



The Impact of Educational Interactive Tools on Perceived Stressors Related to Social Network Sites Among English as a Foreign Language Learners in Small Private Online Courses

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Abstract

The integration of interactive educational tools, like VoiceThread (VT), into new educational settings, like small private online courses (SPOCs), while offering substantial benefits, can introduce less explored drawbacks, including stressors associated with social network sites (SNSs). This study addresses this gap by investigating the implementation of VT within flipped SPOCs, focusing on its impact on language learners' perceived SNS stressors encompassing three subcomponents: social overload, system feature overload, and information overload. Through a quantitative quasi-experimental method, 79 learners were assigned to flipped SPOC language classes (two experimental and two control classes due to SPOC size limitations). As the experimental group, 40 learners applied the Telegram platform to receive instructions while using VT to practice speaking. In the control group, 39 learners employed only Telegram to receive instruction and also practice speaking. The participants' perceived SNS stressors were assessed by questionnaires. The results indicated a significant multivariate difference between the experimental and control groups on perceived SNS stressors, with the experimental group reporting significantly higher social overload. No statistically significant differences were found for system feature overload or information overload. The findings suggest that the observed difference is primarily in the social dimensions of learner stress. All stakeholders within education may benefit from these findings.

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Introduction

Contemporary education incorporates interactive online learning tools into novel pedagogical methods. One of these technologies, which may assist the teaching/learning process, is VoiceThread (VT), an interactive collaboration tool that supports the teaching and learning process by enabling users to create online presentations incorporating documents, audio, video, and images, and to receive feedback from others (Chen & Bogachenko, 2023). Its affordances promote student-centered learning (Utami & Santosa, 2023), foster a sense of engagement and connection in online settings (Mejia, 2020), and help language learners develop oral skills and confidence through regular use (Chen & Bogachenko, 2023).

Employing technology to pave the learning path has also expanded to create novel educational contexts such as small private online courses (SPOCs). SPOCs were introduced by Fox (2013) to counter issues in massive open online courses (MOOCs), such as high dropout rates and learner heterogeneity (Eriksson et al., 2017). SPOCs are defined as private, e-moderated courses for small cohorts of 15 to 20 participants (Fox, 2013). This model fosters deeper learning through peer interaction (Filius et al., 2018), leading to enhanced conceptual comprehension (Jong, 2016), higher academic achievement (Liu et al., 2018), and a positive, socially mediated learning environment (Uijl et al., 2017). SPOCs also significantly increase learner satisfaction, which can positively influence professional development (Vaysse et al., 2018).

Educators have increasingly adopted flipped pedagogy within SPOCs (Chi et al., 2022). This pedagogy method is defined as a model that restructures instructional time by shifting learning agency to students (Wang et al., 2024), and instruction reduces in-class knowledge delivery in favor of student inquiry. This approach requires students to undertake independent learning outside of class. Research indicates the flipped model improves learning outcomes by enhancing self-regulation, task engagement, self-confidence (Rezaeyan et al., 2025), performance (Bhagat et al., 2016), satisfaction (Bösner et al., 2015), and motivation (Huang & Hong, 2016). This instructional model also contributes to language learners' autonomy, skill-learning (Mashhadi, 2022), and achievement (Khosravani et al., 2020). The semi-structured flipped approach, which involves students in selecting course tasks and content, is particularly effective for boosting motivation and engagement by incorporating student interests (Amiryousefi, 2016; 2017). Furthermore, flipped language teaching aids in developing learners' oral skills (Amiryousefi, 2017).

Relying on the favors that new technologies like online instructional contexts (e.g., SPOCs) or educational tools (e.g., VT) offer might not guarantee a smooth path of learning for students. In the virtual world, a variety of applications, softwares, and devices could impose overloads on individuals (Tyrvaenen et al., 2025). Saegert (1973) defined overload as the perceived strain from environmental demands exceeding an individual's processing capacity. This concept extends to the virtual world, where Fu et al. (2020) conceptualized virtual overload as a multidimensional construct comprising system feature overload, information overload, and social overload. Thompson et al. (2005) associated system feature overload with social media users' apprehension of technological traits and described it as the perception induced by the features offered by social media that exceed users' demands. Exposure to the amount of

information beyond an individual's capacity to process and accommodate while using the internet induces information overload (Fu et al., 2020). Internet users in the social network sites (SNSs) context are susceptible to information overload (Zheng et al., 2023). Then, learners in online platforms (SNSs context) are endangered by possible information overload. Perceived social overload might be generated by being positioned in social multi-connections linkage beyond a person's social management capability (Zhang et al., 2023). The essence of online interactive educational platforms and softwares demands users to establish multiple connections with other learners, systems, and instructors to receive and transmit information and feedback (Simonson et al., 2015). Furthermore, these social requirements are not restricted to synchronous class time and persist at any time and place. Therefore, it is highly probable that learners in online classes endure social overload. Masood et al. (2022) indicated how the detrimental impact of SNS stressors could affect academic performance.

