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ONLINE EDUCATIONAL COMMUNITIES AND ADOLESCENTS' SENSE OF COMMUNITY AND BELONGING: IMPLICATIONS FOR WELL-BEING AND LEARNING IN BLENDED SECONDARY EDUCATION

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ABSTRACT

Since the period of emergency remote teaching, online educational communities have become part of everyday life in secondary schools, whether they are hosted on learning management systems such as Open eClass or on school-oriented platforms such as e-me. Yet they are still valued mainly as places to share materials and collect assignments. Much less attention has been paid to whether they can help adolescents feel part of a community and feel that they belong. This theoretical article addresses that gap by bringing together two bodies of research that seldom meet: work on online learning communities and blended learning, and work on sense of community and school belonging in adolescence. Online educational communities are first defined, and the forms they take are outlined, along with the ways they support learning and fit into blended designs. The focus then shifts to sense of community and sense of belonging, and to evidence linking them to adolescents' eudaimonic well-being, understood as living and functioning well, as well as to their motivation, engagement and learning. From these strands emerges a set of design principles for cultivating belonging in online and blended school communities. Equal attention goes to the obstacles: digital inequality, the use of platforms mainly for monitoring students, and the tendency to equate community with participation counts. Online communities can strengthen adolescents' sense of belonging, but only under three conditions. They need to be part of a coherent blended design, sustained by a teacher who is visibly present and caring, and built around collaborative tasks that matter to students.

Keywords: Online Learning Communities; Sense of Community; Sense of Belonging; Adolescents; Well-Being; Blended Learning; Learning Management Systems; Secondary Education

1 INTRODUCTION

The need to belong has long been recognised as one of the fundamental human motivations. In their influential review, Baumeister and Leary (1995) argued that human beings are driven to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships, and that the frustration of this need is associated with a wide range of negative emotional, cognitive, and health outcomes. Adolescence is a developmental period in which this

need acquires particular intensity, since young people are renegotiating their relationships with parents, investing heavily in peer relationships, forming an identity, and moving through school transitions that often disrupt established social networks (Eccles et al., 1993). School is one of the principal settings in which adolescents seek and experience belonging, and a substantial body of research links school belonging with mental health, motivation, engagement, and achievement (Allen et al., 2018; Korpershoek et al., 2020; Osterman, 2000).

At the same time, the setting in which secondary education takes place has changed. Learning management systems (LMSs) and school-oriented digital platforms are now part of the everyday infrastructure of many schools. In Greece, the open-source Open eClass platform, developed by the Greek Universities Network (GUnet), has been widely used by universities and, through the Panhellenic School Network, by primary and secondary schools, while the Ministry of Education has developed e-me as a social, cloud-based platform for pupils and teachers (Megalou et al., 2015). The school closures of 2020 and 2021 accelerated the use of such platforms dramatically, as teachers moved, often with little preparation, to what Hodges et al. (2020) called emergency remote teaching, a temporary shift to remote delivery under crisis conditions that should be distinguished from carefully designed online learning. Greek research from this period documents both the speed of the transition and the uneven readiness of teachers to use online environments pedagogically (Jimoyiannis et al., 2021).

Now that schools have returned to face-to-face teaching, the role these platforms should play remains an open question. They may revert to the status of digital filing cabinets, used to upload worksheets and collect assignments, or they may be deliberately cultivated as online educational communities in which adolescents interact with one another and with their teachers, collaborate on meaningful tasks, and experience themselves as members of a group that cares about them and about their learning. It is this second possibility that the present article explores.

The article starts from a simple premise, namely that a platform does not create a community on its own, whereas well-designed online spaces embedded in a coherent blended pedagogy can extend and strengthen the relationships that make students feel they belong. Early studies already suggested that this is plausible. Rovai and Jordan (2004) found that graduate students in blended courses reported a stronger sense of community than students in either traditional or fully online courses, and Wighting (2006) reported that high school students whose teachers used computers frequently scored higher on the learning dimension of classroom community. Yet much of the research on online community has been conducted with adult and university learners, while research on adolescent belonging has focused mainly on the physical school, so that the two literatures rarely meet.

