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‘It never seems to stop’ Six high school students’ experiences of information overload

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Abstract

Introduction. The paper explores high school students' experiences of information overload in the context of their studies, investigating its causes and how they manage it.

Method. Data was collected through qualitative interviews with six students aged 13-16.

Analysis. A thematic content analysis was applied to discern patterns and themes in the students' experiences.

Results. All informants had experienced information overload, but how and to which degree it manifested differed between them. The most common trigger was encountering complex information, followed by passive exposure to large amounts of information over time. Students primarily responded to information overload by losing attention, while some also reported negative emotions such as irritation and sadness.

Conclusion. The findings reveal that high school students frequently experience information overload in the context of their schoolwork. Personal vulnerabilities seemed to influence the extent in which they experienced information overload.

Introduction

In today's information society, an unprecedented volume of information is produced, shared, and encountered. Information permeates every aspect of daily life, being intertwined with activities and communication in leisure, work, and studies. This continuous information flow can be stressful, leading to information overload (IO). Information overload has been defined as '*a negative psychological state in which individuals feel that they are receiving too much information, which hinders their ability to carry out their tasks*.' (Belabbes et al., 2023, p. 153).

IO has been extensively researched in various contexts, as reviewed by Bawden and Robinson (2020), Edmunds and Morris (2000), Khaleel et al. (2020), and Roetzel (2019). In work and study settings, IO is known to diminish efficiency, productivity, and performance (Al-Kumaim et al., 2021; Benselin and Ragsdell, 2016). When individuals experience information overload, information that could potentially be useful turns into a hindrance (Bawden et al., 1999; Stanley, 2021). This notion is particularly important to notice in an educational context, where information is provided to support student learning. A definition within the context of cancer-related information overload emphasises its impact on learning, defining it as '*a perception of being overwhelmed and, thus, confused by information coming in that might hinder learning …*' (Kim et al., 2007).

The prevalence of IO among university students is well established (e.g., Al-Kumaim et al., 2021; Khalid et al., 2016; Virkus et al., 2018). However, less is known about IO among school pupils. The few studies conducted in compulsory education indicate that IO is a common phenomenon with notable impacts on students' physical and mental health (Akin, 1998; Ismail, 2022). IO can lead to various consequences that may affect learning, including a reduction in the ability to focus (Rajabzadeh et al., 2011), impaired efficiency (Bawden and Robinson, 2009; Benselin and Ragsdell, 2016), and strained cognitive capacity (Eppler and Mengis, 2004). Consequently, there is a need for more research into the occurrence and impact of IO among students in compulsory education.

This study aims to explore how high school students experience information overload in the context of their studies. Specifically, our focus centres on addressing three research questions:

1. Under what circumstances do students experience information overload?

2. What cognitive, emotional, and physical reactions do students exhibit in response to information overload?

3. What strategies do students employ to manage information overload?

Literature review

IO occurs when the volume of information surpasses individuals' cognitive capacity to process it (Eppler and Mengis, 2004). Consequently, people feel overwhelmed (Hartog, 2017) and powerless (Bawden and Robinson, 2020). IO may result from the sheer quantity of received information or arise from an awareness of pertinent information without knowing how to access or utilise it (Wilson, 1995).

Previous research indicates that younger individuals, due to their active use of information technology and lower information literacy, are more susceptible to IO compared to older generations (Benselin and Ragsdell, 2016). Among university students, it has been found that IO experienced on social media has ripple effects that reduces students' academic performance. Information overload outside the study context thus affects students' capacity to acquire and retain academic information (Feroz et al., 2022).

In a learning context IO is closely linked to cognitive load. Cognitive load theory describes how the brain's capacity to process information is restricted both in working and long-term memory (Sweller et al., 1998). Before information reaches working memory, however, it passes sensory memory as input. As IO impedes attention, this is where IO hinders the reception of information and thus interferes with the learning process (Chen et al., 2011). As Chen et al. (2011, p. 104) express it: '*cognitive overload is the load imposed on*

students during content learning, whereas IO is the 'noise' preventing students from learning content'.

