

Personalizing Ambience and Illusionary Presence: How People Use “Study with me” Videos to Create Effective Studying Environments

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ABSTRACT

“Study with me” videos contain footage of people studying for hours, in which social components like conversations or informational content like instructions are absent. Recently, they became increasingly popular on video-sharing platforms. This paper provides the first broad look into what “study with me” videos are and how people use them. We analyzed 30 “study with me” videos and conducted 12 interviews with their viewers to understand their motivation and viewing practices. We identified a three-factor model that explains the mechanism for shaping a satisfactory studying experience in general. One of the factors, a well-suited ambience, was difficult to achieve because of two common challenges: external conditions that prevent studying in study-friendly places and extra cost needed to create a personally desired ambience. We found that the viewers used “study with me” videos to create a personalized ambience at a lower cost, to find controllable peer pressure, and to get emotional support. These findings suggest that the viewers self-regulate their learning through watching “study with me” videos to improve efficiency even when studying alone at home.

CCS CONCEPTS

• **Human-centered computing** → *HCI theory, concepts and models; Interactive systems and tools.*

*This work was done while the author was at KAIST.

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KEYWORDS

study with me, productivity, social learning, self-regulated learning, social presence, motivation, distraction, interview, mixed-method

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1 INTRODUCTION

More and more people share footage of their daily lives on video sharing platforms such as YouTube and Twitch [69]. Recently, a new genre of *Study with Me* (SWM) video has emerged in which people shoot and share themselves studying. SWM videos (an example in Figure 1) typically feature a creator during their study session, with scenes including the creator flipping the pages, jotting things down, or working with a computer. The videos play up to hours without the person saying a word or showing the content they are studying, and many times, even hiding their faces.

According to YouTube, views of videos with titles that contain “study with me” increased by 54% in 2020 from 2019 in the U.S. [63]. Some SWM live streamers are viewed by more than 1,000 viewers at a time. There are also SWM creators who have more than 250,000 YouTube subscribers. Google Trends’ result shows that the search volume of “study with me” query tripled over the past five years¹, which means more and more people are showing interest in this new video genre.

To understand why and how viewers watch these videos, we provide the first broad investigation of the range of SWM videos and survey what makes these videos so appealing and useful for those who watch. We provide a comprehensive view with a mixed-methods approach that combines a video content analysis with 30 videos on YouTube and interviews with 12 SWM viewers. We

¹<https://trends.google.com/trends/explore?date=2016-09-01%202020-09-01&q=study%20with%20me>

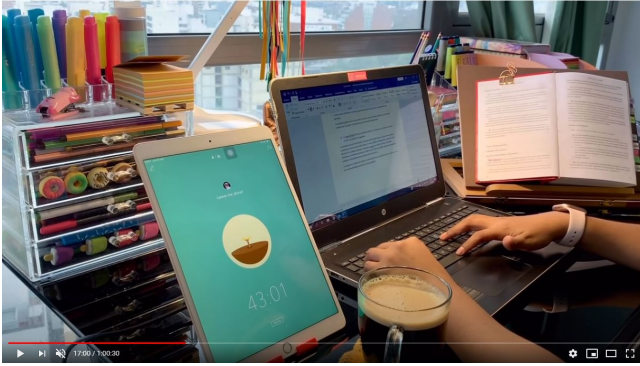


Figure 1: A screenshot of a Study With Me video [13]. The creator is studying in her workplace and a timer is shown on the screen.

first identify three salient characteristics across SWM video by analyzing a sample of videos with “study with me” as the keyword in YouTube, the most popular video sharing platform at the time of writing. We then present major variations of SWM videos in terms of 10 features that we found, including background sound, whether a timer is displayed, whether the creator’s face appears, and video length. This analysis further helped us understand that SWM viewing patterns may differ among viewers and design interview questions accordingly for the actual viewers.

To deepen our understanding of viewers’ motivation and practices of watching SWM videos, we conducted a semi-structured interview study with 12 SWM viewers. The main finding was that the viewers watch SWM videos to create their own virtual study space. We found that there are common conditions to be met to achieve a satisfying study time in general. Whether the conditions are met depends on three factors that interact with each other: the expected effect, the internal state, and the external ambience. We also uncovered that most of the interviewees have experienced difficulties in creating or finding a suitable external ambience for their study time. Based on the three-factor model, we found that our interviewees achieve their expected effect during study time through turning on SWM videos, which helps them create the desired external ambience.

Watching SWM videos can help viewers virtually create a satisfactory studying experience even in the small corner of their home. First, it helps viewers get motivated by creators who are studying hard in the video. Second, it helps viewers get emotional support triggered by the sense of togetherness. Moreover, it is possible for the viewers to freely control the external study ambience with even little cost. With these benefits, viewers watch SWM videos anytime and anywhere when they want to focus on their studies and avoid distractions.

We argue that watching SWM videos could be viewed as a new form of self-regulated learning (SRL) where one tries to understand and control their learning environment. Students need to self-regulate their learning due to various reasons such as regional, temporal, or personal situations. For example, students who have to commute a long distance to get to a school library may want to set a friendly learning environment at home to save commute time

for more sleep or more studying. Students studying until late at night also may want the same to prevent trips back home late at night. For them, watching SWM videos to control their learning environment may help them stay focused even in their bedroom corner. Lastly, people might have personal reasons such as having mobility impairments or social anxiety, which make it hard for them to visit public places such as libraries. They may prefer watching SWM video while studying at home to create an accessible ambience. Our findings are more relevant during the global pandemic, which forced learners around the world to shift their usual studying environment. As a result, the studying environment has drastically changed from study-friendly spaces like a classroom, a library, or a study hall to a more distracting space like a kitchen table or a bedroom. Our study implies that by watching SWM videos, people can still effectively create a satisfactory ambience even when unavoidably studying alone at home.