The literature review indicates that several studies probed the impact of SNS stressors' effects on online learning (e.g., Fu et al., 2020; Masood et al., 2022), although none of these studies investigated it in the SPOCs setting. Additionally, applying the flipped method in online learning has been studied (e.g., Korkmaz & Mirici, 2023) as well as the advantages of rearranging flipped classes in the SPOC framework (e.g., Xue & Dunham, 2021). Although the previous studies have probed the mentioned variables (i.e., SNS stressors) and settings (i.e., semi-structured flipped and SPOC classes) on online learning in secluded settings, they have not investigated the impact of incorporating an interactive software (i.e., VT) in SPOC semi-structured flipped language classes and the possible imposition of SNS stressors on learners. Furthermore, knowing more about the educational setting that may contribute to perceived SNS stressors on learners is the first step to provide a learning atmosphere with fewer SNS stressors and equipping the students with provisions to deal with these stressors. This study aims to investigate the effect of using VT within semi-structured flipped SPOCs on English as a foreign language (EFL) learner's perceived SNS stressors. Then, this study will answer the following question.

Research question: What is the effect of applying VT in SPOC semi-structured flipped context on EFL Learners' perceived SNS stressors (i.e., social overload, system feature overload, and information overload)?

The results of this study could benefit key stakeholders in language education, such as teachers, students, curriculum designers, and institutional managers.

Literature Review

Theoretical Framework: Cognitive Load and Media Multitasking

The theoretical foundation of this study is rooted in Cognitive Load Theory (CLT) (Sweller, 1988), specifically as it intersects with the phenomenon of media multitasking in digital learning environments. CLT posits that human working memory possesses a finite capacity; when the volume of information or the complexity of a task exceeds this limit, cognitive overload occurs, detrimental to both learning outcomes and psychological well-being. Lang and Chrzan (2015) extended this framework to Social Networking Sites (SNSs), where media multitasking is a defining feature. This process involves the simultaneous allocation of

cognitive resources to multiple stimuli—whether digital or physical—which often results in cognitive competition and increased stress (Zamanzadeh & Rice, 2021).

In technology-mediated learning, cognitive load arises not only from the instructional content itself but also from the structural requirement to coordinate multiple channels of interaction. This is particularly evident in SPOC-based flipped learning, where activities are often distributed across several digital platforms. In the context of the present study, the use of a dual-platform approach—Telegram for announcements and informal peer interaction, and VoiceThread (VT) for structured oral tasks—inherently necessitates media multitasking. Learners must constantly shift their attention between these two environments, each with its own interface, communicative norms, and pace. Such repeated attention-switching carries a significant cognitive cost, creating a fertile ground for the emergence of specific SNS stressors.

When these technology-mediated demands outpace a learner's processing capacity, they typically manifest as three distinct but interconnected types of overloads, as identified by Fu et al. (2020) and Masood et al. (2022). The first, Information Overload, occurs when the sheer volume of messages and shared content becomes unmanageable. Within the SPOC framework, learners may be inundated with peer messages on Telegram, e-moderator announcements, and multiple VT comments requiring oral responses. As Farhoomand and Drury (2002) suggest, when the assessment of information exceeds the ability to process incoming stimuli, learners often report feeling “drowned” in content, struggling to distinguish critical tasks from background noise. The second stressor, System Feature Overload, refers to the mental strain caused by navigating complex or unfamiliar technology. Ragu-Nathan et al. (2008) describe this as a byproduct of platforms offering a density of features that exceed a user's management capacity. For language learners—who are already dedicating cognitive energy to second-language processing—grappling with unfamiliar VT functions, such as comment moderation or multimodal response tools, adds an unnecessary layer of demand. When attention is diverted from the pedagogical task to the mechanics of the system, the likelihood of anxiety and tech-related stress increases significantly (Ayyagari et al., 2011). Finally, Social Overload stems from the perceived pressure to maintain high levels of interaction across these platforms. Originally conceptualized by McCarthy and Saegert (1978) as a social demand exceeding individual capacity, this concept has been adapted to digital spaces by Maier et al. (2015) to describe the exhaustion caused by providing excessive social support and responsiveness. In a SPOC, learners may feel a “social debt” to respond quickly to peer VT submissions, participate in Telegram threads, and remain available to the instructor. For those with limited time or lower language confidence, these social expectations can quickly become a primary source of exhaustion.

Despite the growing use of VoiceThread in language education, existing research has focused almost exclusively on its pedagogical affordances, such as speaking development (Dugartsyrenova & Sardegna, 2017), engagement (Mejia, 2020), and student satisfaction (Chen & Bogachenko, 2023). However, the potential “dark side” of these tools—specifically how they might introduce or intensify the three stressors mentioned above—remains largely unexplored. Furthermore, there is a notable lack of research investigating the combination of VT and Telegram within a flipped SPOC model from the perspective of cognitive load. The

present study addresses this gap by examining how such an environment influences EFL learners' perceptions of SNS stressors.

Related Studies

SNS Stressors: Information Overload, System Feature Overload, and Social Overload

Research confirms that stressors from Social Networking Sites (SNSs), caused by information, social, and system feature overloads, negatively impact users. What follows is a critical review of these studies with attention to their methodological details and generalizability to educational contexts.

Maier et al. (2015), through interviews with 12 individuals and a survey of 571 Facebook users (analyzed using structural equation modeling), found that social overload, stemming from high social demands such as support norms, connection immediacy, friend count, and interaction requests, led to SNS exhaustion and a desire to discontinue use. Unlike subsequent studies that examined all three overload types, Maier et al. focused exclusively on social overload. In contrast to Maier et al. (2015), who examined only social overload, Lee et al. (2016) provided a more comprehensive examination of all three overload types simultaneously. Lee et al. (2016), in their study of 201 participants using online and offline surveys (analyzed via regression analysis), found that all three forms of SNS stressors cause SNS exhaustion. They asserted that SNS functionalities are crucial in defining system feature overload.