Triggers of information overload

In Jackson and Farzaneh's (2012) model of IO, the authors explain how IO results from various interacting factors. These factors include the capacity to process information, characteristics of the information itself (complexity, ambiguity, uncertainty, novelty), available time, information quantity, information quality (relevance, validity), task and process parameters, as well as personal factors, all influencing whether a person experiences IO. Belabbes et al. (2023) categorise triggers of IO into five main groups: information characteristics, poorly defined information needs, the environment in which the individual interacts with information, the individual's cognitive abilities, and the information environment. Bawden and Robinson (2020, p.12) present four categories of IO triggers: 1) too much information, 2) diversity, complexity, and novelty of information, 3) pervasive and pushed information, and 4) personal factors and individual differences.

The primary reason for IO is the sheer amount of information that is produced today, much of which is pushed at us (Bawden and Robinson, 2020). Many experiences constant pressure to stay updated, even on matters unrelated to them (Hartog, 2017). The online information environment is becoming increasingly complex, encompassing both relevant and irrelevant information from reliable and unreliable sources. The greater the complexity of the information environment, the higher the likelihood of feeling overwhelmed by the information flow (Bawden and Robinson, 2020). Irrelevant information, furthermore, makes it necessary to navigate through unnecessarily long and complex result lists (Hoq, 2014). The rise of misinformation and disinformation adds to the stress, requiring constant filtering and critical evaluation of information (Stanley, 2021). Moreover, IO is further triggered by a shortage of time to analyse and process information (Hoq, 2014).

People also vary in their susceptibility to IO. Those who feel self-confident and have little concern about potentially missing relevant information are less prone to IO (Walgrave and Dejaeghere, 2017). Conversely, those with pre-existing emotional states such as insecurity, fatigue, or anxiety tend to be more vulnerable to IO (Senft and Greenfield, 2023). In students, IO often results from several interacting variables. Prior topical knowledge reduces IO, while challenges such as language barriers and time constraints increase it. Moreover, some students are better equipped to cope with IO due to their metacognitive skills (Chen et al., 2012).

Consequences of information overload

Cognitively, IO diminishes attention and the ability to focus (Rajabzadeh et al., 2011; Rose, 2010), contributing to information fatigue (Stanić et al., 2021). Consequently, IO hampers decision-making (Phillips-Wren and Adya, 2020) and leads to passivity or procrastination (Bawden and Robinson, 2009). Among university students, IO has been linked to forgetfulness, indecisiveness, and a lack of concentration (Al-Kumaim et al., 2021; Khalid et al., 2016; Virkus et al., 2018). Emotionally, people tend to react to IO by mood swings, irritation, and anger (Benselin and Ragsdell, 2016; Rajabzadeh et al., 2011). Intense feelings of frustration and stress associated with IO can impede individuals from completing work or study-related tasks (Al-Kumaim et al., 2021; Benselin and Ragsdell, 2016). Frequent experiences of IO may additionally diminish work satisfaction (Benselin and Ragsdell, 2016, p. 293). Ultimately, IO may have a negative impact on mental health, potentially leading to depression (Matthes et al., 2020). Reported reactions among university students encompass stress, worry, confusion, irritation, frustration, and anger (Al-Kumaim et al., 2021; Khalid et al., 2016). Experiences of IO may also diminish students' information literacy self-efficacy. When students find it challenging to process and manage information efficiently online, their confidence fades (Aharony and Gazit, 2019). A study by Akin (1998) on eighth-grade students' experiences of information overload found that they felt confused,

frustrated, angry, anxious, and exhausted when confronted with IO.

Physically IO leads to a broad range of stress symptoms (Benselin and Ragsdell, 2016). University students have been found to react with fatigue, sleeping problems and headache (Al-Kumaim et al., 2021; Khalid et al., 2016; Virkus et al., 2018).