In summary, this paper makes the following contributions:

- We identify the main content and production characteristics of SWM videos and their variations.
- We present a model that consists of three factors that shape satisfactory studying experience: expected effect, internal state, and external ambience.
- We identify common challenges in setting up a satisfactory study environment in general and uncover how people leverage SWM video to overcome such challenges.

2 BACKGROUNDS

We discuss related work in video streaming, social learning and presence, and productivity. These studies provide useful background in understanding and defining what SWM videos are.

2.1 Related Work

Recent studies on video streaming offer a pragmatic framing that guides methodological decisions for analyzing SWM videos and understanding their viewers. Within the context of studying together, research on social learning, social presence, and productivity provides theoretical frameworks that motivate and guide our study.

2.1.1 Live video streaming. People use video streaming to share their knowledge, leisure activities, and real-life with each other. Recently, many studies have explored the way people use streaming platforms [51, 69] and viewers of streams in various domains. Various kinds of interactions take place between viewers and streamers in video streaming and these have an important role in viewers’ engagement. Firstly, there is entertainment-focused live streaming, ranging from eSports [49, 61] to real-life streaming (traveling, cooking, eating, etc.) [3, 24, 51, 69], to outdoor activities [41]. In these streams, viewers socially engage in the streaming through active interactions like chat, thereby forming a sense of dialogue and community [3, 25]. Another type of live streaming is knowledge sharing [42], which includes domains such as language learning [60], creative live streaming [17], and programming. Similar to entertainment-focused streams, active interaction between viewers and streamers has been the core means of sharing knowledge.

The aforementioned types of live streaming suggest that the motivation and patterns of viewer-viewer interaction and viewer-streamer interaction vary depending on the contents of the stream [3],

but they all involve active viewer-streamer or viewer-viewer interaction, which is largely missing in SWM videos. The closest type of live streaming video would be live streaming of nonhuman agents with chill music [68]. In such stream, viewers are unable to interact in the same ways as they do with human streamers, but the animation still offers a sense of comfort, like having another person there. Yet, it is unclear if viewers watch SWM with a similar motivation to why they watch streams of nonhuman agents.

2.1.2 Social Presence. Many studies have suggested that face-to-face communication effectively supports human interaction. Strong social presence is preferable in that it helps people collaborate effectively in the workplace [7, 34], and improve close relationships between family members or friends [2, 48, 73]. In the case of learners, they could interact with their instructors effectively with the strong presence [5, 6, 43].

Even if people do not fully share the presence, it is still possible to interact and communicate effectively. Hollan [29] suggested that even when it is impossible to do face-to-face communication, people can create a system that provides the same richness and varied interactions as when they are physically close. Moreover, social translucence theory [14] suggests people can make their collective activity effective based on a socially translucent system rather than a transparent system showing the full presence of others. Privacy issues that can occur from being visible to everyone in a space could be resolved through a system abstracting away from raw presence without sacrificing too much useful social information.

We characterize four types of interaction that occur in a video-mediated communication, in terms of the level of social presence and role distinctions between people (e.g., streamer and viewer). Firstly, people may share each other’s full presence in both directions without a role distinction between them, as in video conferencing for collaborative work [7, 34, 45] and video chat between family or friends [2, 7, 48]. Secondly, people may share only parts of their presence, while still not having a clear role distinction. For example, it is reported that teens multitask by using video chat while doing other things, and they do not seem to insist on full presence to communicate [66]. Kang et al. [33] similarly showed that the anonymity in the visual presentation does not degrade the social copresence of the communication. Thirdly, asymmetric presence may be shared between people based on their distinct roles in communication, such as the viewers and the streamer in live streaming of playing video games [51, 69]. The viewer watches the streamer, and the streamer perceives the presence of the viewer through their real-time comments or chat. Lastly, little presence sharing may occur between people involved depending on their role. For example, in many lecture videos in MOOCs and most uploaded videos in video sharing platforms, the streamer or creator hardly feels any viewer’s presence.

Presence of others also can affect the productivity of people who work or study together. Existing productivity tools adopt various strategies, such as blocking external notifications [15, 18, 64], time management [8, 52, 55], and tracking the productivity to improve self-awareness [28, 36, 57, 71]. While research on productivity has shown that there is potential for using social presence to promote productivity, few tools leverage social presence in their design. For instance, as social presence changes, the effectiveness

of social interaction [33] and the atmosphere of the work environment change [26, 67]. It is underexplored whether SWM videos use social presence. If so, SWM might serve as an example of how social presence affects productivity by showing other people studying in the video.

2.1.3 Social Learning. Social learning theory, which explains how new behaviors can be acquired by observing and imitating others [4], has influenced HCI research for decades. We discuss two different types of social learning, namely (1) learning with others and (2) learning in the presence of others.

In terms of learning with others, Vygotsky’s theory [70] suggests that, when students collaboratively learn with others, they learn more actively and create a richer knowledge structure from sharing their knowledge and perspectives. In the in-class setting, activities in which students discuss, ask, and answer questions to each other enhance their understanding of concepts [62] and ability of applying these on quantitative problem solving [11]. In an online learning environment, social interactions amongst peers improve engagement [38], course performance, and completion rates in classes [53]. The HCI community has supported learners’ social learning in the online education environment by designing new interfaces to organize better social interactions. Specifically, students are supported to do discussions in online learning platforms through chat activities [9], group discussion about learner-generated responses [10], lecture notes based discussion [75], and time-anchored commenting on video lectures [40].

In terms of learning in the presence of others, students gather in a large shared space, such as a study hall, a cafe, or a library, and study individually without sharing any learning material or talking to each other. Many people find it more productive to study in these shared spaces compared to studying in their own separate space, such as a bedroom or dorm room [54]. Anderson et al. [16] also showed that students prefer library spaces because studying with friends is becoming more important. However, Hedge et al.’s study [26] indicates that students sometimes feel stressed and fatigue while they are studying in a library because of unwanted sounds. As viewers and creators of SWM videos rarely directly interact each other, watching SWM cannot be considered as learning with others, but it can be seen as a new way to learn in the presence of others. In this work, we aim to investigate the effects of watching SWM as a form of social learning in which viewers try to learn in the presence of others.

