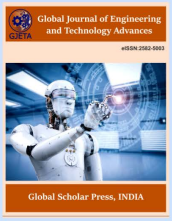
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WHEN ONLINE LEARNING COMMUNITIES FAIL TO CONNECT

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ABSTRACT

Online educational communities are often seen as spaces that extend collaboration and connection beyond the classroom. However, the same platforms that bring some students together can leave others feeling unseen, exposed, or excluded. Specifically for adolescents, whose well-being is closely tied to experiences of acceptance and rejection, these interactions do matter. This theoretical synthesis examines the shadow side of digital educational interaction in secondary education. Drawing on theories of alienation, research on adolescent social development and mental health, and studies of online learning, ostracism, cyberbullying, and technostress, it explores how school alienation (estrangement from teachers, classmates, and learning) can take shape online. Key pathways include unanswered posts, unnoticed withdrawal, the lasting visibility of students' contributions, peer exclusion, perceived surveillance, and the fatigue of constant connectivity. Evidence from emergency remote teaching suggests that these risks may be greatest for students who are already marginalised or disadvantaged. The synthesis proposes a conceptual model linking risk factors and mechanisms to student well-being, while highlighting potential safeguards which are caring teacher presence, clear community norms, thoughtful group formation, and equitable access. Thus, technology is not inherently alienating but poorly designed or weakly facilitated online communities can reproduce, and sometimes intensify, the exclusion that adolescents already experience at school.

Keywords Online Learning Communities, School Alienation, Loneliness, Ostracism, Adolescents, Mental Well-Being, Emergency Remote Teaching, Secondary Education

1 INTRODUCTION

Over the past two decades, learning management systems and school-oriented digital platforms have become part of the ordinary infrastructure of secondary education. In Greece, the open-source Open eClass platform and the Ministry of Education's e-me platform are used to share materials, organise assignments, and host discussion (Megalou et al., 2015), and the school closures of 2020 and 2021 made such environments, together with videoconferencing tools, the main setting of schooling for several months. Teachers moved to what Hodges et al. (2020) called emergency remote teaching, a temporary and largely improvised shift to remote delivery under crisis conditions, and Greek research from this period documents both the speed of the transition and the uneven preparation of teachers to work pedagogically online (Jimoyiannis et al., 2021).

Educational research often portrays online learning communities in an optimistic light as discussion forums, wikis, and collaborative spaces are expected to extend interaction beyond class time, give quieter students a voice, and support the joint construction of knowledge. These benefits are plausible but they rest on an often unexamined assumption that the mere providing of a digital space is enough for students to participate, interact, and feel included. In practice, some students never post or interact, whereas others feel ignored when they do, fear that their mistakes are visible to everyone, or encounter hostility from peers. For adolescents, whose development makes them particularly sensitive to acceptance and rejection, these experiences may have consequences beyond a single course.

This article aims to examine the less visible risks of digital educational interaction and hence it focuses on social alienation, understood broadly as estrangement from teachers, classmates, and learning, and its relationship to adolescents' mental well-being. Here, well-being is explored primarily in terms of distress, including loneliness, anxiety, and depressive symptoms. However, the article does not suggest that online educational communities are inherently harmful. Rather, it argues that their capacity to foster connection or deepen disconnection depends on how they are designed and facilitated, as well as on students' social and material circumstances. Additionally, it highlights that the possibility that these spaces may intensify exclusion warrants systematic attention.

Thus the aim of the article is to examine, through a structured theoretical synthesis of the literature, how and under what conditions digital educational interaction within online educational communities may contribute to adolescents' sense of social alienation and to negative outcomes for their mental well-being, and to identify the protective factors and design choices that may reduce these risks. In pursuing this aim, four research questions guide its synthesis. The first research question (RQ1) asks how social alienation can be conceptualised in educational settings and how it relates to neighbouring concepts such as loneliness, isolation, and exclusion. The second research question (RQ2) asks why adolescence is a period of particular vulnerability to experiences of alienation and to their consequences for mental well-being. The third research question (RQ3), which is central to the article, asks through which mechanisms digital educational interaction may foster alienation and psychological distress, and what the experience of emergency remote teaching reveals about these mechanisms. The fourth research question (RQ4) asks which students are most at risk and which protective factors and design principles can mitigate the risks identified.

2 CONCEPTUALISING SOCIAL ALIENATION IN EDUCATION

2.1 From sociological theory to school alienation

The concept of alienation has a long history in social theory, where it originally described the estrangement of individuals from the products of their work, from other people, and from themselves under particular social conditions. In an influential attempt to give the concept empirical precision, Seeman (1959) distinguished several meanings of alienation, namely powerlessness, the expectation that one's own behaviour cannot determine the outcomes one seeks, meaninglessness, the sense that one cannot understand the events in which one is engaged, normlessness, the expectation that socially unapproved means are required to achieve goals, isolation, the assignment of low value to goals and beliefs that are highly valued in a given society, and self-estrangement, the experience of activity that is not rewarding in itself but only a means to an external end. Seeman's analysis is valuable for education because it shows that alienation is not a single feeling but a family of related experiences, each of which can be recognised in the lives of students who feel that school is not for them.

