (Ahn, 2011). Social media now provide adolescents with online communities that mediate a wide variety of social interactions and social learning (Ito et al., 2010; Jenkins, 2006). With social media as a relatively significant part of the lives of these youths, it is questionable as to why the research on teenagers' use of social media is particularly narrow (Xie, 2014; Ahn, 2012; Ellison, Vitak, Steinfield, Gray, & Lampe, 2011). With this narrowness of research, e.g., the focus of research in schools (Selwyn & Stirling, 2016; Tan, 2012), other significant findings of the consequences of social media could be lost.

As social media provide online communities, one might come across virtual Communities of Practice (vCoP) and even become part of one. A Community of Practice (CoP) is defined by Lave and Wenger (1991) as "an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their community" (p. 98). However, early research on CoP focused on face-to-face communities (Lave & Wenger, 1991). As learning does not only happen offline, Von Wartburg, Rost, and Techert (2006) defined VCoP, with the characteristic of the interaction being at least partially virtual.

One can find such vCoP on TikTok. TikTok is a newly arisen social media platform on which users can upload short-form videos (Herrman, 2019). One video is shown at a time, and in order to see the next video, the user has to swipe upwards (Anderson, 2020). Since its release in 2017, TikTok has had 41 million daily users outside of China (Gill, 2020), of whom 1 million are Dutch (Snakenborg, 2019). Most of those Dutch users, 830,000, are aged six to eighteen (Pouderoyen, 2019). Social media has been proven to influence youth (Best, Manktelow, & Taylor, 2014; Craig & McInroy, 2014; O'Keeffe & Clarke-Pearson, 2011; Valkenburg, Peter, & Schouten, 2006). It is therefore important to look at the consequences of TikTok on youth. This influence accounts for dangerous or hazardous outcomes, e.g. from fake news or dangerous challenges, and it is something parents have expressed their concerns about (Sorbring, 2014). However, social media could also benefit youth in regard to their learning abilities (Selwyn & Stirling, 2016; Tan, 2012). More of this will be discussed later.

As to this day, few studies have included TikTok in their research (Anderson, 2020; De Veirman, Hudders, & Nelson, 2019; Zhou & Jung, 2019; Zuo & Wang, 2019). Recent studies have focused on what TikTok entails and how children can learn from using this platform (Anderson, 2020; Zhou & Jung, 2019). However, so far, most

research about TikTok and other digital media is quantitative (Boers, Afzali, Newton, & Conrod, 2019; Woods & Scott, 2016). Therefore, research should be extended to include qualitative methods and analyses as well. Qualitative research could namely give new insights into users' experiences on the platform, as well as their self-reflexivity on their online actions. As TikTok has become such a big part of youth's lives (Zuo & Wang, 2019), qualitative research on this topic could be important to identify the learning opportunities on the platform as well as to identify the things that youth like about social media and how they think that social media influence them.

As mentioned before, social media influence youth. Most research on the learning abilities of social media have been done on the benefits of social media inside the classroom (Selwyn & Stirling, 2016; Tan, 2012). It is, however, outside the classroom where youth continue to learn, both from each other and from themselves (Greenhow & Lewin, 2016). An example is shown in the study of Tan (2012). This study focuses on the use of YouTube in the classroom, but it also researches if students critically analyze the content they find on YouTube (Tan, 2012). The point of using YouTube was not to practice critical analysis, but it was a secondary gain of knowledge. Finding out exactly how non-traditional ways of learning can happen may be interesting for research, as it might help educators find new innovative ways to teach in schools.

As learning opportunities increase in this new era of information, it is crucial to be critical about these new forms of education. Biesta (2009) describes the three functions of education: qualification, socialization, and subjectification. While Biesta focuses on learning in school, the latter can also be linked with learning outside of the school context. One learns subjectification throughout life by learning to become an individual with their own thoughts and thus not just following a crowd. Thus, the subjectification learning process could happen outside of the school context, as described by Greenhow and Lewin (2016). In this current era, subjectification could also take place online. The study of Tan also works as an example here. The students were not explicitly told to think critically about the YouTube videos, they did voluntarily. Thus, it could be described as a subjective learning process, the process as described by Biesta.

Critical thinking has been taught in schools for years (Pithers & Soden, 2000). The researchers Hasslöf and Malmberg (2015) used Biesta's definition of subjectification to study critical thinking. While Hasslöf & Malmberg (2015) focused on critical thinking in education, they argued that critical thinking invites room for subjectification. Critical thinking is a broad concept and has multiple definitions (Moore, 2013; Pithers & Soden, 2010). Moore (2013) describes critical thinking in seven ways. The two most useful in light of this study are 'critical thinking as judgment' and 'critical thinking as self-reflexivity'. These two have been chosen as the distinction could be made between critical thinking about others and critical thinking about oneself. The former can be seen

as a way to judge and evaluate the actions of others. The latter form of critical thinking, according to Moore, entails both the ability to critique the material in front of you, as well as the ability to critique your own assumptions about the material. Self-reflexiveness thus requires the development of a certain awareness that then results in critical thinking. The relevance of both definitions will be explained in the next two paragraphs.