Strategies to cope with information overload

People employ a variety of techniques to cope with IO. Savolainen (2007) identified filtering and withdrawal as the most common strategies. Filtering involves processing some information while ignoring the rest (Akin, 1998). A way to cope with IO is being selective about information sources, prioritising the most important and relevant information (Bawden and Robinson, 2020; Johnson, 2014). Satisficing is another common technique, involving the selection of sources that may not be optimal but are considered good enough for the intended purpose (Bawden and Robinson, 2020). Organising information, such as taking notes, structuring, categorising, or saving information, is another strategy (Bawden and Robinson, 2020). Additionally, individuals cope with IO by getting an overview of a text by checking lists of content and headings or through skim-reading (Bawden and Robinson, 2020). At times people simply avoid information (Soroya et al., 2021). Avoidance may be directed at specific types of information, such as content that is difficult to understand (Johnson, 2014).

The ability to cope with IO varies significantly among university students. A study revealed that while the majority had experienced IO, about half of the students did not consider it a problem (Virkus et al., 2018). In educational contexts, students utilise strategies such as interacting with peers (Chen, Pedersen, and Murphy, 2011) or supervisors (Al-Kumaim et al., 2021) to manage IO. University students also cope with IO by consulting overviews, prioritising, filtering, withdrawing, eliminating, and ignoring (Chen, et al., 2011; Virkus et al., 2018). A study found that eighth-grade students predominantly dealt with IO by filtering or temporarily omitting information. They also grouped similar information, delayed the processing of information, or at times completely avoided it (Akin, 1998). Information literacy often reduces IO as it increases competence in finding, evaluating, and using information (Al-Kumaim et al., 2021; Kim et al., 2007; Koltay, 2017; Kurelović et al., 2016).

Method

Our study served as an explorative pilot study for a larger investigation into high school students' experiences of IO. Data was collected through semi-structured interviews. Initially, we conducted a pilot interview to test the comprehensibility of our interview guide for teenagers. While the pilot interview did not prompt substantial changes, we made a few reformulations to better suit the age group.

The six participants were high school students in grades 8-10 at a school in eastern Norway, aged between 13 and 16. They were randomly selected through the management of the school, with none having known predispositions toward IO or prior knowledge of the concept. We collected the data through semi-structured interviews, which was essential when engaging with teenagers. Inherently, in the power dynamic of an adult interviewing youth in a school setting, there is an association of adults with teachers (McGarry, 2016). The first author conducted the interviews in the school and emphasised that she sought the students' genuine experiences of information overload and had no intention of evaluating this experience. There was also a conscious effort to create an informal, open atmosphere where the interviews more closely resembled discussions than formal interviews. During the interviews, the students asked questions and occasionally sought clarifications which in turn enabled them to answer the questions with a deeper understanding. This approach also increased their comfort level and contributed to a more relaxed setting. The interviews lasted approximately 30 minutes each and were conducted physically in the school's library. Prior to the interviews, both the students and a guardian granted written consent. Furthermore, the students were repeatedly informed of their right to withdraw from the study and only answer questions they

were comfortable answering. During the interviews, we were strongly aware of our responsibility to customise and adjust the interviews to young informants (NESH, 2022). Ensuring maximal comfortability was a strong priority.

After transcription, thematic content analysis was employed to identify common patterns and themes, recognising both differences and commonalities among the students (Braun and Clark, 2006). All informants are referred to by pseudonyms, and their anonymity is fully preserved.

As IO was investigated in an educational context, we paid special attention to result validity. To ensure validity, we critically evaluated whether students' responses truly pertained to information overload, i.e. experiences where the amount of information hindered the students' ability to carry out their tasks (Belabbes et al., 2023, p.153). In some instances when students mentioned exams as situations where they felt IO, it was not clear whether this was related to the amount of information per se or the pressure to perform well. These instances were not included in our results. As another example, some students described losing attention during lectures when encountering difficult terms. These descriptions did not suggest learning difficulties but rather a feeling of being overwhelmed by the information flow, and thus losing the capacity to absorb more information. Following Chen et al. (2011, p. 104) distinction between IO and cognitive overload, we coded this as IO.