Educational researchers have adapted these ideas to the school context. Firstly, Mann (2001) argued that students' experience can be understood through the opposing poles of alienation and engagement, and that alienation arises when learners feel positioned as outsiders in relation to the practices and expectations of the educational institution. The most systematic recent account comes from Hascher and Hadjar (2018), who reviewed research on school alienation in primary and secondary education and noted that, although many students begin school with positive attitudes, these tend to decline over the school years, with the sharpest decline in secondary education. They defined school alienation as a decreasing sense of belonging with regard to learning, teachers, and classmates, and proposed a model in which alienation has three domains, each with cognitive and affective components, while behavioural consequences such as disengagement and absence are treated as outcomes rather than as part of alienation itself.

This three-domain model is especially useful for the present exploration. Alienation from learning refers to a negative and distanced relationship with academic content and tasks, alienation from teachers to a perception that teachers are uninterested, unfair, or unsupportive, and alienation from classmates to the experience of not being accepted or connected within the peer group. All three domains can be affected by online educational interaction. A student may disengage from tasks that seem disconnected from meaningful activity, may experience the teacher as remote and impersonal behind a screen, and may feel invisible or excluded within a class forum. Longitudinal research suggests that these experiences matter. In a cross-lagged study of secondary students, Morinaj and Hascher (2019) found

reciprocal relationships between school alienation and students' well-being over time, which suggests that alienation both reflects and contributes to declining well-being.

2.2 Alienation, loneliness, isolation, and exclusion

Alienation is closely related to several other concepts with which it is sometimes confused, and distinguishing them helps to clarify what is at stake in digital settings. Loneliness is usually defined as the distressing feeling that arises when one's social relationships are perceived as deficient in quantity or quality, and it is therefore subjective, since a person may feel lonely while surrounded by others. Social isolation, by contrast, refers to an objective lack of social contact. The pandemic period showed that the two can diverge in important ways, as many adolescents had frequent digital contact with peers and teachers yet reported feeling lonely, while others had few contacts but did not report distress (Loades et al., 2020).

Exclusion and ostracism refer to the experience of being ignored or rejected by others. Williams (2007) described ostracism as a powerful social threat that thwarts the fundamental needs for belonging, self-esteem, control, and meaningful existence, and he showed that even brief and apparently trivial experiences of being ignored produce immediate distress. Of particular relevance here is the finding that ostracism does not require face-to-face interaction. In the cyberball paradigm, participants who were excluded from a simple online ball-tossing game by strangers they would never meet reported lower levels of belonging and self-esteem and a worse mood than those who were included (Williams et al., 2000). If being ignored by unknown players in a game can have such effects, being ignored by one's own classmates in a course forum may be considerably more painful.

In this article, social alienation is used as the broader construct that encompasses these experiences. It refers to the student's sense of estrangement from the social and academic life of the class, whether this arises from a perceived lack of connection, from active exclusion, or from a feeling that participation is meaningless or imposed. Loneliness and the experience of ostracism are treated as affective expressions of alienation in the social domain, while disengagement and withdrawal are treated as its behavioural consequences.

Continually, research on alienation in online learning has been conducted mainly with adult and university learners, but it offers useful indications. Rovai and Wighting (2005) examined feelings of alienation and sense of community among graduate students in an online course and drawing on Seeman's dimensions and reported that alienation and sense of classroom community were inversely related. They also noted that feelings of alienation and a weak sense of community have been linked in the distance education literature to lower persistence and higher dropout. These findings suggest that the dimensions identified by Seeman remain relevant in digital environments and that the absence of community online is not a neutral state but one that can be experienced as estrangement.

3 ADOLESCENT MENTAL WELL-BEING AND ITS VULNERABILITIES

Initially, we should first refer to mental well-being, which can be studied from two complementary perspectives. One emphasises positive functioning, such as life satisfaction, positive relationships, and a sense of purpose, while the other focuses on the presence of distress, including loneliness, anxiety, depressive symptoms, and psychosomatic complaints. The two are related but not simply opposite, since the absence of distress does not guarantee flourishing and a degree of distress can coexist with positive functioning. This article adopts primarily the second perspective, because its concern is with the ways in which digital educational interaction may undermine well-being. It is nevertheless useful to keep in mind that, from the standpoint of self-determination theory, distress often reflects the frustration of basic psychological needs, among which the need for relatedness, together with the needs for autonomy and competence, plays a central role (Ryan & Deci, 2000). The need to belong is, in the words of Baumeister and Leary (1995), a fundamental human motivation, and its persistent frustration is associated with a wide range of negative emotional and health outcomes.

In the same light, adolescence is a period in which the need for belonging becomes particularly intense and, at the same time, particularly fragile. Developmental research has shown that adolescents are especially sensitive to the evaluation of their peers. Somerville (2013) reviewed evidence indicating that adolescents show heightened emotional and neural responses to being evaluated by others and that this sensitivity peaks in the early and middle teenage years. Blakemore and Mills (2014) proposed that adolescence may be a sensitive period for sociocultural processing, during which the brain is especially responsive to social signals and the social environment has a particularly strong influence on development.