2.2 What Are Study With Me Videos?

As discussed in the previous section, SWM videos inherit properties of live streaming in their content delivery and include elements of social presence and social learning. However, SWM videos are also unique in that only limited social presence exists and little direct interaction between the streamer and viewers occurs. In this research, we present the first study in the literature that investigates and defines what SWM videos are. This investigation reveals the characteristics across SWM videos and variations within different SWM videos. Furthermore, it guided the design of interview questions for the viewers about their expectations and preferences in using SWM videos and their expected effects.

To understand the salient characteristics of SWM videos, we analyzed three popular platforms that host videos of studying sessions: Gooroomee [21], Virtual Study Room [58], and YouTube. The former two platforms are online services specifically designed for virtually studying together with others. In Gooroomee, up to nine people can join a virtual room with a live stream of themselves studying and share related learning materials with each other. The Virtual Study Room is similar, but uses Zoom as the virtual online sharing space and only for people who study. Gooroomee and Virtual Study Room are different from SWM videos on YouTube in that the norm is for all participants to share a video of their own studying sessions, whereas on YouTube only the creator streams their study session. There is a clear distinction between the viewers who watch videos and the creator who records or streams videos. In this work, we focus on SWM videos, which we refer to as videos that capture a creator’s study session with no direct instruction and minimal social interaction with their viewers. As most of these videos can be found on YouTube, our analysis used videos on YouTube.

2.2.1 What are the salient characteristics of SWM videos? We randomly selected and observed 30 pre-recorded and live SWM streams on YouTube. We used the YouTube API² to download the metadata of the top 600 videos that have the “study with me” keyword in the title or description and randomly selected 50 archived videos among them. One author skimmed through each video to identify meaningful features and made a decision whether to include it in the analysis, and another author reviewed the result.

Out of the 50 videos, 20 videos were excluded from the further analysis. Of the excluded ones, twelve were vlog type videos that did not contain a live study session but showed a person studying in time lapse, eating, and getting ready [3]. Another five were “How to Study” videos which share study tips or advice. The rest were either not available for watching or a lecture video.

We compared the final 30 SWM videos with other study-related videos found on YouTube and other virtual study platforms [21, 58] to identify the distinguishing characteristics of SWM videos. Our analysis revealed three salient characteristics across these SWM videos: (1) the creator studies on camera during their actual study session, (2) there is no direct instruction delivered from the video, and (3) there is a distinction between viewers and creators. These characteristics distinguish SWM videos from other study-related videos found on YouTube and other platforms such as Gooroomee and Virtual Study Room.

2.2.2 What are the differences among SWM videos? To understand what categories of SWM videos exist, we annotated each video with salient production and social features. To select features that vary across SWM videos, we conducted iterative coding with inductive analysis: after one annotator coded, another annotator verified it. The identified features are as follows: the number of people in the video, whether front face was showing, whether chat rooms were available, whether a timer was shown, whether broadcast live, what kind of background sound was playing, whether the creator speaks, uploader’s occupation, and video length. As shown in Figure 2, only one person appears in 29 of the 30 videos. Chat activity occurs in 21 of the 30 videos, but the creator’s involvement

	Phases of Education	Studying Domain	Gen	Age
P1	Graduate Student	Computer Science	F	26
P2	College Student	Film Directing	F	24
P3	College Student	Computer Science	F	24
P4	Graduate Student	Computer Science	F	28
P5	College Student	Electronic Engineering	F	21
P6	College Student	Electronic Engineering	F	21
P7	College Student	Chemistry Education	F	24
P8	Graduate Student	Computer Science	F	26
P9	Standardized test taker	Business Management	M	28
P10	College Student	Biology	F	23
P11	College Student	Business Management	F	19
P12	Standardized test taker	Biology	F	27

Table 1: Background of interview participants. The third column (Gen) stands for gender.

is often confined to minimal interaction such as ‘hi’. In 10 videos, the creator verbally talks to the viewer. The front face of the creator is shown in 16 videos, while the timer appears on screen in 14 videos. Half the videos use music or autonomous sensory meridian response (ASMR), which is tingling sensation that comes from listening or watching videos. Our count of ASMR includes only cases where the creator has explicitly mentioned their use of ASMR in the video title or description. There are more pre-recorded videos than live videos. The creator’s occupation—when the information was available—included test-taker, student, and teacher. The video length ranged from 45 minutes to 24 hours, with an average duration of 5h 45m (standard deviation: 5.7 hours).

3 INTERVIEW STUDY

To gain further insight into the viewers’ motivation and watching practices, we conducted interviews with 12 viewers of SWM videos. To guide our methodological approach in the analyses, we applied grounded theory, a systematic qualitative research technique used to generate theories rooted in observation [19, 46]. This technique mirrors prior work that addresses data sets involving personal habits, behavior, and motivations [3, 27, 30, 72]. To find patterns in viewers’ motivation and interactions between viewers and videos, we adopted this method.

3.1 Participant Recruitment Process

We used the snowball sampling approach [20] to recruit participants. We recruited by posting an advertisement in online communities of several colleges with on-campus students. Table 1 shows details of 12 viewers who participated in our interviews (11 female, 1 male, ages 19-28, $M=24$, $SD=2.9$). The limitations on the homogeneity of the participants will be discussed in Section 5.5. Our pool included college students (7), graduate students (3), and people preparing for standardized tests (2). Our recruiting criteria were those who have experience watching SWM video more than 10 times and those who know some SWM channels. Each participant received 10,000 KRW (approximately USD 8.5) for compensation.