Results

The results will be presented in accordance with the three research questions, addressing 1) the circumstances in which high school students experience information overload, 2) the cognitive, emotional, and physical reactions to information overload, and 3) the strategies they employ to manage information overload. To ensure confidentiality, random names have been assigned to the students for the presentation of results.

Circumstances which triggered information overload

The students particularly highlighted four circumstances which triggered IO. These were encountering complex information, navigating unstructured information environments, long duration of information input and personal vulnerabilities.

Complex information

The students most frequently mentioned complexity of information as a trigger of IO. Complexity primarily manifested in two ways: 1) dealing with a variety of topics simultaneously and 2) needing to study information at depth.

Five out of six informants experienced IO during periods of frequent exams. The students were particularly stressed out when multiple exams across different subjects were scheduled close together, such as within a week. This required them to study a diverse range of topics in-depth within a short timeframe. Nora explains:

> *The school kind of squeezes all exams together very closely to each other. Therefore, we kind of need to repeat everything at once, and it becomes very much to take in. And then it's easier to mix the different subjects together.*

Here, the students encountered complexity both in terms of fragmentation and depth. They were required to study a wide range of topics and gain in-depth knowledge of these topics to pass the exams. Consequently, the students experienced stress and exhaustion.

Another context in which the students encountered a diverse range of topics and the necessity for in-depth study was during independent research. Nora mentioned that research could be overwhelming due to the demands for both breadth and depth: '*Often several topics are included so you need to read about many different things, which can be overbearing. The topics often include sub-topics so we need to read everything very thoroughly.*'

When specifically questioned about it, some students pointed out that information that was difficult to comprehend triggered IO. Some

experienced a loss of attention when encountering information that they found challenging to understand. Kristine explains what could happen to her during lectures: '*Sometimes they present so much information that I get dizzy. I kind of need to repeat it since I do not get it, and it just becomes a lot*'. She would have needed a moment to process the information but was unable to pause the continuous flow of information. Similarly, Frøya gets tired when she encounters complex information during lectures: '*It depends on the day but if it is a lot of information I get tired. Especially when they use a lot of difficult terms that we have not studied yet.*'

Unstructured information environment

IO was also induced by complexity in the information environment. Three students explained that conducting research for presentations or essays at school frequently resulted in IO. The primary reason was the less structured information environment on the Internet. Håkon feels that research online is challenging since '*very, very much comes up. Then it is difficult to know what to use*'. Frøya similarly lists several challenges with online information:

> *The drawback with the Internet is that when you search online there can be some difficult words and then you don't really get it. And then some sites are not so good or reliable, and then I actually think it can be difficult to find information.*

Duration

Long durations of one-sided information transfer were a factor contributing to IO. This occurred during traditional lectures where the teacher was speaking, and the students were solely listening. Four out of six students emphasised that traditional lectures were overwhelming, while two felt that the lectures had the right pace. Nora felt swamped during lectures. She loses her attention during lectures several times every week. She says '*It can quickly be very overwhelming. Many teachers present a lot of information during a short amount of time without properly explaining it, and often they just go through it very quickly*". Kristine and Frøya also express that lectures pose challenges, particularly when teachers cover topics rapidly or when the subject is difficult. Frøya mentions feeling tired and overwhelmed during lectures, especially when teachers speak too quickly or use complex terms.

Four students identify long school days as a cause of IO. Long school days are both exhausting and cognitively demanding. Kristine struggles with the sheer volume of information acquired during a school day: '*At the end of the day I have got so much information that I just don't have the energy or ability to focus anymore*'. As a result, she finds that she does not learn much by the end of a lengthy school day. Frøya and Nora concur that the end of the school day is the most challenging time for effective learning. Frøya explains that her brain '*is kind of used up after having learnt so many different things during the day*'.