In light of the definition 'critical thinking as judgment', research has shown that few children say that they find it difficult to evaluate information critically online (Livingstone, Kirwil, Ponte, & Staksrud, 2014). Nonetheless, research has shown that most children lack the ability to critically evaluate information (Heyman, 2008). With the amount of content TikTok has to offer, children need to think critically in order for them to judge whether certain content is reliable or not. Examples of this content are the blocking (or censoring) of certain content, 'fake news', dangerous challenges, advice videos, or the influence of 'influencers' (Anderson, 2020; De Veirman et al., 2019; Shu, Sliva, Wang, Tang, & Liu, 2017; Wakefield, 2020). If children do not critically evaluate the actions of others, they might perceive things that are dangerous or incorrect, as acceptable or correct. This could have a negative influence on the child (Rapp & Salovich, 2018). This means that it is relevant for society that children learn to think critically.

In light of the definition 'critical thinking as self-reflexivity', TikTok users should be critical about the processing and application of the knowledge they acquire from others. Moreover, users should be critical of how they portray themselves on TikTok. This is thus another part that is integral to self-reflexivity. The online self can be discussed in relation with Goffman's conceptualization of identity (Bullingham & Vasconcelos, 2013). According to Goffman's 'Presentation of Self' (1959), an individual is expected to maintain the initial impression one has made on others. One therefore has to remain critical towards the self-created persona online. By creating their own identity and content, TikTok users are actively participating in the knowledge-making process. Jenkins (2006) calls this a "participatory culture, because users have to critically scrutinize their own online behavior." A culture where users have the opportunity not just to become passive consumers of the information presented, but to become creators of that knowledge (Jenkins, 2006). That knowledge is one of the things that users have to be critical about.

In conclusion, from research it appears that youth find it difficult to evaluate information critically (Heyman, 2008). TikTok has content that might be problematic, as described above, but it is important to find out whether TikTok might help youth to think critically as well, as described by the study of Tan (2012) on YouTube. This is why the focus of this study is how youth might learn to think critically on TikTok, both about the actions of others, as well as about themselves. Therefore, this research will try to answer the main question: 'Does TikTok teach young people to think critically? If so, how?'. To answer this question, it will be supported by the two sub-questions: 'Do young people

learn to think critically on TikTok, about the actions of people around them? If so, how?' and 'Do young people learn to think critically about themselves on TikTok? If so, how?'. A certain vCoP will be chosen and described in the research design. Critical thinking might only happen in some communities as TikTok has been designed as a recreational platform and not as an educational platform.

Research Design

Type of Research

As stated above, the majority of the research about TikTok and other digital media is quantitative (Boers et al., 2019; Woods & Scott, 2016). Because of the small amount of qualitative research, it can be interesting to focus on qualitative methods and analyses. While quantitative research is good for questioning larger groups of people, qualitative research is needed to get insights into users' experiences, and their self-reflexivity on their online actions. Self-reflexivity is important in answering the research question because the participants must know what they do on TikTok, so that they can answer the questions better. By conducting a qualitative, ethnographic research, an attempt will be made to outline the learning opportunities of TikTok for critical thinking.

In order to answer the research questions, it is important to get a better understanding of the community. One of the ways to possibly get a deeper understanding of both the community and what is going on within one is to focus on netnographic research. Netnography can be described as ethnographic research in an online world (Kozinets, 2015). Ethnographic research focuses on understanding the environment and/or other aspects of a specific population (LeCompte & Schensul, 1999). As Kozinets (2015) describes "nethograpy remains rooted to core ethnographic principles of participant-observation while also seeking to selectively and systematically incorporate digital approaches such as social networks analysis, data science and analytics, visualization methods, social media research presence and videography" (p.3). Netnography could thus help the researchers to have a better understanding of the research population. One thus aims to answer the research question by entering this group with netnographic research or by even becoming part of one.

Semi-structured interviews and unstructured observations were used to help the researchers understand how youth think about the subject critical thinking on TikTok. Semi-structured interviews keep place of their original thought out structure, but at the same time can also open up new paths of questioning (Kvale, 2007). When the participant gave an insightful comment about critical thinking, the interviewer could continue that path in order to get a deeper understanding of the topic. The topic list can be found in the appendix (Appendix A). The interviews with the participants could clarify what the participants themselves thought about those videos and the platform itself.

The observations might be able to give a better understanding of the interviewed "community". The observations however cannot give enough information by itself. Therefore, it should be seen as a support for the interviews to give context to the videos that the participants watch and to see how creators interact with their viewers. The 170 videos that have been watched, originate from 25 different creators. These different creators and videos could possibly give new insights into the different ways that critical thinking can be taught. The observation scheme can be found in the appendix (Appendix B). Thus, with observations the researchers hope to support one with visualizing what one can do on TikTok as well as the kind of information one can find.

Validity and reliability of ethnographic interviews and observations. Since netnographic interviews and observations rely heavily on the researchers' objectivity and are not able to take place in a controlled environment, it is difficult to make sure that the study's validity and reliability are assured. To ensure the objectivity of the interviews, the researchers have both taken part in a course to practice interview skills. They have learned to make sure that their questions are as objective and as clear as possible. During the interviews, the researchers have checked with the participants to see if they correctly understood the information that was provided. This ensured the validity of the study. The observations have been handled with care and no conclusions will solely be based on observations.