3.2 Data Collection

Due to the COVID-19 social distancing recommendation at our institution, we remotely conducted semi-structured interviews through

²<https://developers.google.com/youtube/v3/docs/search/list>

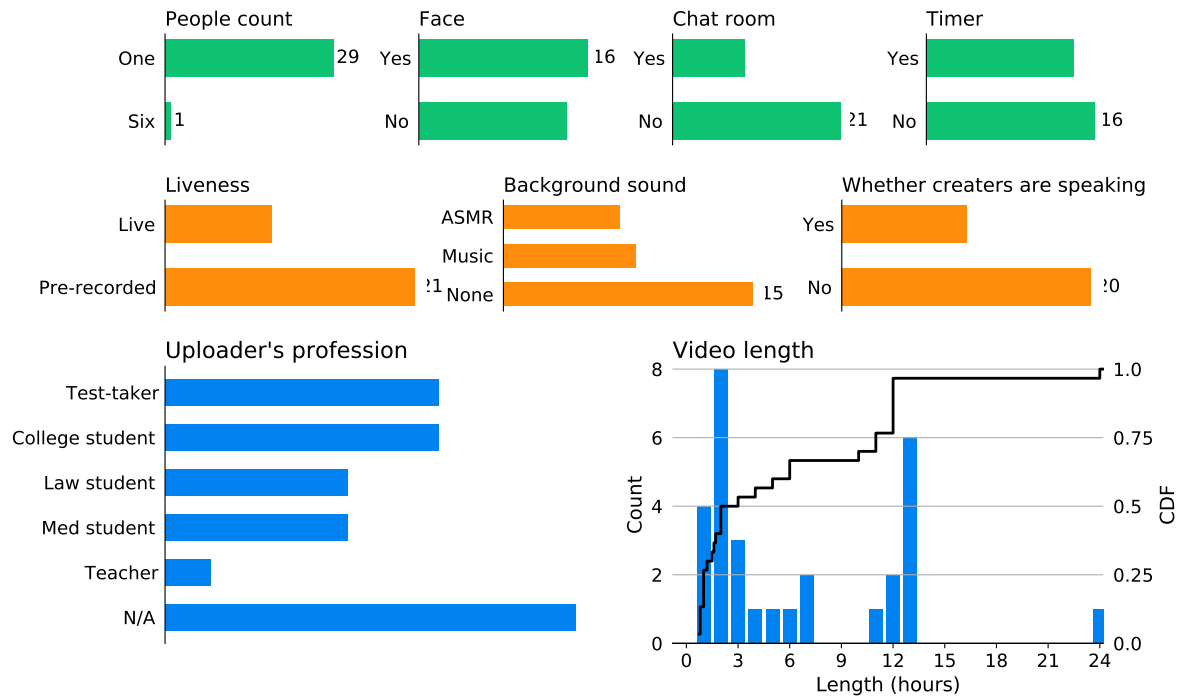


Figure 2: A summary of 30 SWM videos by their salient production and social features.

the participant's preferred method (three using video chat and nine using voice chat). Interviews were 30-60 minutes long and were all recorded. All interviews were transcribed while anonymizing participants' identifiable information.

Our interview delved into motivations and practices by asking questions about participants' experiences. Our guiding questions were as follows: (1) why they watch SWM videos and how they interact with the videos, (2) expected and actual benefits of watching SWM videos, (3) how they choose a video to watch, (4) common study places or study-aid tools used, and (5) differences from a physical study environment. Some interview questions were dependent on the type of video they usually watch and their interview answers. For example, if the participant usually watches livestream videos, then we asked follow-up questions related to experience of being synchronous with the creator.

3.3 Analysis and Interpretation of Data

Using interview data, four of the authors conducted theoretical coding to organize the interview transcripts and discover patterns from the data. Theoretical coding which includes open coding, axial coding, and selective coding requires researchers to merge concepts into groups during the whole analysis process [46].

The four authors randomly paired up to code interview scripts, with each script getting two coders. Each person first independently ran low-level coding and then the pair reviewed the generated codes to resolve conflicts. As an axial coding process, we generated high-level codes when multiple codes were grouped into the same

category. High-level coding tasks were not strictly distributed, but at least two authors, including the lead author, conducted them together. Any disagreements were resolved by discussion.

We iteratively refined codes with the addition of more data. As we realize existing codes cannot effectively describe new data, we either merged, split, revised, or created codes, so that data can be explained with higher clarity [47, 59, 65]. The transcribed quotes and study outcomes presented in the results are representative of each code.

4 RESULTS

Based on our interview analysis, we identify a three-factor model that is composed of expected effect, internal states, and external ambience, and explain how these factors interact to form a satisfying study session. We also uncover challenges that people encounter in creating a study-friendly ambience, which lead them to use SWM video as a tool to overcome the limitations of their suboptimal physical environment and situation. We found that the key is in the control of the *ambience*, which is possible through watching SWM video of their selection.

4.1 Three Factors That Shape Satisfactory Studying Experience

We found that interview participants looked for two types of effects in common that lead to satisfactory study experience: (1) being focused on their task and (2) having an extended length of study