1.1 Aim and research questions

The overarching aim of this article is to examine, through a structured theoretical synthesis of the literature, whether and under what conditions online educational communities can foster a sense of community and belonging among adolescent students in blended secondary education, and how such belonging may in turn support their well-being and their learning. In pursuing this aim, the article seeks to bring together two bodies of research that have so far developed largely in parallel, and to translate their combined insights into design principles that secondary school teachers, including teachers in the Greek school context, can apply in platforms such as Open eClass and e-me.

Four research questions guide the synthesis. The first research question (RQ1) asks what online educational communities are, what forms they take, and how they can support learning and be integrated into blended learning designs in secondary education. Building on this, the second research question (RQ2) asks how the constructs of sense of community and sense of belonging are defined and how they can be understood when interaction takes place in online and blended settings rather than solely in the physical classroom. The third research question (RQ3) turns to the significance of these constructs and asks what the literature reveals about the role of a sense of belonging in adolescents' well-being, understood in the eudaimonic sense of living well, and in their learning, motivation, and engagement. Finally, the fourth research question (RQ4) draws the preceding answers together and asks which design principles, and which cautions, follow for teachers and schools that wish to cultivate belonging through online educational communities.

2 ONLINE EDUCATIONAL COMMUNITIES

2.1 Defining online educational communities

The term *community* has a long history in sociology, where it originally referred to groups bound together by place and kinship. Over time it was extended to relational communities, that is, groups held together by shared interests, practices, or goals rather than by geography (McMillan & Chavis, 1986). The arrival of networked computing made it possible for such relational communities to form and persist online, and the notion of the virtual or online community gradually entered both popular and academic discourse.

In education, an *online educational community* (also called an online learning community) can be defined as a group of learners and teachers who interact through a digital environment over a sustained period, who share a common learning purpose, and who develop norms, relationships, and a shared repertoire of resources and practices through that interaction. The emphasis on a shared purpose matters, because a collection of individuals who happen to have access to the same course page is not yet a community. Equally important is the requirement of sustained interaction, since community develops over time through repeated exchanges rather than through isolated contributions. From these two conditions a third gradually follows, as norms of participation, mutual recognition, and a shared sense of who belongs begin to emerge and give the group a recognisable social structure.

Such a definition makes it possible to distinguish an online educational community from the technical platform that hosts it. An LMS such as Open eClass offers announcements, document repositories, discussion forums, wikis, assignment submission, quizzes, learning paths, and group areas. A school-oriented social platform such as e-me places greater emphasis on social interaction, and its designers describe it as a personal learning environment in which pupils and teachers create "hives", self-contained collaborative spaces that can be set up by teachers for a class or by pupils themselves around a topic of shared interest (Megalou et al., 2015). Neither platform, however, guarantees community. The same eClass course can function as a passive repository or as a lively space of collaboration, depending on how the teacher designs and facilitates it. Kreijns et al. (2003) made this point forcefully in their review of computer-supported collaborative learning, warning that designers often take social interaction for granted simply because the tools exist, and that they tend to reduce it to cognitive, task-related processes while neglecting its social and emotional dimensions.

2.2 Theoretical foundations

The idea that learning can be organised around communities rests on a long line of theoretical work that understands learning as a fundamentally social process. Its roots lie in Vygotsky's (1978) sociocultural theory, according to which higher mental functions develop first on the social plane, through interaction with others, and only then become internalised. Within this perspective, learners progress through their zone of proximal development with the support of more capable others, and learning is therefore designed as interaction rather than as the individual consumption of content.

In the same light, Lave and Wenger (1991) extended this social view of learning beyond the dyad of learner and tutor to the level of the community. Studying apprenticeship in a variety of settings, they described learning as legitimate peripheral participation in communities of practice, a process through which newcomers gradually move from the periphery towards fuller participation and acquire, together with knowledge and skills, an identity as members. Wenger (1998) later elaborated the concept, describing communities of practice in terms of mutual engagement, a joint enterprise, and a shared repertoire, and insisting that learning cannot be separated from belonging and identity. This last point gives the framework particular relevance for adolescents, for whom the formation of identity is a central developmental task.