Personal vulnerabilities

Several informants mentioned that factors beyond the school environment influenced the extent to which they experienced IO. The teenagers shared that challenges in their personal life could make them especially susceptible to IO, citing instances such as the passing away of loved ones or having ill parents. The home environment, including issues like insufficient space for schoolwork or conflicts with siblings, could also hinder concentration and diminish the ability to process information. Kristine mentioned that she has sleeping problems. She shared that when she feels anxious or tired, she more easily gets overwhelmed by information.

The extent to which the informants experienced IO could also be related to individual differences. Håkon experienced the least IO of all students. He had a relaxed and confident attitude towards his studies. He emphasised that learning new things and dealing with large quantities of information came easily to him. Nora, on the other hand, displayed opposite traits. She was one of two students who experienced the most IO. She felt insecure and held high expectations for herself to excel in school. She was eager to be a diligent student and to obtain high grades. Her performance anxiety manifested in pressure to choose the right information sources online

and to immediately grasp the information she encountered. She imposed on herself a demand to study all study material in depth, possibly consulting more information than necessary. As a result, she felt a strong sense of IO.

Cognitive, emotional and physical reactions to information overload

Cognitive reactions

All students had experienced that they lost attention and found it challenging to focus when the information load became too overwhelming. Oftentimes this happened during lectures. Vanessa shares that '*It just gets to be a lot at the same time. It becomes difficult to get what they actually say*'. This challenge becomes particularly pronounced when difficult subjects are presented. As Håkon describes: '*It is difficult to keep up when you did not get what was said previously. Then I lose some information.*'

During exam periods, it was challenging to focus on other learning activities. Håkon explains:

> *I think a lot at the upcoming exams. For instance, if I will have an exam later in the day, I think about it a lot during the day and try to remember what I need to know. Then I might not get everything in other lectures, and (I may) lose some information.*

Nora describes that during long school days, it feels as if her brain unplugs. She explains '*There are many days where I just cannot take it anymore…. I just cannot focus. My head kind of stops working*'. Matheo expresses that too much information makes him feel '*lost, maybe. I kind of don't get what is going on. I feel that it is more difficult to understand it, when there is so much information at the same time.*'

Kristina has experienced that IO causes her to forget things. She gives an example: '*It adds up to quite a lot of information and we have many different subjects…at the exam you forget everything since you get so stressed out that you cannot remember it all.*'

Emotional reactions

Four informants had experienced emotional reactions to IO. All of them mentioned that they get angry and irritated when they get overwhelmed by information. They experience stress, disappointment, sadness, or find themselves in a negative mood. Nora says:

> *I get very stressed out. And almost a little angry, since I don't know what to do. Sometimes it is just too much and it just goes on and on. It never seems to stop, and then I can't take it anymore…I just wish I could have a break from it.*

Nora explains that apart from feeling angry and stressed, she struggles to work effectively when she feels overwhelmed by information. She experiences a sense of powerlessness and does not know what to do. Kristine has had similar experiences and reveals that she becomes frustrated and upset when confronted with an excessive amount of information. Similar to Nora, this has an impact on her schoolwork. Vanessa also feels stressed out, irritated and over-whelmed. When Frøya experience IO it makes her angry and even a little snappy. She explains '*I sort of get a little angry and a little sad. I maybe mostly get angry if it is too much information, and a little overwhelmed.*' She shares that the anger can feel like she is about to cry, but the tears do not come.

IO may also lead to feelings of inadequacy. When Kristine faces a high amount of information at school, she feels that she is not good enough:

> *I get stressed out and sometimes I feel very annoyed and frustrated. And then I think that everyone else is able to find information, but I cannot do it. Then I kind of feel like, what is wrong with me? Sometimes I get very frustrated and a little sad after a while. It is annoying. There are many negative feelings like that.*

Similarly, Vanessa feels disappointed in herself when she cannot keep up with the flow of information.