This sensitivity has a direct bearing on the experience of exclusion. Using the cyberball paradigm, Sebastian et al. (2010) found that adolescents reported greater negative mood and anxiety after being excluded than adults did, which suggests that the affective consequences of ostracism are particularly pronounced during this period. Orben et al. (2020) drew on such findings to argue that the social deprivation brought about by pandemic measures was likely to have especially

serious consequences for adolescents, precisely because social interaction with peers is essential to development at this age. The same reasoning applies on a smaller scale to everyday educational interaction. A student who posts in a class forum and receives no response, who is left out of a group, or who sees classmates interacting while she remains on the periphery is exposed to a form of social evaluation to which she is, developmentally, highly sensitive.

Adolescence is also a period in which mental health difficulties often first appear, and there are signs that adolescents' well-being had been under pressure even before the pandemic. Drawing on PISA data, Twenge et al. (2021) reported that school loneliness among adolescents increased in 36 of 37 countries between 2012 and 2018, with larger increases where smartphone access and internet use were more widespread. The association between digital technology use and adolescent well-being is, however, a matter of ongoing debate. In large-scale analyses, Orben and Przybylski (2019) found that the association between digital technology use and adolescent well-being was negative but very small, while Przybylski and Weinstein (2017) found that moderate use was not harmful and might even be beneficial, with negative associations appearing mainly at high levels of use. These findings caution against simple claims that screens cause distress and direct attention instead to the nature, context, and quality of digital experiences, which is the focus of the next section.

School is one of the principal settings in which adolescents experience either belonging or alienation, and its influence on mental health is well documented. Students who feel connected to their school report lower levels of emotional distress and engage less in risk behaviours, and meta-analytic research has shown that school belonging is associated with social-emotional functioning as well as with motivation and achievement (Allen et al., 2018; Korpershoek et al., 2020). The converse is equally important. Students who feel alienated from school, from their teachers, or from their classmates are deprived of a key source of support at a time when they need it most. As schooling increasingly extends into digital spaces, the question of whether these spaces strengthen or weaken students' connection with school becomes a question about their mental health as well as about their learning.

4 MECHANISMS THROUGH WHICH DIGITAL EDUCATIONAL INTERACTION MAY FOSTER ALIENATION

All the aforementioned suggest that adolescents are highly sensitive to signals of acceptance and rejection and that alienation from school is closely linked to their well-being. In this sense, there are specific ways in which digital educational interaction may generate or intensify such signals. The mechanisms discussed below are not inevitable features of online educational communities. They describe tendencies that become active under certain conditions, most notably when design and facilitation do not anticipate them.

On the one hand, the first group of mechanisms concerns what is missing from much digital interaction. More specifically, text-based and asynchronous communication removes many of the cues through which people ordinarily perceive warmth, attention, and acceptance, including facial expression, tone of voice, gesture, and the immediacy of response. Research on social presence has shown that people can compensate for this loss and project themselves socially through text, and the Community of Inquiry framework treats social presence as an achievable feature of online learning (Garrison et al., 2000). Compensation, however, requires effort and skill, and it is not evenly distributed (Kehrwald, 2008). A confident student may use humour, emoticons, and personal references to build connection, while a shy or less fluent student may write brief, formal messages that attract little response (Rourke et al., 1999). Where teachers do not actively model and support social presence, the online space may feel cold and impersonal, and students may come to perceive their teacher as remote and their classmates as anonymous names on a list. In this light, Kreijns et al. (2003) warned that designers of collaborative environments often take social interaction for granted simply because communication tools are available, and that they tend to neglect its social and emotional dimension. When this happens, the conditions for alienation from teachers and classmates are already present (Mann, 2001; Rovai &Wighting, 2005).

Subsequently, the thinning of social cues has a further and less obvious consequence, which is that withdrawal becomes invisible (Rovai, 2002). In a physical classroom, a teacher usually notices a student who sits silently, looks distressed, or stops coming. In an online course, a student who logs in, reads a few posts, and leaves without contributing may remain unnoticed for weeks (Macfadyen & Dawson, 2010). Research on online communities has long documented the phenomenon of lurking, in which many members read but do not post, and it has shown that non-participation can have many causes, from a preference for observation to a feeling of not belonging or not knowing what to say (Nonnecke & Preece, 2000). In this light, Hrastinski (2009) argued that online participation should be understood as taking part and joining in rather than merely as writing messages, which implies that silent reading may be a legitimate form of participation. The difficulty is that, from the outside, silence that reflects quiet engagement and silence that reflects estrangement look exactly the same (Dennen, 2008). Without deliberate attention from the teacher, online educational communities may therefore allow students to drift towards the periphery without anyone noticing, and the more peripheral they become, the harder it is to return (Lave & Wenger, 1991).

In turn, asynchronous interaction also changes the experience of response meaning that in face-to-face conversation, a contribution is usually acknowledged within seconds, whereas in an asynchronous forum, a post may receive a reply after several hours, after days, or not at all (Hewitt, 2005). For an adolescent, an unanswered post can easily be interpreted as a sign that her contribution was uninteresting or that she herself is not valued. The cyberball research mentioned above suggests that such experiences of being ignored, even in minimal and impersonal online settings, produce immediate decreases in belonging, self-esteem, and mood (Williams et al., 2000), and that adolescents react to them more strongly than adults (Sebastian et al., 2010). The silence of a course forum may therefore function as a mild but repeated form of ostracism (Smith & Williams, 2004).