Whereas communities of practice emphasise participation in existing practices, Scardamalia and Bereiter (1994) turned attention to the creation of new knowledge. They proposed that classrooms can function as knowledge-building communities whose collective goal is the advancement of shared understanding, supported by networked environments in which ideas are made public, built upon, and improved. In their view the community itself, rather than the individual learner, becomes the unit through which knowledge advances, which anticipates many of the collaborative possibilities later offered by wikis and shared online spaces.

The theoretical traditions discussed so far were developed largely with face-to-face settings in mind. The framework that has most shaped research specifically on online and blended learning is the Community of Inquiry (CoI) model proposed by Garrison, Anderson, and Archer (2000), which translates the social view of learning into the conditions of computer-mediated communication. The model holds that a worthwhile educational experience emerges from the interplay of three presences. *Cognitive presence* refers to the extent to which learners construct meaning through sustained reflection and discourse, *social presence* to their ability to project themselves socially and emotionally as real people, and *teaching presence* to the design, facilitation, and direction of cognitive and social processes. A decade of research supported the usefulness of the model for describing and designing online learning (Garrison et al., 2010), and later studies refined our understanding of how the presences relate to one another. Of particular interest for the present article is the work of Shea et al. (2006), who showed that teaching presence, in both its design and facilitation components, was strongly associated with students' sense of learning community in fully online and web-enhanced courses, a finding that places the teacher at the centre of community building.

If the CoI model clarifies the conditions of a successful online learning experience, Hrastinski (2009) helps to clarify what learners actually do within it. He argued that online participation should be understood not merely as the writing of posts but as taking part and joining in a process of learning, and that participation in this broader sense is intrinsically linked to learning. His argument brings the discussion back, in a sense, to Lave and Wenger's notion of participation,

now applied to online environments, and it encourages researchers and teachers to look beyond the number of messages towards the quality of learners' involvement in an online community. Taken together, these approaches converge on a common view, in which learning is social, participation shapes identity, and the online community can become a space where knowledge, relationships, and a sense of membership develop together.

2.3 Types of online educational communities

Online educational communities can be classified along several dimensions, the most widely discussed being their purpose. Riel and Polin (2004) proposed an influential typology that distinguishes three overlapping forms of learning community. Task-based communities bring a group together to work intensively for a limited period on a shared task or product, as when a class collaborates on a project that culminates in a presentation or a digital artefact. Practice-based communities, by contrast, are organised around a profession or discipline and are oriented towards sharing and refining good practice, and they correspond closely to Wenger's (1998) communities of practice. Knowledge-based communities, finally, focus on the production and continuous improvement of collective knowledge, in the spirit of Scardamalia and Bereiter's (1994) knowledge-building communities. The three forms differ in duration and focus, yet they often coexist, and a community may move from one form to another as its purposes evolve.

Purpose is not the only relevant dimension. Communities also differ in their mode of delivery, since some exist entirely online whereas others are blended and combine online interaction with face-to-face meetings. They differ, moreover, in their origin and degree of formality, as some are formally organised by an institution or teacher while others emerge spontaneously among learners. In secondary education these dimensions combine to produce a small number of recurring forms, which are summarised in Table 1.

Table 1: Forms of online educational communities relevant to secondary education

Form	Typical setting	Who initiates	Main purpose	Example
Course or class community	LMS course for one class and subject	Teacher	Extend the classroom, share materials, discuss, collaborate	An eClass course for a Year 2 English class
Project or task community	Group area within an LMS or platform	Teacher, with student groups	Complete a bounded collaborative task	A wiki where groups build a guide to their town
School-wide or interest community	Open space on a school platform	Teacher, club, or students	Connect students across classes around a shared interest	An e-me hive for a school newspaper or environmental club
Inter-school or international community	Cross-school platform	Teachers in partner schools	Collaboration and intercultural exchange	A partnership project between two European schools
Teacher professional community	Professional network or platform	Teachers	Share practice and learn professionally	A subject teachers' forum for sharing resources

These forms are not mutually exclusive as a single eClass course may host a task-based community during a project while continuing to function as a class community throughout the school year. For adolescents, the class community and the interest community are especially significant, because they map onto the two main social worlds of school life, namely the classroom group and the peer group defined by shared interests.