Research Population

The research population is teenagers, both girls and boys, from 13 till 21 years old. Even though a lot of children who are not yet 13 years old use the platform (Pouderoyen, 2019), the lower boundary of 13 years old has been chosen for the reason that users officially must be 13 years or older in order to use the platform (Terms of Service TikTok). This age has been chosen particularly for this research because from this age on, there might be a bigger chance of receiving valuable information concerning the research question on critical thinking. Older teenagers might be able to describe their thinking processes better. According to Vygotsky's stages of development (1978), one grows up in a community where going through phases of development depend on social contexts. However, with this in mind, the researchers would like to focus on the ages 13 till 21 as they think that this is the group that can be seen as "youth" or "adolescents" in society. Therefore, the upper boundary of 21 years old has been chosen.

When considering a community within TikTok, the researchers focus on youth that watch informational videos. These videos include broad topics such as finance, psychology, and home renovating tips. In order to use the information, for example buying stock after seeing a video about investing, one has to think critically about the information provided in the video. Thus, to act upon such videos, one has to reflect on

what they had just seen. The decision to include multiple 'informational' topics has been made to ensure that enough participants could be found.

Protocol of Research

In order to find out how youth think critically on the application TikTok, the two definitions of critical thinking from Moore (2013), as well as Biesta's subjectification (2009) have been used. Some indicator factors have been established, namely thinking about: the information one receives, the information provider, the actions of oneself, the consequences of one's actions, and how one portrays their online identity. These factors have also been described by Cottrell (2017), who used the indicators of Ennis (1993). The full operationalization can be found in the appendix (Appendix C). In this research, the aforementioned factors that could help indicate how youth think critically and will be measured by means of thirteen netnographic interviews.

One of the thirteen participants was found through connections of the researchers. The other 12 were found on TikTok. The researchers searched through the comment section and the following list of informational TikTok accounts to find eligible youth. Once someone appeared to fit the participant profile, they were contacted via their Instagram DM. This means that only people with an Instagram account connected to their TikTok account could be approached. This limited the amount of people that could be approached. A message was sent with some information about the study and the question whether they were interested in being interviewed. Once they confirmed that they wanted to help, they got sent an information letter and a consent form. Once the consent form was completed, an appointment for the interview was scheduled.

Despite the research population being both boys and girls from the age of 13 till 21, all of the interviewed were the age of 16 till 21, and only one was a boy. The reason for this was the fact that most of the younger teens and boys did not respond to the message of the researchers. Those who did respond reacted either negatively or said that their parents did not allow them to participate. The deviation of both the age and the gender of the youth that were interviewed and the actual research population, could possibly have an effect on the results that were found. Younger youth and boys may have a different experience on TikTok that could provide different insights. Those insights cannot be included in this research.

The aim was for the interviews to be around 45 minutes long each. These interviews were recorded and transcribed at a later moment. The participants were asked to be alone in the room during the interview. This may have helped to ensure that the participants could speak freely. Before the interview started, the participants were reminded that the interview would be recorded. Ten of the thirteen interviews have been done with participants who could all speak English fluently. The other three have been done in the mother tongue of the participants, namely Dutch. As the transcripts of these

three interviews are in Dutch, these quotes have been translated into English. The researchers tried to translate the quotes as verbatim as possible, but some words might differ. Consequently, some quotes might be interpreted differently.

Information from each participant can be found in Table 1. Participants A through G have been interviewed by researcher 1. Participants 1 through 6 have been interviewed by researcher 2. Participant 6 was part of the network of researcher 2 but was interviewed by researcher 1. The interviews with participants 2 and G have been done through the chat function on Google Hangouts. The other 11 interviews have been done via video calls and audio calls on Microsoft Teams. The video calls could possibly help to observe the non-verbal aspects of language. It could also help create a comfortable sphere for the participants, since they could see the unfamiliar person they were talking to. However, sometimes the internet connection was inconsistent, which caused some interviews to change into audio calls.

Analyzing Plan

The semi-structured interviews have been transcribed and later openly coded using the program NVivo 12. Examples of the labels used are: "interest in topic", "self-reflection", and "reading comments", but the list can be found in the appendix (Appendix D). The labels could help the researchers understand underlying themes within and between users. Secondly, observations of the platform TikTok itself as well as observations of advice videos have been done. In total 170 videos have been viewed in order to help answer the research question. The main focus of the analysis during the observations were both the visual and the verbal information from the video, the title of the video and the comment section. The amount of likes and comments were also taken into account to see if the video, and therefore the ideas or information in the video, were of common interest within the community or not. The comments could give more insight into whether people seem to agree with a video or whether they had a counterargument.

Results

Table 1.

Participant information (age, level of education, since when they are on TikTok (with an * are on TikTok since it was Musically) and the country they live in)

Participant	Age	Education	Joined app	Country
1	16	High school	August 2019	USA
2	20	College	March 2020	USA
3	21	College	April 2020	Canada
4	20	College	April 2020	Canada

5	16	High school	2017 *	USA
6	16	High school	2016 *	Belgium
A	20	College	November 2019	The Netherlands
B	20	College	February 2020	USA
C	18	High school	April 2019	Canada
D	16	High school	September 2019	USA
E	21	College	2016 *	USA
F	20	College	December 2019	The Netherlands
G	16	High school	2016/2017 *	UK

Interviews

The table above provides information of the 13 interviewed participants (table 1). The average age of the group participants is 18.46 years old. Differences were found in education levels as well as the fact that some of the users used the app when it was still called Musical.ly. The differences between participants could have an influence on the data and should be mentioned. Nationality for example, and thereby cultural differences, could have an impact on the data as their views towards social media use might differ. Since the gender of the participants does not matter for the results that they provide for this study, it has been chosen to use 'they' or 'them', a gender-neutral pronoun.