On the other hand, the second group of mechanisms concerns what digital interaction adds rather than what it removes (Nesi et al., 2018). Specifically, online educational communities make students' contributions visible and durable (Boyd, 2014). For instance, a post in a class forum remains on the screen, can be read by every classmate, and can be compared with the contributions of others. This visibility has pedagogical advantages, since it makes thinking public and allows ideas to be built upon (Scardamalia& Bereiter, 2006). It also, however, increases the social risk of participation. Somerville (2013) showed that adolescents are particularly sensitive to evaluation by their peers, and a written contribution that contains an error or a naive idea can feel more exposed and more permanent than a remark made in class (Hew et al., 2010). Students who fear such exposure may withdraw, or may restrict themselves to safe and minimal contributions, which in turn deprives them of the recognition that more substantive participation could bring. Visibility also invites social comparison, meaning that when contributions, grades, badges, or completion indicators are displayed, students can see at a glance who is ahead and who is behind, and those who consistently find themselves behind may come to see the platform as a place where their inadequacy is confirmed (Festinger, 1954; Hanus & Fox, 2015).

Following, online educational communities are also spaces in which peers can actively exclude or harm one another (Smith et al., 2008). Exclusion may take subtle forms, such as group members ignoring one student's messages in a shared document or forming private channels outside the course space from which some classmates are absent (Williams, 2007). It may also take overtly aggressive forms meaning cyberbullying, which includes insulting messages, the spreading of rumours, the circulation of humiliating content, and deliberate exclusion, has been extensively documented among adolescents, and a large meta-analysis by Kowalski et al. (2014) found that experiencing cyberbullying was associated with depression, anxiety, loneliness, and lower self-esteem, as well as with reduced academic performance. Although educational platforms are monitored more closely than social media, they are not immune to such behaviour, and conflicts that begin elsewhere can easily spill into class spaces. Furthermore, the boundaries between official and unofficial digital spaces are porous. A class may have an official forum on eClass and, in parallel, a messaging group created by the students themselves, and a student who is excluded from the unofficial group may find that the social life of the class takes place in a space she cannot enter (Boyd, 2014; Nesi et al., 2018).

A final mechanism concerns the institutional character of educational platforms. Learning management systems record when students log in, which resources they open, how long they spend on tasks, and how many messages they post, and these data are increasingly displayed to teachers through dashboards and learning analytics. Lupton and Williamson (2017) described how children's lives have become increasingly datafied, with digital traces turned into data that can be monitored and evaluated, and they drew attention to the implications of this process for children's privacy and autonomy. For adolescents, who are developmentally striving for autonomy, a platform that tracks their activity may be experienced less as a community than as an extension of school surveillance. When participation is counted towards grades, students may respond by participating in a performative way, posting the required number of messages without genuine engagement. In Seeman's (1959) terms, such participation is a form of self-estrangement, in which activity loses its intrinsic meaning and becomes only a means to an external end. Paradoxically, therefore, measures intended to encourage participation may deepen alienation from learning when they replace meaningful engagement with compliance.

5 DIGITAL FATIGUE, TECHNOSTRESS, AND WORKLOAD

While, the mechanisms described above are primarily social, there is a further set of risksarises from the demands that digital interaction places on students' attention, time, and energy, and these demands can contribute to alienation indirectly, by exhausting the resources that students need in order to engage.

The experience of prolonged videoconferencing during the pandemic gave rise to the popular term Zoom fatigue. Bailenson (2021) proposed a theoretical explanation that identifies several sources of this fatigue, including excessive amounts of close-up eye gaze, the cognitive load involved in sending and interpreting nonverbal cues through a screen, the constant presence of one's own image, which increases self-evaluation, and the reduced physical mobility imposed by staying within the frame of a camera. Such demands draw on attention, a limited resource whose regulation depends on the interplay of cognitive, emotional, and metacognitive processes (Drigas&Karyotaki, 2019a, 2019b), and when much of it is consumed by the effort of managing the medium, less remains for engaging with the people and ideas that

the medium is meant to connect. Several of these factors are particularly relevant for adolescents. The constant view of one's own face, for example, may intensify self-consciousness at an age when concern about appearance and the judgement of others is already high. Many students responded to these demands by turning off their cameras, a choice that relieved the pressure of being watched but also made them less present to their teachers and classmates, and that sometimes left teachers speaking to a screen of black rectangles. In this way, a coping strategy against fatigue could simultaneously reinforce the thinning of social cues discussed above.

The concept of technostress, first developed to describe stress in technology intensive workplaces, offers a useful perspective for understanding these experiences. Firstly, Tarafdar et al. (2007) identify several sources of technostress, including techno overload, when technology requires people to work faster or for longer, techno invasion, when it blurs the boundaries between work and personal life, and techno complexity, which is when people feel that their skills are insufficient for the technology they are expected to use. Each one of these parameters has a parallel in education. For instance, students who receive assignments, announcements, and messages across multiple platforms may feel overloaded. Similarly, when a school platform is always available on a phone, notifications that arrive in the evening can make it difficult to separate schoolwork from personal time. In the same light, students with less developed digital skills may find the platform difficult to navigate and interpret that difficulty as personal failure.