Applying the Stressor-Strain-Outcome model to 446 users of Facebook, Twitter, and Kakao Talk (using confirmatory factor analysis and structural equation modeling), Zhang et al. (2016) found that system, information, and social overload are stressors that cause strain (fatigue and dissatisfaction), leading to platform discontinuance. Overloads impacted fatigue more than dissatisfaction, with gender and age as potential moderators. Additionally, Fu and Li (2022), applying social cognitive theory with a sample of 346 Facebook users (analyzed via structural equation modeling), found that technology, information, and social overload on SNSs lead to dissatisfaction and social media exhaustion. Their results indicate that these forms of overload vary in their impact on exhaustion and dissatisfaction. Unlike Zhang et al. (2016), who found that overloads impacted fatigue more than dissatisfaction, Fu and Li reported that dissatisfaction more strongly influences the complete cessation of SNS use than exhaustion, though both have similar effects on reducing usage. A pattern of decreased use typically preceded complete abandonment.

While the studies reviewed above provide foundational evidence for SNS stressors, they were conducted with general SNS users (e.g., Facebook, Twitter, Kakao Talk) rather than language learners in educational contexts. The following studies address this limitation by examining SNS stressors in academic settings.

SNS Stressors in Educational Settings

Studies examining educational settings exclusively have identified various SNS stressors, providing evidence more directly relevant to the present investigation. Xu et al. (2022), applying the stressor-strain-outcome framework and compensatory internet use theory to a sample of 441 college students (using hierarchical regression analysis), found that information, communication, system features, and social media overloads correlate with boredom, leading

to poorer academic performance. Similarly, Masrek et al. (2024) surveyed 384 university students in distance courses (using correlation and regression analyses) and identified significant positive associations between information overload and stress, information overload and anxiety, as well as between stress, anxiety, and depression among distance learners. This study is particularly relevant to the present research as it focuses on distance learners, who face similar challenges to students in SPOC environments.

Based on a scoping review of 82 studies, Shahrzadi et al. (2024) identified key antecedents of information overload, including individual traits, information characteristics, task demands, organizational structures, and information technology features. The consequences of this overload were found to be impaired decision-making, reduced productivity, and diminished user well-being in SNS contexts. In the Iranian context, Pahlevan Sharif et al. (2025) examined how SNSs affected life satisfaction during the COVID-19 pandemic by investigating 530 Iranian SNS users using a moderated mediation model. They indicated that SNS negative impacts, like information overload, might impact life satisfaction through a sequential pathway of elevated fatigue and stress. This study establishes the relevance of SNS stressor research in the Iranian context, where the present study was conducted.

These educational-context studies, while not conducted in SPOC or flipped learning environments, establish that SNS stressors can negatively affect learners in structured academic settings. This provides a basis for investigating whether similar or intensified effects occur in the specific context of SPOC semi-structured flipped EFL classes.

Critical Synthesis and Identification of Gap

The reviewed studies collectively demonstrate that SNS stressors (information overload, system feature overload, and social overload) consistently and negatively affect users' psychological well-being. In educational contexts, these stressors have been linked to boredom, stress, anxiety, depression, and reduced academic performance (Xu et al., 2022; Masrek et al., 2024; Shahrzadi et al., 2024). However, several important gaps remain. First, none of the reviewed studies investigated SNS stressors within a SPOC context or within a flipped learning environment. Second, no research has examined how using a secondary performative platform (VoiceThread) in addition to a primary communication platform (Telegram) might affect the perception of SNS stressors among language learners. Third, none of the educational-context studies have focused specifically on EFL speaking practice as the learning outcome. These gaps motivate the present study's investigation of perceived SNS stressors in a VT-enhanced SPOC semi-structured flipped EFL context.

Method

Design of The Study

Based on a quantitative, quasi-experimental design, this study examined the effects of the presence versus absence of VoiceThread (VT) (independent variable) on learners' perceived SNS stressors (dependent variable), while controlling for constant SPOC settings and a semi-structured flipped instructional method. The independent variable had two conditions: (1) the control condition, where learners used only Telegram for instruction and speaking practice, and (2) the experimental condition, where learners used Telegram for instruction and VT for

speaking practice. The three dependent variables were the learners perceived social overload, system feature overload, and information overload, as measured by the SNS Stressors Scale.

Participants

Participants were 79 adults (28 male, 51 female) aged 22-31, enrolled in tourism-related career training programs; all possessed a high school diploma and demonstrated intermediate English proficiency, as verified by the Oxford Placement Test (OPT) and the Face-to-Face Oral Placement Test (Cambridge University Press, 2013).

Due to the size limitations inherent in the SPOC model (maximum 20 learners per class), participants were assigned (rather than truly randomly assigned) to four distinct SPOC classes: two experimental classes ($n = 20$ each, total $n = 40$) and two control classes ($n = 19$ and 20 , total $n = 39$). The assignment was conducted at the class level, not the individual level, as the SPOC framework requires fixed class sizes. All conditions (teaching method, applications used, teaching materials, instructor, assessment procedures) were identical across the two experimental classes and, separately, across the two control classes. The only difference between the experimental and control conditions was the use of VoiceThread (VT) for speaking practice in the experimental classes.

Materials and Instruments

Oxford Placement Test

To homogenize participants, the Oxford Placement Test (OPT) was used. The test has two sections: a "use of English" part evaluating grammar, implied meaning, and reading (100 items), and a listening part assessing comprehension of dialogues and monologues (100 items). Following the test manual, only participants scoring within the intermediate range (51–59 on the 1–120 Common European Framework of Reference-aligned scale) were included.