Physical reactions

Nora and Frøya were the only ones who described physical manifestations of IO. Both of them had, however, experienced strong reactions. Frøya shares her experience:

> *I get a little headache, and become kind of tense. And then I begin to fidget, and my leg moves a lot…When I am overwhelmed I may even get a little dizzy and have less energy. I get exhausted, particularly in subjects that require much from me.*

Frøya feels tired, restless, and gets headaches. These symptoms become particularly pronounced at the end of the day when the volume of information has accumulated. Nora describes a similar reaction: '*I feel a kind of restlessness and that I just need to do something. There is so much discomfort in my body. I try to cool down in a way.*' Nora also experiences headaches and feels exhausted at the end of a long school day. She shares that particularly when she needs to study for multiple exams and switch between subjects, she feels the stress in her body intensively. She explains that '*at the end of the day I can get crazy tired. It is just like I can't take it anymore.* She mentions that juggling all the various subjects during a school day '*makes the brain boil at the end of the day*'.

Coping strategies

The students describe various ways in which they cope with IO. They mentioned taking breaks, having a good lunch, and approaching topics from different angles. Additionally, some avoided information at times, such as occasionally skipping tasks that were too difficult. Vanessa mentions that she ignores information formulated in a difficult way and looks for texts that are more accessible. Frøya admits that she sometimes completely avoids information: '*Yes, that can happen sometimes, if it gets to be too much. Sometimes I just don't have the energy for it.*'

Particularly three coping strategies were mentioned by several students. They were skim-reading, choosing easily available material and discussing with others.

Skim-reading and use of headings

For all students it was important to get an overview quickly and easily, and five of six skim-read frequently. Frøya describes: '*I use skim-reading a lot. Particularly when the articles are long, I get impatient and don't always bother reading them…So then I try to get an overview of the text and find what I need for my essay.*' Vanessa skim-reads to locate specific words or topics, while Matheo and Håkon use skim-reading as a strategy to avoid reading long texts. Håkon says that '*Reading thoroughly takes a lot of time, and it is also more tiring*".

The students also employed a similar strategy to skim-reading, namely reading headings in books and on websites to quickly gain an overview of the texts. Frøya explains: '*If I read the heading or sub-heading I get an overview of what the article is about, and then it is easier to see if the information I need is there.*' Similarly Håkon feels that '*the headings help a lot to find the right information on websites, so it gets easier that way*'.

Another similar strategy employed by four students was reading abstracts and summaries to avoid delving into lengthy texts.

Easy availability

All students mentioned that at times, they opt for the first source they encounter to avoid extensive research. Nora says: '*If look up something and it is written in an easy and simple way, I usually just pick it. Then I don't need to read so much*'. Kristine selects the first available information when she is tired, while Matheo does it to quickly complete the assignment. The students are aware that they should critically evaluate information, especially online. They strive to adhere to this principle, but often end up simply choosing something that appears acceptable. Håkon says: '*Often I guess I trust too many websites. I don't think I should trust them all, but often I just think that it is fine*'. Frøya concurs: '*Many times I use some sources that I shouldn't use. I don't always check who has written it and when it is published and such. That takes a lot of time, so I just pick something that looks ok.*'

Discussions with others

Four of the students think that discussing with teachers or fellow students is important to reduce IO. Kristine finds it helpful to talk with peers. She feels that her fellow students can explain things in a way that is easier for her to grasp. She says: '*My friends explain it better than the teachers. The teachers just say the same thing (over again).*' Håkon also finds it helpful to discuss with fellow students, as they can find

solutions together or explain things that are unclear to each other. Vanessa similarly learns the most through interaction. She explains: '*I always use the people around me. That helps a lot. If there is something we do not understand, we can collaborate, and then we figure it out together.*'

Discussion

All six high school students had experienced IO in the context of their schoolwork. Several factors appeared to interact in shaping the students' susceptibility to IO. These factors were related to information content (complexity, fragmentation, depth), information quantity (input duration), information environment (pushed information, unstructured online environment), learning environment (lectures, independent research, long school days) and personal vulnerabilities (life context, personal characteristics). These factors align with previously defined categories of IO triggers (Bawden and Robinson, 2020; Belabbes et al., 2023).