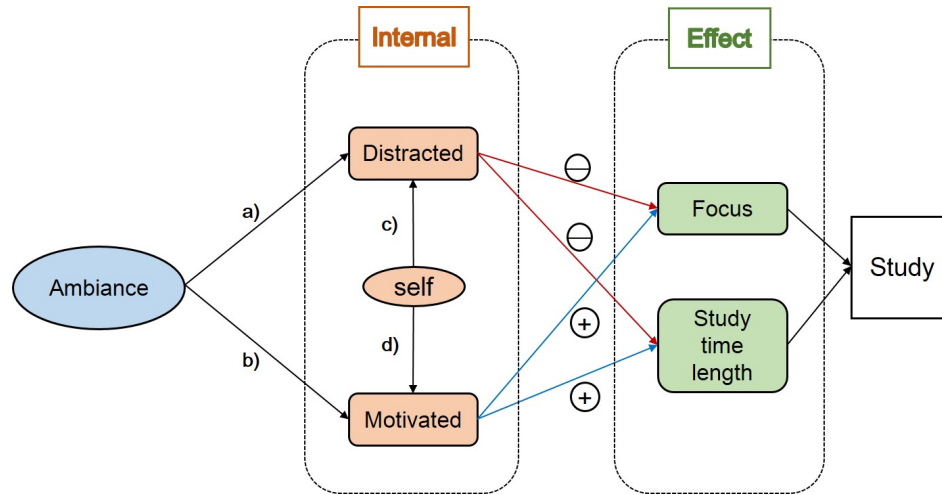


Figure 3: A three-factor model that explains the user’s experience surrounding a satisfying study session. Learners’ common expectation is to *focus on their study* and to *sit and study for a longer time*. A person’s internal state directly affects the achievement of these expectations, either by being in a *distracted state* or a *motivated state* to create the effect. This internal state is affected by both an internal factor and an external factor, where the internal factor is themselves and the external factor is the ambience. For example, if a library suddenly becomes crowded and noisy (the ambience changes), the learner may get distracted by the noise (internal state changes), and the learner may end up losing focus (the expected effect fails).

time. We also found that these are influenced by the person’s internal state, whether they are distracted or motivated. Furthermore, we identified that people get distracted or motivated either (1) by themselves or (2) by external ambience that is formed by both the place and the people they are with. We now explain the individual components of the model and their interaction in more detail.

4.1.1 Expected Effects: Being Focused and Extending Study Time. Participants expected to stay focused and study for a long time. People felt they needed to focus to study efficiently, which means spending less time studying more content with minimizing looking at the same content over and over again. P6 said, “*If I don’t concentrate enough, it feels like my study time was wasted.*” They wanted to focus quickly when they have upcoming deadlines for assignments (P1, P3, P4, and P5). Moreover, a test-taker reflects a strong need for concentration, worrying that they have to study the same parts again unless they focus on their study (P9 and P12).

Participants expressed their desire to study for a long time, particularly in the situation of preparing for an exam. Participants who are preparing for the national exam (P9, P12), or exam for graduate school (P8), reported that it is important to study steadily and a long time since these tests require a huge amount of content to study. Even P2, P3, and P11 who are not preparing for tests mentioned they want to study longer because of dealing with hard course work. P2 said, “*If it’s too late at night, I think of ‘Shall I stop and work tomorrow?’, but I feel so accomplished when I study for a long time. It’s important to hold on to it.*”

4.1.2 Expected Internal States: Not Being Distracted and Being Motivated. We identify that mitigating distraction and being motivated contribute to focus and longer task time. When there are sources that make people distracted, such as smartphones, less motivated

people around them, and an unsatisfactory atmosphere of a study place, people could neither focus nor study long. Participants tended to lose focus due to coming up with small thoughts when they were disturbed by the above sources. P8 said, “*I did something else such as watching posts in social media or checking messages from others and finally lost concentration when I get distracted while studying.*” Besides, P1 and P5 described their actual study time goes shorter when they are getting distracted while studying: “*Whenever I’m distracted, the study time is cut off in the middle, so the amount of time I study is naturally reduced.*”

It turns out that when people are stimulated or motivated while they are studying, they reflect on their current state of study and think that they should develop the aspects necessary for their study to succeed. For example, they tried to recover concentration when interrupted due to distractions. P1 said “*I used the Pomodoro app to motivate myself to focus when I should do a study I hate.*” In addition, getting motivation made them feel they should sit a little longer than when they study without the motivation.

4.1.3 The Role of Internal Factors: Invoking internal states by themselves. While people’s satisfaction with study experience gets influenced by whether they are distracted or motivated, they can make both internal states by themselves, as shown in Figure 3. In this study, we defined internal factors as stimuli that invoke people to do something without any explicitly external factors but only with desire within themselves.

For example, some participants got distracted from the desire to read news articles (P1) and social media posts (P2, P8), or to watch YouTube (P2). This desire arises within themselves without any notifications from applications or seeing someone else watching it. We also can see in P2’s saying that “*I do a lot of work with a computer, but when I sit in front of my computer, I keep wanting to enter*

YouTube and watch videos, which interferes with my studies.” This is a case of self interruption (or internal interruption), as research on technological distraction suggests [1, 12, 31].

Moreover, people sometimes felt lonely or helpless when they studied alone (P1, P8, P10, and P12). P10 felt tired when she had a lot to study alone, and it disturbed her.

4.1.4 The Role of External Factors: Invoking Internal States by ambience. The external ambience motivates people to focus more and study longer. On the contrary, there are some cases when distractions from external factors make it difficult for people to concentrate or study longer than usual. 10 out of 12 participants said that the study ambience at places like the library or cafe and the people they study with have the greatest influence on obtaining the internal states presented above.

Participants sometimes felt distractions from the external ambience, as can be seen in Figure 3-a). Noise from the surrounding is one of the sources of distractions. Studying at a cafe was sometimes disturbing because many people made a lot of noise (P3, P6, and P8). P9 said that *“Noises such as the sound of flipping a book and the sound of opening the lid of a pen made by people studying in the library make me distracted by causing other thoughts.”* Moreover, sometimes viewers were unexpectedly disturbed by people who they studied with and found it hard to concentrate on their works. For example, P1 said *“I went to the library to study, but unexpectedly, no people were studying around, and only people talking, or eating pizza, or doing something different not studying. It was so hard for me to focus on my work.”* Especially, they feel more burdened when they study with close friends. P10 felt a sense of togetherness when she studied with her friend, but there was a burden that she had to chat with her friend, so she almost couldn’t finish her plan. P2 also said *“When studying with my friend at a cafe, we often interfere with each other because each person’s focus is different during the entire study time. I also wanted to keep talking to her when I’m right in front of her.”* It is seen that the people studying next to participants are sometimes unexpectedly considered as external ambience, causing the distraction, and as a result, the expected effects are not obtained well.