Face-to-Face Oral Placement Test

To homogenize participants' speaking skills, the Face-to-Face Oral Placement Test (Cambridge University Press, 2013) was administered, as the OPT lacked a speaking proficiency component. This test includes an oral question bank and a standardized scoring guide. The test is aligned with the Common European Framework of Reference (CEFR), and its score levels are compatible with the OPT, allowing the two scales to be used together. Two raters assessed each participant's oral performance, and inter-rater reliability was calculated to ensure consistency (Cohen's $\kappa = .84$).

SNS Stressors Scale

The fourth instrument measured the learners' perceived SNS stressors, adapting a validated scale by Zhang et al. (2016) with reliable subcomponents (Cronbach's $\alpha > 0.70$). The original scale was designed for general Facebook use. For the purposes of this study, the scale was adapted to the Telegram context for the control group and to the Telegram plus VT context for the experimental group. To ensure that the adapted items were interpreted as intended by the participants, a pilot study was conducted with 15 EFL learners (who did not participate in the main study). These learners completed the adapted questionnaires and were then interviewed about their understanding of each item. Based on their feedback, minor wording

adjustments were made to improve clarity (e.g., specifying "Telegram" and "VoiceThread" explicitly in each item rather than using general terms such as "this platform"). The adapted version added a demographic section and a second section using a 5-point Likert scale to measure three SNS stressor subcomponents (system feature overload, information overload, and social overload). The control group's scale specified the Telegram context (see Appendix A), while the experimental group's version referenced the use of Telegram alongside VT (see Appendix B). The instrument was administered only as a post-test (not a pre-test), as the study's aim was to compare the two groups' perceived SNS stressors after the intervention rather than to measure change over time.

Instructional Material and Time

The study involved teaching units 7-12 of *English for International Tourism* (Dubicka & O'Keeffe, 2002) to all participants over an eight-week term, comprising 24 sessions, a total of 36 class hours, with three 1.5-hour sessions per week.

Instructional Tools

Telegram. In this study, Telegram served as the primary platform for delivering course material to all the classes. As a free SNS, Telegram offers a range of features, including text messaging, calling, video and file sharing, and screen sharing, that have extended its use beyond personal communication into educational interactive contexts. The platform supports synchronous video and voice calls for 2 to 30 users, allowing participants to share their screen or an application window on mobile and desktop devices. In the experimental classes, participants additionally used Telegram's built-in browser to share and open VT links.

VoiceThread. The experimental group also used VT for practicing and presenting speaking tasks. VT is an asynchronous multimedia tool that allows users to create, edit, and share multimodal presentations incorporating voice, text, and video, and to receive comments from others. While VT shares some features with social networking sites (e.g., persistent user identity, the ability to view and comment on others' contributions), it is primarily an educational collaboration tool rather than a general-purpose SNS such as Facebook or Instagram. The authors acknowledge that the concept of "SNS stressors" was originally developed for platforms like Facebook, and applying the same framework to VT requires caution. However, the stressors measured in this study (information overload, system feature overload, and social overload) are platform-independent constructs that can arise from any technology-mediated environment where users must process information, navigate system features, and maintain social interactions. The validated scale by Zhang et al. (2016) was adapted to the specific features of Telegram and VT, and the pilot testing described in the SNS Stressors Scale subsection confirmed that participants interpreted the adapted items as intended.

In this study, Telegram was used for synchronous class time (e.g., live discussions, real-time feedback), while VT was used for asynchronous speaking practice (e.g., recorded presentations, delayed peer comments). The authors acknowledge that the two platforms served different functions, and the observed increase in social overload may be attributable to the asynchronous, performative nature of VT (e.g., creating polished, publicly viewable presentations) rather than the mere addition of a second platform. This potential confound is

addressed as a limitation in the Discussion section. This platform provides an exclusive, interactive, and collaborative environment where learners create, edit, and share multimedia presentations, and visit, comment on, and edit others' presentations (with access). Each learner must first register for a VT account. Although highly interactive for collaborative creation and sharing, VT is asynchronous and does not support real-time communication.

Class Settings and Procedure

Two features (controlled variables) were common in all the classes under study: first, the classes were arranged as SPOCs, and second, they received semi-structured flipped education. The following parts explain how these two features were ascertained and controlled in the classes.

SPOC Setting

The course was structured as a SPOC, following the characteristics defined by Fox (2013). Its design was tailored to address participants' specific needs: to gain the English proficiency required to excel as tour guides and to pass the Tourism Comprehensive Test. True to the SPOC model, the course featured a restricted class size (maximum 20 students), personalized instruction via an e-moderator (using Telegram and VT), a strong emphasis on peer interaction, and clearly defined start and end dates.

Semi-Structured Flipped Settings

The course employed a semi-structured flipped learning model. All new vocabulary and grammar for each unit were distributed to learners via a Telegram group, using video, PDF, and audio files, at least 72 hours before the session. Students were required to study these materials beforehand. For further clarification, they could contact the instructor privately on Telegram. Frequently asked questions were then addressed explicitly for all students in the main group.

The course aimed to enhance learners' spoken English within tourism-related contexts. For each unit, learners completed a speaking task, such as delivering monologues about tourist attractions, performing role-play dialogues for accommodation bookings, or presenting on cultural traditions from their countries, resulting in six presentations per learner.