Therefore, workload itself merits particular attention, meaning that when several teachers assign tasks through the same platform without coordinating deadlines or volume, as may occur during remote teaching, students can face a heavier workload than they would in face to face schooling. When students experience the online community mainly as a stream of tasks and deadlines, its social function can recede significantly and the platform may then come to signify pressure rather than connection. In Hascher and Hadjar's (2018) terms, alienation from learning may develop not because learning itself lacks interest, but because it is experienced as an endless sequence of demands, detached from relationships and a sense of purpose. Digital fatigue and technostress are therefore more than matters of comfort. A tired student may be less willing to make the effort required to convey social presence, is more likely to withdraw into silent reading, and more inclined to experience the platform as an obligation. Fatigue can thus heighten the risk of alienation and in turn, when alienation diminishes the social rewards of participation, the demands of digital learning may feel heavier still.

6 LESSONS FROM EMERGENCY REMOTE TEACHING

School closures during the COVID-19 pandemic provided an unplanned, large scale illustration of what happens when schooling shifts almost entirely into digital spaces. This period must be interpreted cautiously as the effects of remote teaching cannot be disentangled from lockdown, health-related anxiety, family stress, and broader disruption to daily life (Hodges et al., 2020). With these limitations in mind, evidence from the pandemic can still illuminate the mechanisms discussed above.

Specifically, international research documented substantial psychological distress among young people during this period. A meta-analysis of studies from the first year of the pandemic estimated that about one in four young people worldwide experienced clinically elevated depressive symptoms and about one in five experienced clinically elevated anxiety symptoms, with these estimates being approximately twice the corresponding prepandemic figures (Racine et al., 2021). Similarly, a systematic review by Loades et al. (2020) found that social isolation and loneliness were associated with increased risk of depression and anxiety among children and adolescents. The review also reported that the duration of loneliness was more strongly associated with later mental health difficulties than its intensity. In the same light, Orben et al. (2020) suggested that adolescents may have been particularly affected because reduced face to face contact with peers coincided with a developmental stage in which such relationships are especially important.

In the Greek context, a survey of 442 final-year senior high school students conducted during the first nationwide lockdown in the spring of 2020, Giannopoulou et al. (2020) found substantial increases in self-reported symptoms of depression and anxiety compared with the period before the lockdown, and they identified lockdown-related distress as the strongest predictor of symptom severity. The participants were also preparing for the highly competitive Panhellenic examinations, which added a further source of pressure to an already difficult situation. Although the study relied on a self-selected online sample and retrospective reports, which may have inflated the estimates, it illustrates the pressure under which Greek adolescents studied during this period, when much of their schooling took place through digital platforms.

The pandemic also revealed how much students value the social dimension of school. In a study of 226 Greek secondary school students, Tate et al. (2024) asked which practices had supported their sense of belonging during the pandemic, and students emphasised approachable, understanding, and caring communication from their teachers, inclusion, safety, and equality, as well as group work and opportunities for social connection. These responses can be read in reverse as an indication of what students missed when such practices were absent. Research with teachers points to

similar conclusions. Greek teachers who shifted to emergency remote teaching reported considerable difficulties, and their priorities were understandably focused on maintaining the continuity of content delivery rather than on designing for interaction (Jimoyiannis et al., 2021). Under such conditions, the platform easily became a channel for distributing material and collecting assignments, and the social mechanisms that might have counteracted alienation were weak or absent.

The experience of this period does not demonstrate that digital educational interaction causes alienation or distress, since the confounding influences were too numerous. What it does suggest is that the mere availability of online tools does not preserve the social fabric of school, that adolescents' well-being depends heavily on the quality of their relationships with teachers and peers, and that a digital school designed primarily around content delivery is likely to leave many students feeling disconnected. The lessons of emergency remote teaching are therefore relevant not only to future crises but also to the everyday use of online educational communities in blended teaching.

7 WHO IS MOST AT RISK?

The risks described so far are not evenly distributed. Some students move easily between face-to-face and digital interaction and find in online communities an additional source of connection, while others encounter in them new obstacles that add to existing disadvantages. Identifying the students who are most at risk is therefore essential, both for understanding the phenomenon and for designing appropriate responses.

The most obvious source of inequality is access. Participation in online educational communities presupposes a reliable device, a stable internet connection, a quiet place to work, and the skills needed to use the platform. Livingstone and Helsper (2007) showed that young people's internet use is graded rather than binary, with differences in the quality and breadth of use linked to age, gender, and socio-economic status, and van Deursen and van Dijk (2014) argued that, as physical access becomes more widespread, the digital divide increasingly shifts to differences in skills and in patterns of use. A student who shares a single device with siblings, who connects through a mobile phone with limited data, or who lacks the confidence to navigate the platform is likely to participate less, to respond more slowly, and to be less visible in the online community. Such a student may be perceived by teachers and peers as uninterested, when in fact she is excluded by circumstances, and the resulting distance may gradually be internalised as a sense of not belonging.

Social and cultural background also matters. PISA data indicate that students from socio-economically disadvantaged and immigrant backgrounds tend to report a weaker sense of belonging at school (OECD, 2019, 2023). Students who are learning the language of instruction may find written online interaction particularly demanding, since it exposes their linguistic difficulties in a durable and visible form. Research on migrant students in several European countries during the pandemic found that school closures were not followed by a significant decrease in school belonging across the whole sample, but that in some countries rising post-traumatic stress symptoms were associated with a small but significant decline in belonging during closures (Szelei et al., 2022), which suggests that students already carrying heavy burdens may be particularly vulnerable when school moves online.