Observations

The 25 accounts that have been observed all provide different kinds of information. The topics e.g. are: finance, health, finding jobs, 'life-hacks', and law. The amount of followers of the accounts observed range from 1,500 to 490,300. The different information providers might have a different approach to educating their audience and this might say something about whether the audience will think critically or not.

The results will be divided into two sections as this makes it easier to answer the individual sub-questions. Firstly, 'critical reflection on shared information', e.g. whether participants research topics of interest and see the comment-section in a critical way. This was the main focus during the interviews 1 through 6. Secondly, results that imply self-reflexivity, namely 'critical self-reflection', e.g. thinking about what to post, and what their online identity could be. This was the focus during the interviews A through G. All participants (n=13) were asked about different aspects of TikTok where critical thinking could play a role. The most interesting findings in relation to the overarching research question will be discussed, and the results will be summarized.

Reliability of Information and Creators

The recurring themes of 'critical reflection on shared information' during the interviews were: (1) Searching for more information when they found something interesting. (2) Looking at the person behind an account to see whether that person seems credible or not. (3) Reading the comment section to see if there is a debate about the information. (4) Critical thought about the culture on TikTok. While theme 1 explains more why participants are critical about information, themes 2 and 3 focus on how these participants will evaluate the information. Each theme will be discussed further.

Firstly, most participants (n=11) indicated that after having seen an informational video on TikTok, they sometimes research more information about the topic. Participants A, B, and C all want to know if the information given in a video is reliable as well as scientific. Participant A for example says: "If it isn't scientific, then you just never know if they are talking nonsense". Respondent C explained: "If I'm interested in the topic, in the comment or like the subject of the video, then I will google just to make sure like, that's how it is". All of the participants that look up information after seeing a video already have an interest in the topic. TikTok is a platform that focuses on the users' interests. This is because TikTok's algorithm allows users to see videos of their interest on the "For You" page without following these accounts. The researchers have observed this as they were looking through TikTok for accounts that provide informational videos. TikTok's algorithm provided the For You page of the researchers with the same kind of TikToks after the researchers had interacted with the videos (e.g. liking the video or commenting on it). Thus, it seems as though TikTok can shape their content to the participant's interests. Therefore, users will mostly get to see videos of their interests. Five participants also noted that after watching certain types of videos for a while, TikTok would recommend the same type of videos to them. Although it looks as if most participants take action upon the information they receive, not everyone has experience with researching and therefore some nuance is needed. Participant 4 feels as though not a lot of people will go out of their way to look it [information] up. They said: "you watch it once and you scroll and you, it's gone". Participant A feels as though the given information is more often personal experience and therefore, they feel like oftentimes research is not required. Thus, even though they are interested in the topic, they will not always do more research about it. It can therefore still be questioned whether users do more or less research on the information they receive from TikToks when the TikToks are targeted towards their interests. Overall, TikTok users will mainly get to see videos that are interesting to them, based on the algorithm. The participants indicated that this contributes in whether or not they will think critically about it.

Secondly, some of the participants said that once they see an interesting video, they will look at that person's account to check whether that person is credible or not.

There are two things that participants look for when deciding if someone is credible or not. Firstly, about half of the participants (1, 2, 4, A, B, C, D) indicated that they look if the given information coincides with someone's profession. Participant C says: "I'm gonna google it, because I don't know if you're actually a doctor". Hereby they give an example of a critical attitude towards the information that they receive. Participant B indicates that when the setting of the videos seems unprofessional, such as a living room, they often check the comments to verify the given information. Once TikTok users look for more information about the creator, they might come across the line "This is education, not personal advice" at the top of the creators page. It was observed that seven out of 25 accounts had this. This could help remind the youth to be careful regarding the information that they get. Participant 1, who posts informational content on TikTok as well, however admits that they do not always warn people about misinformation. It is important to mention that the participants were not specifically asked if they had seen this statement, thus no more information on critical thinking about this statement was found. Nonetheless, the reminder that the videos are educationally based, and thus not personal advice, might say something about how the participants might learn to think critically about the information in the videos. Secondly, another factor that seems to indicate authority or reliability is age. Participant D feels mostly influenced by people their own age: "That's the reason people are on TikTok, to kind of relate to people their age and be like 'oh I did that, this makes so much sense, I'm not the only one'". If someone looked a lot like them (participant D), they would be more inclined to believe that person. Participant G has a different view about age than participant D and said that they are more likely to trust someone if they are an adult. If an adult were to say one thing, and a youth another, the participants are more inclined to trust and believe the adult. Age appears to be an outweighing factor for these participants. Thus, the participants explained that they will either look at one's profession or at the age of the creator to judge if that person is credible or not. They judge that people who make videos that coincide with their video are probably more credible, regarding age, the participants differ. These findings help and give insight into how the participants think critically about the creator of a video.