The students frequently experienced IO when dealing with complex and fragmented information. Fragmentation could occur during Internet searches, concurrent exams in different subjects, or when switching between subjects throughout a school day. The students dealt with information complexity through strategies such as filtering and satisficing. Engaging in discussions with peers or teachers, as well as actively working with information content by strategies such as filtering and satisficing also helped students cope with IO.

The students found long durations of information input, such as during lectures or throughout long school days, to be draining. In compulsory education, students lack control over the amount and duration of information they receive during a school day, with limited opportunities to pause and process new information. During lectures, information is pushed at them over an extended time. Research in education indicates that traditional lectures foster passivity and increase cognitive load (Hadie et al., 2018). In a school context, education is designed to support student learning. When the input is overwhelming, however, information becomes a hindrance instead of a help (Bawden et al., 1999; Stanley, 2021).

The primary consequence of IO was losing attention, an experience shared by all six students. As the students could not control or pause the information flow, they rather paused their concentration by "zooming out" and "unplugging the brain". Some students, moreover, reacted emotionally and physically to IO. IO consequently did not only have a negative impact on students' efficiency and learning at school but also had repercussions on their psychological and physical well-being. In addition to feelings of irritation and sadness, IO could lead to a sense of inadequacy. The physical reactions reported by students—fatigue, headache, and restlessness—align with findings from previous studies (e.g. Al-Kumaim et al., 2021). Distinctive for a school context was that the mental exhaustion manifested physically after a long day, during which the students were required to be at school and absorb large amounts of information. Mental exhaustion in this context may result not only from the volume of information but also from the duration of the school day. Research indicates that attention tends to decline with time on task, such as during lectures (Farley et al., 2013).

Stressful family situations outside of the school context and personal characteristics, such as insecurity and performance anxiety, heightened the susceptibility to IO. Stress and negative emotions may restrict the psychological capacity to process information, consequently lowering the threshold for experiencing IO. Teenagers, additionally, navigate a challenging age and often engage in extensive information consumption during leisure, potentially further increasing their vulnerability to IO.

The students reacted negatively to long information input and got stressed by fragmented information from a variety of sources. Strengthening the students' information literacy would therefore be important to alleviate IO. Implementing pedagogical models such as Guided Inquiry Design (Kuhlthau et al., 2015) which applies

interactive, activating teaching methods for students' content learning and information literacy development, could also be a viable approach to tackle the challenge of IO in schools.

There is a need for further research to gain a comprehensive understanding of how IO affects high school students. The main limitation of this study is the small number of participants. The perspectives described in this article thus only reflect the experiences of our six informants. These findings hence need to be validated with a larger sample of high school students. Incorporating additional data sources such as questionnaires and diary entries (see e.g., Zimmerman, 2018) would also be beneficial. Despite the limited number of participants, the results, nevertheless, highlight that IO occurs among students in compulsory education. The findings both confirm characteristics that define IO in other contexts and demonstrate features that are highlighted in a school environment.

Conclusion

The students' susceptibility to IO was influenced by various factors, including information content, information quantity, information environment, learning environment, and personal vulnerabilities. These factors interacted to shape the students' experiences of IO. Students in compulsory education may be particularly vulnerable for IO as they study in an environment where they lack control over the amount and timing of information input. All six students had experienced IO, which, in turn, had impacted their learning and well-being at school. The students, however, differed in the extent to which they had experienced IO, the context in which they experienced it, and how they reacted to it. Personal characteristics, such as insecurity, and stressful circumstances in the students' daily lives outside of school made some students particularly susceptible to IO.

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