A further group consists of students who are already marginal in the physical classroom. Students who are shy, socially anxious, or rejected by their peers do not necessarily become more connected online. Asynchronous interaction may give some of them a welcome opportunity to contribute without the pressure of speaking aloud, but it may also reproduce existing patterns of exclusion, since peers who ignore them in class may ignore their posts as well. Research on cyberbullying has shown considerable overlap between involvement in traditional bullying and in cyberbullying (Kowalski et al., 2014), which suggests that digital spaces often extend existing peer dynamics rather than creating new ones. Students with special educational needs may face additional difficulties if materials and activities are not designed with accessibility in mind. This risk is not inherent in the technology itself, since a considerable body of research has shown that ICT applications can support students with dyscalculia and mathematical difficulties, visual impairments, or co-occurring ADHD and autism, both in screening and in teaching (Bakola et al., 2019; Drigas& Kostas, 2014; Drigas et al., 2006; Pappas &Drigas, 2015). The same research also shows, however, that such benefits follow from deliberate and needs-sensitive design, which is precisely what a generic class forum may lack.

These patterns point to the risk of what has been described, in other contexts, as a Matthew effect, in which those who already have advantages accumulate further advantages while those who are disadvantaged fall further behind (Merton, 1968; Stanovich, 1986). Students who already feel that they belong may use online educational communities to deepen their connections and their learning, while students who are already on the periphery may experience the same communities as yet another place where they are absent or overlooked. If this is the case, the uncritical expansion of digital educational interaction could widen, rather than narrow, the inequalities in belonging and well-being that already exist within schools.

8 PROTECTIVE FACTORS AND PREVENTIVE DESIGN

If the risks of alienation arise from identifiable mechanisms, they can also be anticipated and reduced. The protective factors discussed in this section correspond closely to the mechanisms analysed above, and they suggest that the same online educational community can become a space of connection rather than of estrangement when it is designed and facilitated with these risks in mind.

An active and caring teacher presence is a key protective factor as teacher support is strongly associated with school belonging during adolescence (Allen et al., 2018). In online settings, a visible and responsive teacher can make the learning space feel more human. Meaning that responding to posts, acknowledging students by name, summarising discussions, and modelling respectful communication can compensate for reduced social cues and help ensure that contributions do not go unnoticed (Anderson et al., 2001; Kehrwald, 2008). Teachers also need to notice students who have become less visible, as online withdrawal can be easy to miss, changes in participation may serve as a prompt for supportive contact rather than as a basis for grading (Dennen, 2008; Macfadyen & Dawson, 2010). Artificial intelligence techniques that model students' knowledge and behaviour have long been explored as a means of adapting instruction to individual learners (Drigas et al., 2009), and they could in principle help teachers notice such changes, provided that they are used to direct care towards students rather than to intensify monitoring. The Academic Communities of Engagement framework also highlights the role of students' personal communities, including parents and siblings highlighting once again the importance of the communication between school and family, which can help sustain students who are struggling to engage (Borup et al., 2020).

Additionally, community norms and structure offer another layer of protection in this online scape. Specifically, clear expectations for respectful interaction, agreed upon with students, can be reinforced through explicit procedures for responding to conflict and cyberbullying, along with active moderation (Gaffney et al., 2019). Small groups may foster trust more readily than whole class forums. Thoughtful grouping can also limit the reproduction of existing cliques and reduce the risk that a student is left without a group (Blatchford et al., 2003). Structured roles in collaborative tasks can make it harder for any one student to be overlooked (Johnson & Johnson, 2009; Kreijns et al., 2003). Tasks built around educational games, digital simulations, or robotics can give such collaboration a concrete shared focus and can invite contributions from students who hesitate to express themselves in written discussion (Kefalis et al., 2025; Kokkalia et al., 2016; Mitsea et al., 2020).

The way participation is assessed matters as well, meaning that when contributions count mechanically toward grades, students may post to meet a requirement rather than to engage meaningfully, and the platform can begin to feel like a tool of control (Lupton & Williamson, 2017; Ryan & Deci, 2000). Separating assessment from discussion and social interaction, evaluating the quality of contributions rather than their quantity, and using participation data to guide support rather than impose penalties can reduce this sense of surveillance (Gikandi et al., 2011; Slade & Prinsloo, 2013). Students should also be told clearly what information is collected and how it is used. This transparency is consistent with obligations under data protection legislation, including the European Union's General Data Protection Regulation (European Parliament & Council of the European Union, 2016).

In the same light, workload and digital balance require deliberate planning, as highlighted in previous section. Teachers using the same platform can coordinate assignments and deadlines, set reasonable expectations for response times, avoid sending messages or setting deadlines late in the evening, and balance synchronous activities with asynchronous work (Bailenson, 2021; Tarafdar et al., 2007). Blended learning may be particularly supportive when online interaction complements rather than replaces face to face teaching. Relationships built in the classroom can carry into online discussions, while students' digital contributions can be recognised in-person (Garrison & Kanuka, 2004; Rovai & Jordan, 2004). Beyond reducing demands, online environments can also be used to strengthen the inner resources with which students meet them. Approaches that cultivate emotional intelligence, metacognition, and mindfulness have been proposed as supports for both well-being and inclusion (Drigas& Papoutsi, 2021; Mitsea et al., 2020), while online and mobile applications have been used for cognitive training and for mental imagery practices that address learning difficulties and mental health (Drigas et al., 2020; Karyotaki&Drigas, 2015). When such activities are embedded in a caring community rather than offered as isolated exercises, they may help students regulate the attention and emotions on which meaningful participation depends (Drigas&Karyotaki, 2019a).