Thirdly, the majority of the participants (n=10) indicated that they often check the comments to see other people's opinions. TikTok has given users the opportunity to comment on every video, as well as the ability to like other people's comments. First, the participants (n=10) mostly used the comments to see if other people agreed with the video but were less likely to use it as a source of information than the actual video. Participant B explains that they will "look at that [the video] compared to a comment that someone typed up in like two seconds". Second, participant F said that they read the comments of those who have a particularly strong opinion, whether they agree with it or

not. Several participants (2, 5, A, C, D) do the same. The participants explained that they are especially interested in the opinions around controversial topics, such as politics. Moreover, participant 4 mentioned that whenever there is a debate going on in the comment section, they are more likely to believe the person with the most likes because more people would seem to agree with this comment. It thus seems like these participants are interested in both sides of an argument and thus read the comments to see what other people have to say. Although these participants enjoy reading the debates, participant D believes that TikTok would be better off without the comments altogether: "I think that if there were no comments, TikTok would be very uncontroversial and there would be a lot less bullying going on". Overall, this data shows that some of the participants either used the comments to look at other people's opinions, to measure the reliability of a video, or they seemed critical of the comments-function altogether. This might say something about whether the participants think critically about the information in the video, as some of them try to verify the information with other people.

Lastly, the above-mentioned comment of participant D also connects to another theme, namely the culture of TikTok. This is relevant to the sub-question since it shows that TikTok could be a place where one might be able to be critical of the behavior of someone else. Thus, one might be able to learn to think critically through experiencing the behavior of others. Eight participants said that they are critical about the culture of TikTok. They act especially critical towards the behavior of users who leave hateful comments. Participant A notes that these comments discourage her to read more comments, as they do not like the attitude of others. Participant 6 even admitted that they stopped making videos because they were hesitant about the reaction of others. Participant E shared an anecdote about someone making videos about celebrities with STDs. Not only did they critically question how someone would know this, but they also noted that this person used 'nice' photos for men and for the women "he chose all of her photos from when she was having a mental breakdown". When they commented on the video about this, they got hateful comments telling them to "go back in the kitchen where you belong". This anecdote shows that even when one comments critically, one could get backlash and therefore initiating a discussion. TikTok is a platform where people can, within platform guidelines, say whatever they want to say. Eight participants critically noted that this means that some people use this opportunity to be hateful. Overall, this data shows that some of the participants tend to be critical of the behavior of someone else on TikTok. This might say something about whether or not the participants learn to think critically, as people on TikTok can be hateful. This concludes the results of the reliability of information and creators.

Critical Self-reflection

The recurring themes, on why and how the participants would think critically about the actions of themselves on TikTok, during the interviews were: (1) Thinking about what they post themselves. (2) Online identity. Each theme will be discussed further and will include notes on how some people think critically at certain times.

Firstly, ten participants indicated to think critically about what they post themselves. This is relevant for the sub-question since posting their own videos is an action that participants partake in. The participants thought about what they posted in varying ways. For example, participant A mostly pays attention to two things before posting. First, they think about whether other users would find the video funny. Second, they think about how they could come across. They do not want to be seen in a negative light and feel more aware of this because they are older. Moreover, participant 5 thinks about what to post because they want to influence other people, and therefore, they reflect on what others want to see from them. Thus, participants A and 5 tend to think about what they want to post since they anticipate the reactions of others. Furthermore, participants A and C agreed that a video could be posted when it can be seen as funny. Nonetheless, five participants also said that deciding to post or not to post something was not that hard, mostly because they could always delete a video. For example, participants A, D, and E admit that they often reflect on what they have posted, and based on the engagement or their own thoughts about the video, they either keep the video online or they end up deleting it. Participant (E) does so by reflecting on it an hour later with "fresh eyes". It might be that being able to delete something off TikTok is an important factor for these participants. Overall, this data shows that most participants think about what they are going to post. However, it also seems as though these participants often think about what they posted after they already posted it. These findings give insight into whether the participants think critically about their own behavior and whether they might have done this before they posted something, or after they saw the consequences of their actions.

Lastly, possibly being able to create an identity online was a topic of interest for the researchers. This is relevant for the sub-question since the awareness that one could have an identity online might say something about how the participants think about their place within an online community. Eight participants (4, A, B, C, D, E, F, G) indicated that they thought about how they portrayed themselves, either by being themselves or by promoting a certain identity. For example, participant F says they feel completely themselves on TikTok. Nonetheless, participant E has 60 thousand followers and is "crowned" on TikTok. They believe their online identity has entirely been based on their TikTok presence. However, they do not feel like they belong in any community. The reason being: "I've been stuck at the same amount of followers for a while now, cuz my engagement isn't so good". This participant thinks about their success on the app TikTok,

as well as what others might think of their engagement. They have observed a link between engagement and success. However, even though this participant is "crowned", and therefore recognized by TikTok itself as a "good creator", they still reflect negatively on their own engagement, and therefore success, online. As a result of the bad engagement, and everyone being able to see that on the app, they do not feel like they belong within a community. This shows that even with having an identity online, one might still not feel welcome in a community. On the other hand, Participant D believes that it is easy for someone to feel welcome because of the openness of the app, there are e.g. no "age categories" on the app. During the observations it quickly became apparent that some users tend to follow a person, and continue to support this creator, e.g. by commenting on every TikTok they post. These users thus might feel part of a community and might want to present themselves positively, but these users were not included in this research. Therefore, these results cannot be used. Nonetheless, the results show that even though these participants indicate that they have an online identity, they often do not seem to reflect whether this is equivalent to their real-life persona or not. This might say something about the sub-question since the participants do not seem to think about the differences of their actions on TikTok and their actions in real-life. This is interesting since it might say something about how they critically think about their own actions. This concludes the results of critical self-reflection.