Operationalization of the Semi-Structured Aspect: The semi-structured format allowed learners to contribute to topic selection. For each unit, the instructor provided a list of 3–4 potential speaking topics aligned with the unit's learning objectives. Learners were then asked to vote for their preferred topic via a Telegram poll. The topic with the most votes was selected for that unit's speaking task. In the rare event of a tie, the instructor made the final selection. This procedure was applied identically across both the experimental and control groups to ensure consistency. No additional learner-generated topics were permitted, ensuring that the degree of learner choice was controlled and comparable across groups.

Subsequently, during the first synchronous session for each unit, the instructor facilitated a collaborative brainstorming activity to help learners generate ideas and identify necessary information and correct grammar for their presentations.

Experimental Classes

The sole distinction between the experimental and control classes was the use of VT for speaking practice in the experimental condition. While both groups received identical instructions, including shared audio/video materials for vocabulary and grammar and synchronous sessions on Telegram for class routines, the experimental classes in their first session were provided a brief orientation by the instructor on creating a VT account. Throughout the course, participants in the experimental group were required to create and present six speaking tasks within VT, share the presentation links, and provide constructive comments on their classmates' presentations. Figures 1 and 2 exemplify one learner's VT presentations.

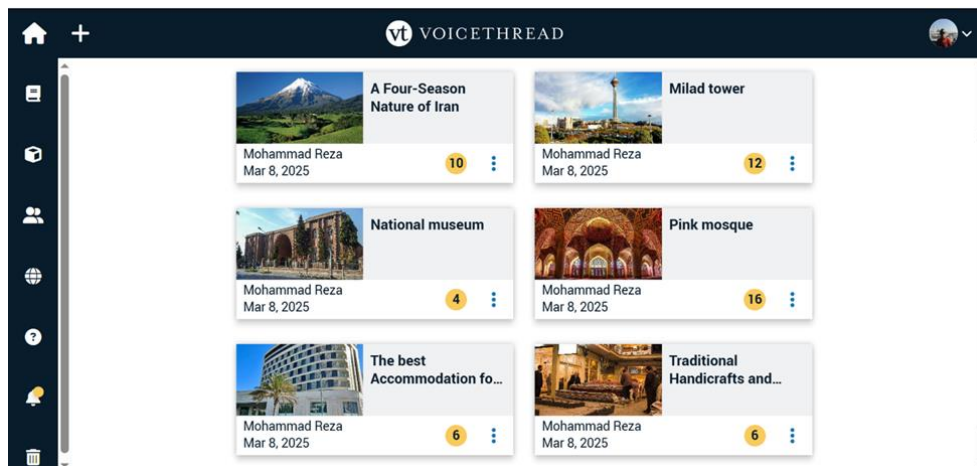


Figure 1. An example of a learner's list of VT presentations

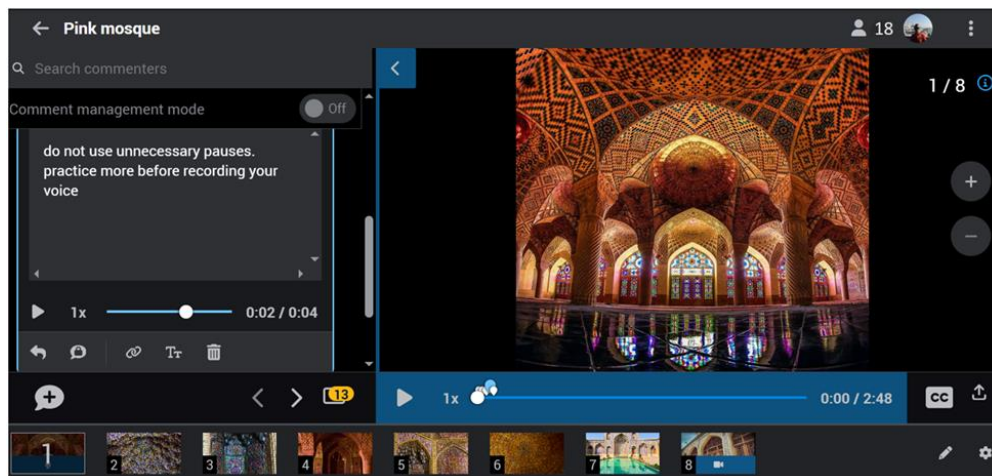


Figure 2. An example of a VT presentation

Control Classes

Students in the two control classes were taught the same content and completed the same six speaking presentations as the experimental classes. The distinction was that control classes used Telegram for their speaking assignments, whereas the experimental classes used VT + Telegram (Telegram for instruction and VT for speaking practice) as well.

Data Analysis

At the end of the course, the learners' perceived SNS stressors were measured through the SNS Stressors Scale. The questionnaire was administered to participants via Google Forms. This study employed a post-test only design without a pre-test. The rationale for this decision is as follows. Before the course, learners had not been exposed to SNSs (Telegram or VT) as formal instructional platforms for group-based English learning. While some learners may have used Telegram for personal communication, they had never experienced Telegram (or any other SNS) as a platform for structured, collaborative language learning with an instructor, graded tasks, peer evaluation, and fixed deadlines. The SNS stressors measured in this study (social overload, system feature overload, and information overload) are context-dependent constructs that emerge from the specific demands of using SNSs for formal educational purposes. Therefore, a pre-test would have measured either null values (as the stressors had not yet emerged) or perceived stressors from unrelated personal SNS use, which would not be comparable to the post-test measurements. Consequently, the post-test only design was deemed appropriate for this study's research question, which focused on comparing the two groups' perceived SNS stressors after the intervention rather than measuring change from a baseline. The lack of a pre-test is nonetheless acknowledged as a limitation, and future research may employ pre-test-post-test designs with longer interventions to track the emergence of SNS stressors over time.