Finally, equitable participation depends on addressing differences in access and support. Schools can provide devices and on site access for students who need them, design activities that do not require reliable home connectivity, make materials accessible to students with special educational needs, and offer language support to students learning the language of instruction (Drigas et al., 2006; Livingstone & Helsper, 2007; Pappas &Drigas, 2015; Szelei et al., 2022; van Deursen & van Dijk, 2014). Students who already feel isolated in the physical classroom merit particular attention (Hascher & Hadjar, 2018; Morinaj& Hascher, 2019). Online communities can create new opportunities for their

participation, but they can also reproduce the exclusion they already experience (Merton, 1968; Valkenburg & Peter, 2007).

9 DISCUSSION

The analysis presented in this article can be summarised in a conceptual model that links risk factors, mechanisms, and outcomes (Figure 1). On the left of the model are the conditions that make alienation more likely, which include characteristics of the student, such as heightened sensitivity to peer evaluation, limited digital access or skills, linguistic difficulties, and prior marginalisation, as well as characteristics of the context, such as weak teacher presence, unclear norms, mechanical assessment of participation, and uncoordinated workload. These conditions activate the mechanisms analysed in Sections 4 and 5, namely the thinning of social cues, invisible withdrawal, unanswered contributions, exposure and social comparison, exclusion and cyberbullying, the experience of surveillance, and digital fatigue. The mechanisms in turn feed the three domains of school alienation identified by Hascher and Hadjar (2018), alienation from teachers, from classmates, and from learning, which are associated with loneliness, anxiety, depressive symptoms, and disengagement. Protective factors act on the mechanisms themselves and can weaken the path from risk to harm, while a feedback loop reflects the reciprocal relationship between alienation and declining well-being reported in longitudinal research (Morinaj& Hascher, 2019).

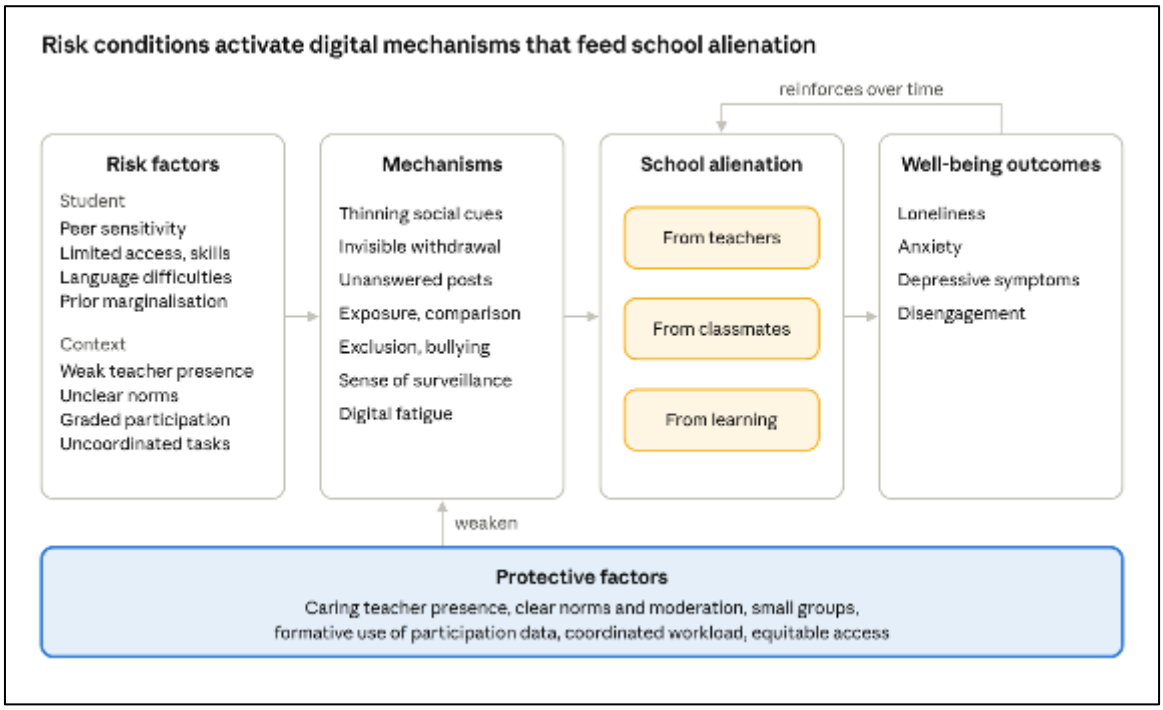


Figure 1: A conceptual model of the pathways from risk factors through digital mechanisms to school alienation and negative well-being outcomes, with protective factors acting on the mechanisms.