   In short, the majority of the participants appear to feel inclined to think critically about the information they receive, the person spreading the information, and the comments they see under a video. Besides that, participants also often think about what they post on TikTok themselves and how they portray their own identity as part of a possible community. Thus, these results might give insights about how the participants learn to think critically on TikTok.

Discussion and Conclusion

   To give a general answer to the research question, as well as the two sub-questions, it is important to integrate the most relevant results of all the interviews and observations. Regarding the topic of the first sub-question, the participants overall indicate that they do think critically about the information they receive from TikTok, but this is generally when they are already interested in the topic. This is in line with the study of Manshaee, Dastnaee, Seidi, and Davoodi (2014). They found that the students who were interested in learning a new language, did indeed have higher levels of critical thinking. Kuhn (1999) also found that when children are not convinced of the value of thinking critically about information, they are less motivated to do so (Kuhn, 1999).

   The results show that participants would practice critical thinking in multiple ways, but some are more linked to critical thinking than others. While looking at someone's profession could be seen as critical thinking, checking the credibility by looking at

someone's age is not. This is in line with what has been mentioned in the introduction. Livingstone et al. (2014) said that few children think that they lack the ability to think critically, in this case using the 'correct' methods of thinking critically. It however has been proven that most children lack the ability to evaluate information critically (Heyman, 2008). Participant C said something in line with Tan's study (2013): "I'm gonna google it, because I don't know if you're actually a doctor". Tan exemplified a student who searched for more information about the maker of a video, and them only being satisfied if that creator was backed up by 'trusted parties'. In brief, most of the participants did think about whether the creator was credible or not, but this is not always fully related to critical thinking. The reason for this being that some participants did not seem to realize that age, as well as the amount of time it takes to spread information, do not fully correlate with credibility.

It seems that some creators on TikTok try to stimulate their audience to think critically about the information that they provide. These creators have added the line 'this is education, not advice' at the top of their page, seemingly to remind their audience that not all of the information could apply to them. TikTok cannot fully be held responsible for spreading misinformation, but the more one might be confronted with the opportunities, the more it might help youth to think critically in the context outside of school. While this is an interesting finding, none of the participants mentioned that they had seen this line at the top of someone's page. It can therefore be questioned whether this effort in promoting critical thinking actually has an impact on youth, more specifically, whether it results in more critical thinking. While this is interesting, more research is needed about this to fully understand what TikTok users do with this information.

One of the ways the participants would practice critical thinking was by looking at the comment section. The participants would look at which comment got the most likes and whether people would agree with others. This finding coincides with the study of Tan (2013). Tan found that some students would look at the comments of a YouTube video and how it was rated. Tan calls this method superficial as the youth who use this method might be skeptical about the information, but they do not go out of their way to search for more information or other sources. This concludes that while the participants who used this method did think more about the credibility, this method is usually seen as more superficial.

Another action that some of the participants seemed to think critically about, were the hate comments on TikTok. In general, the majority of the participants felt as though the comment section influences the overall experience on TikTok. It seems that the participants have learned from experience that comments could have a negative influence on how they feel. The participants seem to have learned by using TikTok to not take everything literally. Overall, the data shows that the participants use the comment

section to form their own opinion about the video, as well as the topic discussed in the video. More research is needed to learn more about this aspect of the influences of social media on youth. This is especially important as no more research on critical thinking about the attitude of others on TikTok has been found. Instead, other studies focus on how social media platforms deal with hateful comments (Hammer, 2016; Salminen, Luotolahti, Almerekhi, Jansen, & Jung, 2018).

       With these results it can be said that regarding the first sub-question, all of the participants appear to act critically towards the information they receive from TikTok, especially when it sparks their interest. The participants check the reliability of the video based on the creator as well as based on the comment section. Eight participants admitted to being critical of the culture on TikTok, namely the behavior of others. Overall the participants appear to be critical towards the information they receive as well as the people spreading the information. It thus could be that the participants have learned to think critically on the app TikTok.

       In general, the results also give insight into the topic of the second sub-question, namely, the participants do think critically about their own behavior at certain times. Some of the participants said that they think about the videos that they post, before they post them. Generally they want to post videos that present them positively. This is in line with the study of Vogel and Rose (2016) where they studied self-presentation on Facebook. Namely, Facebook users tend to want to present themselves positively. A few participants of this current study agreed that a video could be posted if it was funny, thus when it would be positively received. It should be noted that the study of Vogel and Rose (2016) did not distinguish between youth and adults, thus it is not known whether the findings support youth correctly. However, roughly 30% of all Facebook users are within the age of 13 till 24 (Datareportal, 2020) and thus these results could support this group of youth as well. Moreover, 87% of TikTok users also use Facebook (Datareportal, 2020). Nonetheless, some participants admitted that they thought about the content of the video after they had already posted it. Thus, it could be possible that their critical thinking process happens after something was already posted. It remains unclear as to what the main factor is that causes these participants to reflect on the material after it is already online. Therefore, a general conclusion cannot fully be made and future research is needed.