Statistical Analysis: A one-way multivariate analysis of variance (MANOVA) was performed to determine the effect of the independent variable (presence vs. absence of VT) on the three dependent variables: social overload, system feature overload, and information overload. MANOVA was chosen because the study had three conceptually related but distinct dependent variables (the three SNS stressor subcomponents). According to [Dattalo \(2013\)](#), MANOVA is the appropriate statistical technique when a study involves two or more groups and two or more dependent variables, as it controls for Type, I error inflation that would occur if separate univariate ANOVAs were conducted. The data gathered was analyzed using SPSS software. The data gathered was analyzed by employing SPSS software.

Results

Given the identical instructional conditions and treatment experienced by both experimental classes, and considering that the division into two experimental classes was only necessitated by the limitations of class size within the SPOC framework, all participants within these two experimental classes were collectively considered as a single "experimental group" for the purposes of data analysis in this section. Following the same logic, all participants within the two control classes were collectively considered as a single "control group". Then the total number of participants in the experimental group was 40, and in the control group, it was 39. Before any analysis, a descriptive analysis of the data is presented in Table 1 to provide a comprehensive understanding of the dataset.

Table 1. *Descriptive Analysis*

		Mean	Std. Deviation	Skewness	Kurtosis
Control Group (N=39)	Information overload	15.82	.790	.001	-.696
	Social overload	15.87	.695	.177	-.839
	System feature overload	15.69	.694	.501	-.772
	Total SNS stressors	47.38	1.227	.191	-.266
Experim ental Group (N=40)	Information overload	15.85	.802	-.030	-.772
	Social overload	16.40	.744	-.424	-.456
	System feature overload	16.10	.900	.240	-.899
	Total SNS stressors	48.35	1.210	.188	-.201

In Table 1, based on the skewness and kurtosis statistics, all variables for both the Control (N=39) and Experimental (N=40) groups show acceptable values. All skewness values (−0.424 to 0.501) are within the acceptable range of −2 to +2, indicating symmetric distributions. The kurtosis values (−0.899 to −0.201) indicate slight platykurtosis (flatter distribution than normal). However, MANOVA is considered robust to minor violations of normality, particularly when group sizes are approximately equal (Tabachnick & Fidell, 2013). Given that the group sizes were nearly equal (N=39 and N=40), the use of parametric statistical methods was deemed appropriate.

Table 2. *Reliability Test of SNS Stressors Questionnaire*

	Number of Items	Cronbach's alpha for the Experimental group	Cronbach's alpha for the Control group
System feature overload	4	.70	.70
Social overload	4	.72	.70
Information overload	4	.70	.70
Total SNS stressors	12	.75	.73

As shown in Table 2, Cronbach's alpha values for all subscales and the total scale were calculated separately for the experimental group and the control group. All Cronbach's alpha values were $\geq .70$, which is the conventional threshold for acceptable internal consistency (Nunnally & Bernstein, 1994). These results indicate that the adapted SNS Stressors Questionnaire demonstrated acceptable reliability for both versions (Telegram+VT for the experimental group; Telegram only for the control group).

The Analysis to Answer the Study's Question

In response to the research question, a one-way multivariate analysis of variance (MANOVA) was performed to determine the effect of VT application on the three interrelated dependent measures of perceived SNS stressors: social overload, system feature overload, and information overload. Preliminary evaluation confirmed the assumptions of homogeneity of variance-covariance matrices (Box's $M = 4.006$, $p = .699$) and univariate error variances (all $p > .05$ via Levene's test). The MANOVA yielded a significant overall effect of Group, as presented in Table 3.

Table 3. *Multivariate Analysis of Variance (MANOVA) Results for SNS Stressors*

Effect	Wilks' Λ	F	Hypothesis df	Error df	p	Partial η^2
Group	.858	4.235	3	75	.008	.142

Note. Group = VT Intervention (Experimental vs. Control).

As shown in Table 3, the multivariate test was significant, Wilks' $\Lambda = .858$, $F(3, 75) = 4.235$, $p = .008$, partial $\eta^2 = .142$. This indicates a statistically significant difference between the control and experimental groups on the combined set of the three SNS stressors.

To identify the source of this multivariate effect, follow-up univariate analyses of variance (ANOVAs) were conducted using a Bonferroni-adjusted alpha level of .0167 (.05/3). The descriptive statistics and the results of these follow-up tests are presented in Table 4.

Table 4. *Follow-up Univariate Tests and Descriptive Statistics for SNS Stressors*

Dependent Variable	Group	Mean	SD	F(1, 77)	p	Partial η^2	Sig. ($\alpha = .0167$)
Social Overload	Control	15.87	0.70	10.616	.002	.121	Yes
	Experimental	16.40	0.74				
System Feature Overload	Control	15.69	0.69	5.064	.027	.062	No
	Experimental	16.10	0.90				
Information Overload	Control	15.82	0.79	0.027	.870	.000	No
	Experimental	15.85	0.80				

As presented in Table 4, a statistically significant difference between the control and experimental groups was found only for social overload, $F(1, 77) = 10.616$, $p = .002$, partial $\eta^2 = .121$, with the experimental group reporting higher perceived overload. The differences for system feature overload ($p = .027$) and information overload ($p = .870$) were not significant after the alpha adjustment. The direction and magnitude of the group differences are detailed in the parameter estimates shown in Table 5.