On the other hand, ambience also leads people to be motivated as we can see through b) in Figure 3. Participants (P1, P2, P3, P4, P5, P8, P9, and P12) reported that seeing other people studying makes them get motivated and study harder. P11 and P6 explained that when they study with others, they felt more competitive and it led to being motivated. P11 said, *“When I study with my friends, then I feel kind of competition, so I’m motivated to keep studying until my friends left.”* P6 also said *“Rather than studying in the study room with a partition, I am more focused I sit face to face with people since I get more motivated by them.”*

4.2 Two Common Challenges in Creating Satisfying Study ambience

Through the interviews, we uncovered two common challenges in forming a satisfying study ambience. We note that all of the interview participants had experience with being disturbed by an undesired external ambience that affected their study time negatively.

The first challenge happens when there are no study-friendly places available. As mentioned above, people often go to places where other people also study rather than studying alone. However, it is not possible to go to such places in some situations. P3 said *“I like the ambience of study in the library the most, but I can’t go because using a laptop is forbidden due to noise. I have no choice when I have to use my laptop.”* Because of COVID-19, many libraries and cafes closed down, and participants (P5, P6, P7, and P12) reported they couldn’t go to such places any more and had hard time focusing on their work because they had no options outside of their home.

Secondly, it requires extra cost to surround oneself with the personally desired ambience. Each participant shared a study ambience that suited them well. For example, some people like studying with a person who studies hard (P1, P3, and P12), others like an ambience that is not too quiet (P4 and P10), and others like places where there are not too many people (P3 and P6). However, in some cases, it is costly to create such an external ambience that suits each person. For example, P1 felt that it takes much social capital to find a proper person to study with who is highly motivated. P1 said, *“I have to establish a relationship to know the concentration, study habits, and kind of study of the person I’m studying with, but I don’t want to waste my energy on it.”* There are cases in which not only social costs but also financial costs are incurred, for example, those who want to sit in the seat they want at the time they want (P12), and those who want an open place but quiet space (P7), pay money for the seats in the study cafe and study room.

4.3 Why People Watch SWM Videos

Aforementioned challenges motivated participants to watch SWM videos. We found five main themes that arose when participants described why they watched SWM videos: (1) to get motivated by a creator studying in video, (2) to gain the sense of studying together, (3) to control their studying ambience easily, (4) to reduce the cost of creating a study-friendly ambience, and (5) to mitigate distraction from smartphone. In the following subsections, we describe each theme and how they affect the internal states to help them create a satisfactory studying environment.

4.3.1 To Get Motivated by Others. The first theme describes viewers who watched the SWM video in order to get motivated by social interactions and comparison with creators in video. All participants used SWM videos to motivate themselves to focus more on their task and extend their study time.

Eleven out of 12 participants said they had been inspired by comparing themselves with a person who was constantly studying in the video. P5 described her thoughts: *“This person studies so hard, what am I doing?”* While watching SWM, they could feel a sense of being in a place studying together, such as a library, study room, or cafe. Participants appreciated how SWM videos creates such social ambience, which keeps them motivated by others studying in those virtual places. Sometimes, watching others who are studying hard in the video prevents users from using their cell phone. P6 said, *“When I study with my friends, I want to remain a hard worker, so I use my cell phone less. Similarly, when I look at SWM, I feel like I’m doing it at the library table with my friends, so I use my cell phone less for the same reason.”* Likewise, in the case of the P8, when she saw a person studying in the SWM who never touched his phone

while switching the screen in laptop, she thought she shouldn't do anything else with the computer. Even daydreaming while studying (P5, P7, P8, P9, and P12), SWM helps people be motivated. P12 said *"Every time I look at the screen, the uploader is constantly working hard, so I think I should also focus on my study like him when useless thoughts are coming up."*

In addition, P2, P5, and P6 are also motivated by other viewers watching the video in real time. P6 said that *"when the number of viewers goes up, I get motivated and sometimes there are more than 1000 people watching"*. P2 also felt very motivated by them, so she watched the most crowded video among real-time SWM. Moreover, when viewers admire the uploader's field, it turns out that viewers are greatly motivated by uploaders' studying (P3, P11). P3 said *"When watching Sarang's SWM video, I felt I should work harder because Sarang is super good enough to study at medical school, but she studies so hard."*

This comparison also made viewers stay in their seats longer (P2, P3, P8, P9, P11, and P12). P2 said *"When I'm tired and wondering if I should stop and try tomorrow, the uploader is still studying, so I decide to do more and study for a longer time."* For participants who prepare for exams that require much more study such as administrative examination (in Korea), it is very important for them to extend study time. P9 who watched live streaming videos reported that he is motivated to start studying early when the streamer has already started studying in the morning.

4.3.2 To Get Emotional Support. The second theme addresses viewers who want to get emotional support from watching SWM. Participants expressed they feel lonely when studying alone due to COVID-19 (P5, P12), staying late at night (P2, P10), or being in a foreign country as an exchange student (P1). They reported that being alone makes it difficult to concentrate on studying, but watching SWM gives them a sense of studying with the person in the video and emotional comfort. P4 said, *"Although I was alone, I wanted to feel that someone is studying around me. I rarely see SWM videos in the lab and with my friends. I only watch it when I'm in a dorm room and studying alone."* P1 said, *"When I was out of my country as an exchange student, I watched a video game live stream because I was really lonely. However it's hard to study while watching such a video, so I watched a SWM so that I could study together while reducing my loneliness."* P10 said, *"Studying alone at home makes me feel very lonely, but I feel less tired by watching SWM videos. I've seen it before, but now all my roommates have left so I see it more often."* In addition, P1 and P10 could ease loneliness by watching SWM videos.