       Secondly, the results say something about how the participants experience their online identity. While some participants talk about their online identity and say that they experience having one, they often do not seem to reflect whether this matches with their real-life identity. The fact that they are aware of their online identity, and thus how they portray themselves, is in line with the study of Omar and Dequan (2020). They found that the users' active involvement on TikTok generally is related to "the need to express

themselves publicly". Other research, however, does not correlate with this study. The participants did not indicate that they had formed an online identity, while more often research finds that youth generally do form an online identity (Greenhow & Robelia, 2009; Subrahmanyam & Šmahel, 2010). Whether this is because the participants do not think critically about their online persona, remains unclear.

With these results it can be said that regarding the second sub-question, the participants appear to think differently about their own actions, e.g., posting their own videos. It however remains unclear when critical thinking comes to play when posting one's own video. Generally, the participants did not seem to reflect whether their online identity matches with their real-life identity, but it can be questioned whether this is because the participants thought critically about creating an online identity at all. In conclusion, critical thinking about oneself, namely self-reflexivity, appears to differ between the participants.

Since this study did not focus on the difference between the critical attitude of the participants before they joined TikTok and the critical attitude after they joined TikTok, it cannot be concluded that they learned to think critically on TikTok. However, the fact that most participants said that they would look for more information regarding videos on TikTok, makes it likely that TikTok at least in one way or another could stimulate critical thinking. The participants generally act critically towards the actions of others, as well as the information of other creators. However, it can be questioned whether critical thinking concerning self-reflexivity also plays a role here. It could however mean that there are opportunities on TikTok for critical thinking, both concerning self-reflexivity as well as concerning the actions of others. Thus, with practicing critical thinking on TikTok, the participants might get more experience and therefore get more skilled.

Limitations and Future Research

The aim of this study was to fill in some of the gaps of already available research about critical thinking and learning opportunities on social media. This study, being of interpretive nature, causes some limitations but also raises new opportunities for future research. More research will be needed to further elaborate the findings of this study.

Firstly, a limitation of this study is the fact that the participants who have been interviewed do not fully coincide with the research population. One boy has been interviewed, which might be problematic as literature shows that there is a significant difference in the level of critical thinking between boys and girls (Manshaee et al., 2014). Another deviation is the fact that the participants are aged 16 till 21. Consequently, the participants were not mixed well which makes it impossible to draw any conclusions about boys and younger teens. It is possible that youth aged 13 till 15 have a different experience on TikTok, specifically regarding self-reflection and evaluating the actions of

others. Future research should include younger youth and more boys in order to understand more about this population.

Another limitation is the fact that only TikTok users that had their Instagram account connected to TikTok could be approached, which made it impossible to randomly select people for this research. This could have had an impact on the results, since the participants had not been randomly selected. Therefore, it could mean that the results are biased and thus should be looked at carefully.

Lastly, another limitation is the fact that during the interviews some questions were colored by the opinion of the researchers. This meant that the participants at some moments might have felt like they could not contradict the researchers. Occasionally, the researchers finished a sentence of the participant, with the result being that the participant never actually said what they wanted to say. The researchers failed to stay objective with these mistakes. During other moments the researchers had failed to ask for examples. This meant that the researchers sometimes interpreted some of the quotes of the participants. Thus, future research should focus on the objectivity of the study. The researchers in future studies should be fully trained in interview related skills so that they can objectively interview youth. This will ensure that the researchers of future studies will not interpret and respond to the participants incorrectly.

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Appendix A

Topic list

1. Introduction: explaining about the interview. Do they have any questions?

2. General information/ ice breakers: Why do you think TikTok is so popular? How many hours are you on TikTok per week? How many videos do you make per week? For how long have you been on TikTok? Why do you use TikTok? Are there topics on TikTok that you enjoy the most? What are they? Do you see the personal finance videos on the "For You" Page or the "Following" Page? (Did they voluntarily subscribe to this content?).

3. Start of the questions surrounding the informational videos: Who do you follow? How many accounts that make videos about personal finance or other advice accounts do you follow/ watch? What is the reason that you started watching those videos? If they follow the account(s) → What is the reason that you decided to keep watching those videos? Can you describe the thought process of watching a Personal Finance video? Do you research the information that you get from these accounts? Do you take action based on the information that you get from these accounts? → Can you describe those actions? If you watch other content à how do you evaluate if what someone says is true or not.

4. Questions about looking more into what they see/ read: Do you read the comments under these videos (to see if there is a debate going on/ to see other people's opinions)? What do you think about when you read these comments? Do you fact check what you read (to see if what someone says is true)? → how do you fact check?

5. If they make their own videos: How would you describe your own content? Can you describe the thought process when making a video? How do you decide on how you make your videos? Are there certain things that you think will help people understand? Are there certain things that you do in the videos that you think will make people think more about the topic. What do you want your followers to take away from your videos? How much research do you do for your videos? Do you/ How do you deal with criticism? Are there certain things that you use that help to explain the message of the video? What do you think that your followers/ and teenagers learn from your content? Why do you think that? What is the difference?