Table 5. *Parameter Estimates for Group Differences*

Dependent Variable	Mean Difference (Control - Exp)	Std. Error	95% CI for Difference
Social Overload	-0.528	0.162	[-0.851, -0.205]
System Feature Overload	-0.408	0.181	[-0.768, -0.047]
Information Overload	-0.029	0.179	[-0.386, 0.327]

Note. CI = Confidence Interval. A negative mean difference indicates the Experimental group had a higher mean score.

The significant effect on social overload, while statistically moderate in size (partial $\eta^2 = .121$), represented a mean increase of 0.53 points on that subscale for the experimental group, equating to approximately a 3.3% rise from the control group's baseline. The confidence interval for this difference (0.21 to 0.85 points) suggests the true effect lies in this range, indicating a consistent, though modest, increase in perceived social demands due to VT use.

Consequently, the answer to the research question is that employing VT within the semi-structured flipped SPOC context had a significant multivariate effect on learners' perceived SNS stressors. This effect is specifically and solely attributable to a significant increase in perceived social overload. No statistically significant effects were found for system feature overload or information overload. These findings are discussed in the following sections.

Discussion

This study investigated the influence of VT + Telegram on perceived SNS stressors among EFL learners in a semi-structured flipped SPOC setting. The analysis revealed a statistically

significant multivariate effect, indicating that the addition of VT to the learning environment (Telegram + VT) produced a different pattern of perceived SNS stressors compared to the Telegram-only condition. Subsequent analyses using a Bonferroni correction identified the specific nature of this difference: learners in the experimental group (Telegram + VT) reported significantly higher levels of social overload than the control group (Telegram only). No statistically significant differences were found for system feature overload or information overload. Therefore, integrating VT into this learning environment specifically increased feelings of social pressure from SNS use, without significantly raising stress related to platform complexity or information quantity.

The observed increase in social overload for the experimental group may be explained by the different affordances of the two platforms. VT, as an asynchronous multimedia tool, required learners to create, share, and comment on recorded presentations, which likely increased the frequency and visibility of peer interactions compared to the Telegram-only condition, where speaking practice was conducted synchronously via voice chats without permanent records. However, the authors acknowledge that this study did not directly measure interaction frequency (e.g., number of comments exchanged), interaction detail (e.g., length or quality of feedback), or time spent on each platform. Therefore, the explanation that "more frequent and detailed social interactions" caused the increase in social overload remains a speculative interpretation. Future research should collect behavioral data (e.g., platform analytics, log files) to directly test whether interaction frequency and detail mediate the relationship between VT use and social overload.

The difference in perceived social overload between the groups is consistent with the research of [Maier et al. \(2015\)](#), which explains that a user's experience of social overload is shaped by a platform's specific features, user norms, and communication styles. This result can be further explained through relevant theories. The notable increase in social overload for the experimental group is attributable to the interaction between VT's characteristics and principles of Cognitive Load Theory concerning media multitasking ([Lang & Chrzan, 2015](#)). VT, as an asynchronous multimedia tool for speaking practice, makes the learning task a performative, publicly assessed social activity. Unlike Telegram's synchronous text/voice chat, VT requires learners to create, edit, and share polished audiovisual presentations that remain on the platform for peer review. This introduces substantial extraneous cognitive load linked to social evaluation and self-presentation ([Sweller, 1988](#)). Learners must divert finite cognitive resources from the language task to managing their digital persona, anticipating peer feedback, and making social comparisons ([Zamanzadeh & Rice, 2021](#)). Thus, using VT with Telegram added a qualitatively distinct and more prominent social stimulus to the media multitasking environment. The overwhelming amount of shared perceptual input ([Lang & Chrzan, 2015](#)) in this context was socio-evaluative, resulting in a cognitive load experienced as heightened social overload.

Conversely, the non-significant result for system feature overload, despite a noted mean increase, can be understood through concepts of germane cognitive load and task routinization ([Orru & Longo, 2019](#)). The initial extraneous load of learning VT's interface may have been partly transformed into productive skill development as learners automated the procedures for

the recurring task. While managing two platforms, the specific procedural knowledge for using VT likely became routine, lessening its ongoing perceived burden. The intrinsic cognitive load of the core speaking task was unchanged. Hence, the sustained cognitive demand from the systems alone did not create a significantly different overload compared to the control group's use of the familiar Telegram system. The principal enduring extraneous load from VT was thus not its technical features, but the social-performance context they created.

The absence of a significant difference in information overload is also explained by Cognitive Load Theory, which distinguishes three types of loads (Orru & Longo, 2019): intrinsic cognitive load (from the material's inherent complexity), extraneous cognitive load (from poor instructional design), and germane cognitive load (effort toward schema construction and learning). In this study, the core learning materials were identical for both groups, so the intrinsic load (from the English presentation content) was constant. This accounts for the similar levels of perceived information overload, as this stressor relates directly to content volume and complexity. The VT intervention did not add more essential information. Instead, it imposed a high extraneous cognitive load related to using a second platform's interface (system feature overload) and adapting to its performative social space (social overload). The added demand was thus a more complex mode of production and interaction, consuming cognitive resources for process management rather than content comprehension. Consequently, the overload differentially appeared as process-related burdens, not as increased information volume, leaving the intrinsic, information-centric load and its associated stressor statistically similar between groups.