The model should be read as a set of hypotheses rather than as an established causal account. Its value lies in drawing together findings from separate literatures and in identifying the points at which intervention is possible. Several features of the model nevertheless deserve emphasis. The first concerns the role of technology. The analysis does not support the view that digital educational interaction is inherently alienating. Large-scale studies of adolescents' digital technology use have found that its average association with well-being is very small (Orben & Przybylski, 2019) and that moderate use is not harmful (Przybylski & Weinstein, 2017). What matters is not the presence of technology but the quality of the experiences it mediates. A course forum in which every contribution is acknowledged, in which norms of respect are clear, and in which the teacher is visibly present is a very different environment from one in which posts go unanswered, participation is counted mechanically, and conflicts are left unaddressed, even though both may run on exactly the same platform.

The second concerns the interaction between mechanisms. The mechanisms identified rarely operate in isolation. A student with limited access participates less, receives fewer responses, becomes less visible, and may gradually be ignored by peers, so that a material disadvantage is transformed into a social one. A tired student withdraws into silent reading, which makes her estrangement invisible to the teacher. A student who fears exposure posts only the minimum required, which the platform records as compliance, and which in turn deprives her of recognition. These cumulative processes help to explain why the risks of alienation are concentrated among students who are already disadvantaged,

and why responses that address only one mechanism, for example by providing devices without attending to facilitation, are unlikely to be sufficient.

The third concerns the relationship between alienation and mental health. Alienation is not a mental health condition, and most students who feel distant from a course will not develop clinical difficulties. Nevertheless, the developmental evidence reviewed in Section 3 suggests that, for adolescents, repeated experiences of being ignored, excluded, or exposed carry a particular emotional weight, and the evidence from the pandemic suggests that prolonged disconnection from the social life of school is associated with increased distress. Schools that make extensive use of online educational communities therefore carry a responsibility not only for their students' learning but also for the emotional quality of the digital spaces in which that learning takes place.

Finally, the analysis has implications for how online educational communities are evaluated. Indicators commonly available in learning management systems, such as login frequency, number of posts, and completion rates, capture only the visible surface of participation. They cannot distinguish quiet engagement from estrangement, and they may reward performative participation. Understanding whether an online community supports or undermines students' well-being requires attention to students' own experiences, gathered through validated measures of belonging and alienation, through qualitative inquiry, and through ordinary conversation between teachers and students.

10 CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

This article set out to examine how and under what conditions digital educational interaction within online educational communities may contribute to adolescents' sense of social alienation and to negative outcomes for their mental well-being. In answer to RQ1, it conceptualised social alienation, drawing on Seeman (1959) and on the three-domain model of Hascher and Hadjar (2018), as a sense of estrangement from teachers, classmates, and learning, of which loneliness and the experience of ostracism are affective expressions and disengagement a behavioural consequence. In answer to RQ2, it showed that adolescence is a period of heightened sensitivity to peer evaluation and exclusion, in which experiences of being ignored or rejected carry particular emotional weight and in which school connectedness is closely bound up with mental health.

In answer to RQ3, the article identified two groups of mechanisms through which digital educational interaction may foster alienation. The first concerns what digital interaction removes, namely social cues, the visibility of withdrawal, and the immediacy of response, so that silence can easily be experienced as rejection. The second concerns what it adds, namely the durable visibility of contributions, opportunities for comparison, exclusion, and cyberbullying, and the experience of surveillance, which can turn participation into performance. Digital fatigue and technostress amplify both. The experience of emergency remote teaching, including evidence from Greece, does not establish a causal link between digital schooling and distress, but it indicates that the availability of online tools alone does not preserve the social fabric of school. In answer to RQ4, the article argued that the risks are concentrated among students who already face disadvantages, including students with limited digital access, students from socio-economically disadvantaged and migrant backgrounds, and students already marginal in the physical classroom, and that an active and caring teacher presence, clear norms, thoughtful grouping, formative use of participation data, coordinated workload, and equitable access can weaken the pathways from risk to harm.

Several directions for future research follow from this synthesis. Most research on alienation and online learning has been conducted with university students, and studies with adolescents in secondary schools are needed, ideally using validated measures of school alienation alongside measures of loneliness and psychological distress. Longitudinal designs could clarify whether experiences within online educational communities predict changes in alienation and well-being over time, and whether these relationships differ between students with different characteristics. Qualitative research that gives voice to adolescents themselves, and in particular to those who remain silent online, could reveal how they interpret unanswered posts, visibility, and monitoring, and what would make them feel welcome. Design-based research could test whether the protective factors proposed here actually reduce alienation in real eClass or e-me communities. Research is also needed on the relationship between official school platforms and the informal digital spaces that students create for themselves, since exclusion in one may shape experience in the other. Finally, research on the use of learning analytics should examine not only what such data can reveal about students' participation, but also how being monitored is experienced by adolescents and how it affects their sense of autonomy and belonging.

Online educational communities are now a stable part of secondary education, and their potential to support learning and connection is real. Recognising that the same spaces can also leave some students feeling unseen, exposed, or excluded is not an argument against their use. It is an argument for designing and facilitating them with the same attention to relationships, care, and equity that good teachers bring to the physical classroom, so that the digital extension of school does not become, for its most vulnerable students, an extension of their isolation.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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The Authors proclaim no conflict of interest.

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