6. End of the interview: thank them for participating and ask how they experienced the interview. Ask for age, country, and level of education. Ask if they still want to say something regarding the topic. Lastly, say goodbye.

Appendix B

Observation scheme.

Table 2.

Observation information (topic of the video, whether the viewers are warned about the information being information and not advice, whether the creator cites sources, and the most important observations of the comment section of the video)

Video	Topic of video.	Warning?	Sources?	Comments.
Account 1 Video 1				
Account 1 Video 2				
Etc.				

Action plan observations:

1. Find an account that provides informational videos.
2. Find a video that focuses on providing information.
3. Watch the video and focus on what the creator is saying.
4. Watch the video and focus on what the creator is using (visually, auditory and materials).
5. Read the caption of the video. Does the creator use sources? Does the creator warn their viewers about misinformation?
6. Read the comment section. Is there a debate going on? Do the commenters generally agree with what is being said in the video?
7. Fill out the observation scheme with the most interesting findings.
8. Repeat for several videos per creator.
9. Repeat for several creators.

Appendix C

Operationalization.

These indicators result from research of Ennis (1993) and the application of those indicators of Cottrell (2017).

1. Identifying other people's positions, arguments and discussions;
2. Evaluating the evidence for alternative points of view;
3. Weighing up opposing arguments and evidence fairly;
4. Being able to read between the lines, seeing behind surfaces, and identifying false or unfair assumptions;
5. Recognizing techniques used to make certain positions more appealing than others, such as false logic and persuasive devices;
6. Reflecting on issues in a structured way, bringing logic and insight to bear;
7. Drawing conclusions about whether are valid and justifiable, based on good evidence and sensible assumptions;
8. Synthesizing information: drawing together your judgements of the evidence, synthesizing these to form your new position;
9. Presenting a point of view in a structured, clear, well-reasoned way that convinces others.
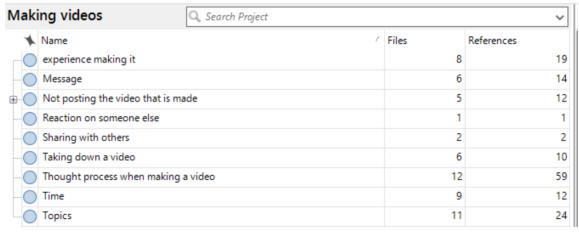
Appendix D

Coding of the transcripts.

Respondent 1	38	83
Respondent 2 (chat)	20	29
Respondent 3	27	69
Respondent 4	27	77
Respondent 5	32	94
Respondent 6	29	82
Respondent A	32	90
Respondent B	35	105
Respondent C	37	124
Respondent D	32	75
Respondent E	30	91
Respondent F	31	70
Respondent G (chat)	32	54

Creators on TikTok   Search Project

Name	Files	References
Inspiring	2	2
More followers, more credible	1	1
Research - Creator Background	9	30

Critical Thinking   Search Project

Name	Files	References
Misleading information	4	9
No critical thinking - 'zoned in'	4	14
Not every video is fit for critical thinking	3	7
Promoting by TikTok	4	9
Verifying with what they already know	8	14

General information   Search Project

Name	Files	References
Age	13	13
Country	4	5
Following people	1	2
Hours on TikTok	13	33
Known TikTok since	7	12
On TikTok since	12	18
Reason joining	10	17
School	12	14

Identity   Search Project

Name	Files	References
Creating identity on TikTok	7	27
No change of identity	7	18

Making videos

Name	Files	References
experience making it	8	19
Message	6	14
Not posting the video that is made	5	12
Reaction on someone else	1	1
Sharing with others	2	2
Taking down a video	6	10
Thought process when making a video	12	59
Time	9	12
Topics	11	24

Misleading information

Name	Files	References
Creator - not warning people	1	2
Recognizing misleading information	3	7
Through videos, not comments	1	1

Reading comments

Name	Files	References
Argument or discussions	7	11
Critism on own video	1	4
Ignoring comment in favor of the video	1	3
Reason - Getting new ideas	3	4
Reason - What other people think	12	26
Skeptical of grown people	1	2
Thought process while reading	6	10

Thinking

Name	Files	References
Thinking others	4	10
Thinking self	10	45
thought about others	5	18
thoughts of others	6	9

TikTok

Name	Files	References
Challenges on TikTok	2	6
Complementing school	2	12
For You Page	10	48
Negativity	9	42
Relatable	12	26
Thought process while watching a video	1	1
What makes a good video	7	17
Why popular	6	28

Types of topics

Name	Files	References
Topics that they enjoy	13	93
Why they enjoy those topics	12	36

When interested in video

Name	Files	References
hashtags	1	2
Not taking action	5	12
Researching more about the topic	11	44
Rewatching the video	2	3
Saving the video for later	6	14
Sharing video with themselve to keep video	2	2
Sharing with others	6	11
Thought process while watching	8	12
Using the video in real life	12	29
Using video in real life - without research	3	3

Writing comments

Name	Files	References
Going viral	1	1
Not commenting on misleading information	5	8
Replying to someone with the same experience	2	2
Saying something is wrong	6	13
Thanking creators	3	3