Conclusion

The findings of this study revealed that employing an interactive educational tool (VT) within an online education context could significantly elevate perceived SNS stressors through increasing social overload. This study had several limitations. It investigated SNS stressors introduced solely by VT and used a limited sample size within a constrained timeframe. Additionally, further studies could examine the impact of diverse tools over longer periods with more demographically varied learners. Subsequent studies could also employ self-reports and interviews to identify overloading factors from the learners' perspective and investigate the mechanisms by which they could impact learning processes.

Practical Implications: Despite these limitations, the findings offer several practical implications for educational stakeholders.

For teachers, the results suggest that while interactive tools like VT offer pedagogical benefits for speaking practice, instructors should be mindful of the potential social overload they may create. Teachers can mitigate this by setting clear expectations for peer feedback (e.g., limiting the number of required comments per student), providing structured guidelines for interaction, and offering students options for private rather than public feedback when appropriate.

For instructional designers and e-moderators, the findings indicate that the addition of a secondary performative platform (VT) to an existing communication platform (Telegram) increased social overload even though system feature and information overload did not

significantly change. This suggests that the social dimension of online learning environments requires separate attention from technical and informational dimensions. Designers should consider integrating social support structures (e.g., orientation sessions on giving/receiving feedback, moderated discussion norms) when adding new interactive tools to existing platforms.

For institutional managers and curriculum developers, the study highlights the importance of a balanced approach to technology integration. Before adopting new interactive tools, institutions should assess whether the anticipated pedagogical gains outweigh the potential social stressors imposed on learners. Professional development programs for instructors could include training on recognizing and mitigating technology-induced social overload.

This research offers valuable insights into the perception of SNS stressors in online education. It emphasizes that despite the considerable advantages of interactive educational tools, awareness is required regarding the potential strain these tools may impose on learners. Consequently, all educational stakeholders within the learning domains can benefit from these findings.

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Appendices

Appendix A

The Perceived SNS Stressors questionnaire for the learners in the control classes

We appreciate the time you are dedicating to complete this survey. We truly value the information you have provided.

Section 1: Demographic Information

1. How old are you?

2. What is your educational background?

Graduated from high school

BS/BA degree

MS/MA degree

PhD

3. Gender of the participant

Male

Female

4. The name of the online English class you are registered in.

Class 3

Class 4

Section 2: System Feature Overload, Information Overload, and Social Overload

Construct	Items	
System feature overload	SFO1	I am often distracted by features that are included in Telegram but are not related to my main purpose in using Telegram.
	SFO2	I find that most features of Telegram contain too many poor sub-features instead of too few very good sub-features.
	SFO3	Telegram tends to try to be too helpful by adding features, which makes social performance even harder.
	SFO4	The features of Telegram I use are often more complex than the tasks I have to complete using these features.
Information overload	IO1	I am often distracted by the excessive amount of information available to me on Telegram.
	IO2	I find that I am overwhelmed by the amount of information I have to process in an online class on Telegram.
	IO3	There is too much information about my classmates on Telegram so I find it a burden to handle.
	IO4	I find that only a small part of the information on Telegram is relevant to my needs.
Social overload	SO1	I take too much care of my classmates' well-being in an online class on Telegram.
	SO2	I deal too much with my classmates' problems in an online class on Telegram.
	SO3	I am too often caring for my classmate in an online class on Telegram
	SO4	I pay too much attention to my classmates' posted files in an online class on Telegram

Appendix B

The Perceived SNS Stressors questionnaire for the learners in the experimental classes

We appreciate the time you are dedicating to complete this survey. We truly value the information you have provided.

Section 1: Demographic Information

1. How old are you?

2. What is your educational background?

Graduated from high school

BS/BA degree

MS/MA degree

PhD

3. Gender of the participant

Male

Female

4. The name of the online English class you are registered in.

Class 3

Class 4

Section 2: System Feature Overload, Information Overload, and Social Overload

Construct		Items
System feature overload	SFO1	I am often distracted by features that are included in Telegram and VoiceThread but are not related to my main purpose in using Telegram.
	SFO2	I find that most features of Telegram and VoiceThread contain too many poor sub-features instead of too few very good sub-features.
	SFO3	Telegram and VoiceThread tend to try to be too helpful by adding features, which makes social performance even harder.
	SFO4	The features of Telegram and VoiceThread I use are often more complex than the tasks I have to complete using these features.
Information overload	IO1	I am often distracted by the excessive amount of information available to me on Telegram and VoiceThread.
	IO2	I find that I am overwhelmed by the amount of information I have to process in an online class on Telegram and while creating or visiting a post in VoiceThread.
	IO3	There is too much information about my classmates on Telegram and VoiceThread so I find it a burden to handle.
	IO4	I find that only a small part of the information on Telegram and VoiceThread is relevant to my needs.
Social overload	SO1	I take too much care of my classmates' well-being in an online class on Telegram and/or while visiting their presentations on VoiceThread
	SO2	I deal too much with my classmates' problems in an online class on Telegram and/or while visiting their presentations on VoiceThread.
	SO3	I am too often caring for my classmate in an online class on Telegram and/or while visiting their presentations on VoiceThread.
	SO4	I pay too much attention to my classmates' posted files in online class on Telegram and/or while visiting their presentations on VoiceThread