4.3.3 To Control Study-friendly ambience Easily. Participants reported experiences of being unexpectedly dissatisfied with the space they went to study. However, they said that the study ambience coming from SWM is more easily controllable compared to physical spaces as seen in Table 2. Viewers can choose the time to study together (P2), the design of the screen, the ambient noise, and how clean the surroundings are (P9). P1 said, *"While watching SWM, it is easy to change the study atmosphere and create 'time' and 'space' to study at any time."* P2 and P4 mentioned that watching SWM offers a high degree of freedom in time (Liveness - Pre-recorded in Table 2), whereas the physical environments such as a cafe and library do not. For P6, P8, and P9, sound is a very important factor in the

study ambience. They selected SWM based on ASMR (Music/ASMR - Well-suited sound in Table 2) and even played the video in a library or cafe to mitigate distraction made by noise in physical places. P9 said, *"Noises made by people studying in the library, such as the sound of flipping pages or the opening of a pen lid, are distracting. At that time, watching the SWM provides ASMR that suits me, calming me and making me feel less distracted by other thoughts."* In summary, we found that participants are creating a satisfactory study ambience by choosing a video with features that suit them.

In addition to choosing a video that suits their needs, they tried to create a better ambience by adjusting the way they watched the video as seen in Face and Music/ASMR features of Table 2. Viewers often flipped their phones while playing SWM on their mobile phones (P9 and P12) or placed the SWM video window behind other windows to hear only the sound without looking at the screen (P1, P2, P3, P5, P8, and P10). Not only that, some viewers covered the screen and even turned off the sound (P3 and P12) but still had the video playing in the background for the minimal social presence of the creator. P12 said, *"I usually turn down the volume and do not watch the screen, but I know that I played it. I'm sure that he will continue to study, so I can be motivated by him without any disturbance. I also can watch him again when I can't focus on."* This viewing pattern lets us find that ambience is internalized while minimizing the distracting elements of ambience. P12 might have gotten motivated from the existence of the creator signaled by video and audio and internalized the existence of the creator, being able to 'sense' the presence without explicit external factors like sounds. After that P12 could have removed distracting external elements, like sound and visual of the video.

4.3.4 To Reduce the Cost of Creating a Study-friendly ambience. Participants watched SWM because additional costs incurred when creating in a physical environment could be reduced by SWM. As mentioned in Section 4.2, people said that it costs when looking for people to study with, especially who are highly motivated. However, it was easier to find motivated people in SWM videos because there are many studying creators who often study such extensively as medical school students or standardized test takers. Specifically, P1 said, *"In the online environment, I can be easily motivated because I study with highly motivated people I want without spending energy in human relationships."* P3 said they admire a SWM YouTuber named Sarang, and said, *"Thanks to SWM, I can study with Sarang whom I want to imitate."* P8 said, *"I like to study with people who are working in a similar field to me, but not too close. I can find people who meet these conditions easily by searching for 'graduate student study with me' on YouTube."*

4.3.5 To Mitigate Distraction from Smartphones. Viewers use SWM in order to use their cell phone less. When they watch SWM on their mobile phone, of course, they cannot use their phone for anything else. This effect differs from reducing distraction by being stimulated by others in that it reduces distraction in a physical manner. P5 and P9 said that the frequency of use of the mobile phone was greatly reduced while studying because the SWM video was playing on a mobile phone and they studied with an iPad or books.

Features	Viewer's Selections	Effects	Mechanisms
Area of study or study purpose	Similar area/purpose	Get motivated Share information	• Seeing people with similar goals • Watching study methods specific to area of study
	Creators' area of study revealed	Get motivated	• Shared a sense of urgency (e.g. 3 days left until midterm) • Desiring to imitate the creators in admirable area
Liveness	Live streaming	Get motivated	• Seeing the number of real-time viewers increasing • Shared presence when creator is currently studying
	No specific preference	No specific effect	• Expected benefits without liveness • No need for synchronous communication with others
	Pre-recorded	Easy to adapt to their studying	• Able to watch videos of desired length • Able to watch at desired time • Able to watch videos of desired length
Video length	Short videos	Easy to adapt to their studying	• Able to tailor study cycle and break time
Video communication	Avoid videos with communication	Prevent distraction	• Removing creator voice sounds
		No positive effect	• Motivation not positively affected by communication between viewers
Music/ASMR	Well-suited sound	Get focused well	• Mitigating interrupting thoughts and remaining calm
	Turning off sound	Prevent distraction	• Removing loud / annoying sounds
Creator's timer	Shown	Get focused well	• Visual feedback on length of study time
	Creator's current time shown	Easy to adapt to their studying	• Visual feedback on current time when making a plan
	Not using steamers' timer	Hard to adapt to their studying	• Not being able to measure accurate studying time
		Be disturbed	• Breaking the feeling of being together from a timer that doesn't match their sync
		No positive effect	• Not being able to measure accurate studying time
Face	Face appearing	Get motivated	• Seeing the face of creator studying in the video
	Covering screen to not see the creator	Prevent distraction	• Remove creator's face visible

Table 2: Features the viewers want to select or control are listed in the first column. The Viewer's Selections column describes possible choices for each feature and how they can be adjusted. Effects of each selection on their studying session and how they work are stated in the third and fourth columns.

4.4 Summary

We found that people expect enough concentration and extended study time to achieve a satisfying study experience. These effects are changed by two internal states, namely mitigating distraction and being motivated, and they are triggered by external ambience or by themselves. People had experiences in which the above effects were not satisfied mainly due to the difficulties of creating an external ambience. SWM viewers watched these videos to invoke internal states in a positive direction through external ambience, but also solve the difficulties in creating a well-suited ambience and reducing disturbance occurred in existing study sites. From watching SWM, viewers were motivated by the creators studying in SWM and emotionally supported by them, while freely controlling their desired ambience at a small cost.

5 DISCUSSION

We believe that the findings from this study are informed by and have implications for various areas such as social learning, social presence, productivity tools, and self-regulated learning. In this

section, we discuss the unique characteristics of watching SWM videos by connecting them to existing theories and studies.

5.1 Social Learning and SWM Videos

SWM viewers virtually study together with the video creator or other viewers. We now compare the practice of watching SWM videos with other social learning environments from the perspective of learning in the presence of others, as characterized in Section 2.1.3. In this type of social learning, learners study with others in shared spaces like a library, but each learner works on their own material. We found that SWM and virtual study rooms [21, 58] serve the identical role to the conventional physical study space. Even if there is no direct social interaction between learners and no explicit articulation of instructional or interactive content, the social presence of other people still exists in SWM videos, which motivates the viewers to study harder. We also found that the effort people put into finding a satisfying study space is similar to the effort that SWM viewers put into finding a well-suited video that creates their desired study environment. For example, people switch seats in a library if they get distracted or visit different spaces to study each

time. SWM video allows viewers to create a desired study-friendly environment more easily (almost instantly) at a lower cost.

5.2 SWM Viewers Control the Degree of Social Presence Using Video

Our study found that SWM viewers proactively use videos with partial presence and sometimes intentionally reduce the presence of others in the video while studying. SWM viewers reduce others' presence through turning off screen and only listening to sound. Viewers' watching practices suggest that they set up the studying environment in a way that sets presence in a unique manner. We found that there is a trade-off between the desire to see people studying together and the desire to avoid disturbance from external ambience. In other words, viewers expect to get the virtual presence of studying together, and at the same time wish to avoid distractions from the creator's movement and noise. Therefore, viewers watched SWM while adjusting this trade-off in a way that is appropriate for themselves. As mentioned in Section 4.3.3, they adjusted the creator's presence in varying degree, from showing a full view of study, to revealing limited parts of creators, having only sound or only screen, and removing both sound and screen. Even though the level of presence is lowered, viewers are certainly aware that the creator continues to study, which is enough for them to get motivated and feel the sense of studying together.

5.3 Productivity Tools and SWM Videos

While computer devices (e.g., laptops and smartphones) help people get things done more quickly and easily, they also can be a source of distraction due to the varying activities and content that are accessible by using them [35]. For example, frequent notifications from these devices can unpredictably interrupt users who are focusing on other tasks [37, 39].

Technological interruptions can also be caused by internal stimuli, known as self-interruption (or internal interruption) that individuals interrupt themselves during ongoing work [1, 12, 31]. Similar to these, our interview participants also mentioned technological interruptions as distracting during studying sessions (Section 4.1.3). Methods people use to manage technological interruptions during study time or work hours include separating their phones physically from themselves or setting their smartphones in airplane mode. However, mainly due to users' lack of self-regulation, the effectiveness of these approaches tend not to last long [37].

In our study, we found that SWM viewers use the videos for a similar purpose to the reason why people use productivity tools. Typically, information workers use productivity tools to reduce distraction during work hours and to be motivated to stay focused and work longer [44]. This agrees with our model illustrated in Figure 3 and Table 2, in which we explain the mechanism for how people control their internal state (being motivated and avoiding distraction) through creating a study-friendly ambience using SWM videos. More specifically, a SWM video being played in their smartphone directly prevents the viewer from being distracted by their smartphones because they cannot access other apps while it is playing. Viewers also use SWM videos to self-regulate themselves by being aware of the presence of the creator studying hard in the

video, which is the most crucial difference between SWM videos and other productivity tools.

5.4 SWM Videos for Self-Regulated Learning

We found that SWM viewers actively manage their own studying ambience while watching the video. We discuss this practice from the perspective of Self-Regulated Learning (SRL). SRL describes learners as cognitively, motivationally, and behaviorally active participants of the learning process who seek to self-regulate [74]. In Winne and Hadwin's SRL model [22, 23, 56], learners exercise agency across four loosely sequenced phases: They (1) scan their environment to identify internal and external factors that may influence a task, (2) frame goals and design plans to approach them, (3) implement actions to animate their plans, monitor their actualization, and adjust the actions, and (4) re-examine these prior phases to consider major revisions to action if progress toward goals is blocked or unsatisfactory.

Our findings reveal that SWM supports learners to perform these phases as well. Sometimes SWM viewers felt being disturbed when they heard sounds or saw the screen that did not suit them, and recognized they were unable to maintain focus. It can be seen as a viewer's judgment as to whether perceived internal states and external ambiances make their study experience satisfactory. Viewers who felt dissatisfied reduced the sound, covered the screen, or changed the video. This can be viewed as examining and revising the external ambience obtained from prior action which is studying with the originally chosen SWM. We found that viewers go through the above process when using SWM to control their study environment. In addition, changing the viewer's context from studying alone at home to watching SWM is an example of regulating context, or the learner's external environment [50]. These viewers' controls show how SWM viewers act as agents who seek, choose, and carry out options to make their study environment better [32].

5.5 Limitations

Our study focuses on SWM viewers rather than creators. We have limited our scope by excluding the perspectives of SWM creators such as motivation to stream one's own studying and challenges in creating such videos. It would be interesting future work to explore the creator's motivation and authoring practice and compare it with the viewer's perspectives presented in this paper. Another limitation of our work is the homogeneity of the interview participants. The participants were recruited through snowball sampling and were mostly female college students, who might not represent the possibly broader pool of viewers. Future work could capture experiences of people of more various age groups and occupations.

5.6 Future Work

Based on our finding that viewers wish to self-regulate through SWM, a possible direction for future work is to design SRL interventions that help learners create their desired studying ambience. As the first step, one can quantitatively verify the three-factor model to gain insights into whether and how changes in the external factor lead to satisfactory or productive study. Building a system based on the three-factor model that supports learners to perform SRL effectively could be the next step. We believe such SRL intervention

tools could be used not only in a virtual study space, but also in online learning environments like MOOCs.

6 CONCLUSION

We identified the main characteristics of SWM videos and differences among SWM videos. We found out three factors—expected effect, internal states, and external ambience—and explained how these factors interact to create a satisfying study session. We also identified two common limitations in forming satisfying study environment. We uncovered that some people watch SWM as a means of getting motivation, while others seek emotional support. Watching SWM allows learners to control the external ambience, and help them create a well-suited environment at a low cost. Our findings suggest opportunities to scale the practice of actively creating productive studying environments. More systematic support for SRL in SWM can enhance people’s study experience and increase their agency, not just for a few highly motivated people but for many who struggle to find a personalized ambience.

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