2.4 How online educational communities can support learning

The ways in which online educational communities support learning follow closely from the theoretical traditions outlined above. Perhaps the most immediate contribution is that they extend the time and space available for interaction. Asynchronous forums and collaborative documents carry the classroom beyond the timetable, and students who are reluctant to speak in front of the class often find it easier to contribute in writing, after having had time to think. Because asynchronous discussion leaves room for reflection, it also nurtures the kind of sustained, meaning-making discourse that the CoI model describes as cognitive presence (Garrison et al., 2000).

The same extended space makes collaborative knowledge construction possible. Through wikis, shared documents, and group areas, students can co-construct texts and artefacts, observe each other's reasoning, and build on each other's ideas, so that ideas become, in Scardamalia and Bereiter's (1994) terms, public objects that the community can examine

and improve. Collaboration of this kind also makes peer support more visible and accessible. Students can ask questions, answer the questions of others, and share resources, with the result that the scaffolding function is distributed across the community rather than resting solely on the teacher. The Academic Communities of Engagement (ACE) framework of Borup et al. (2020) builds directly on this idea. It conceptualises student engagement in online and blended courses as supported by two communities, the course community of teachers, peers, and school staff and the student's personal community of parents, siblings, and friends, and argues that students are most likely to achieve the engagement needed for academic success when both communities provide active support.

Alongside these collaborative functions, online environments allow for a degree of differentiation that is difficult to achieve in a crowded classroom. Learning paths, adaptive quizzes, and optional resources make it possible to offer differentiated materials and to let learners proceed at their own pace while still remaining part of a shared space. Research on artificial intelligence in education has long sought to model learners' knowledge and progress in order to adapt instruction to them (Drigas et al., 2009), while digital simulations, educational games, and online cognitive training applications widen the range of activities through which students can explore content and practise skills at their own level (Karyotaki&Drigas, 2015; Kefalis et al., 2025; Kokkalia et al., 2016). The visibility of students' work in these environments further supports formative assessment and peer feedback, and e-portfolios allow progress to be documented over time.

Finally, and most relevant for the argument of this article, online communities can provide spaces for social presence and emotional connection. Barbour and Plough (2009) described how a cyber charter high school in the United States introduced a closed social networking space precisely because online schooling tended to isolate students, and found that this space extended opportunities for both academic and social interaction.

The evidence on effectiveness is encouraging, although it also underlines the importance of design. A meta-analysis of online and blended learning studies conducted for the U.S. Department of Education found that, on average, students in online conditions performed modestly better than those receiving face-to-face instruction and that the advantage was larger for blended conditions. The authors cautioned, however, that much of this advantage could be attributed to differences in time, curriculum, and pedagogy rather than to the medium itself (Means et al., 2013). The benefits of online communities, in other words, depend on how they are designed and used.

2.5 Online educational communities within blended learning

The importance of design becomes particularly clear when online communities are considered within blended learning, generally defined as the thoughtful integration of face-to-face and online learning experiences (Garrison & Kanuka, 2004). Graham (2006) noted that blending can occur at the level of the activity, the course, the programme, or the institution, and he distinguished enabling blends, which mainly improve access, from enhancing blends, which make incremental changes to pedagogy, and from transforming blends, which fundamentally restructure the learning model. For K–12 education, Staker and Horn (2012) proposed a taxonomy that includes rotation models such as the flipped classroom, as well as flex, self-blend, and enriched virtual models.

In secondary schools that operate mainly face-to-face, online educational communities fit most naturally into enhancing or rotation-type blends, and they can be woven into teaching in several ways. In a flipped arrangement, students engage with materials and a short discussion task on eClass before the lesson, and class time is then devoted to collaborative application that builds on what was raised online. The movement can also run in the opposite direction, when a discussion begun in class continues online, giving quieter students a second opportunity to contribute and allowing the class to follow up on questions that remained open. Over longer periods, a multi-week project can be organised through a group area or wiki, with face-to-face sessions used for planning, problem solving, and presentation, while the online space serves for drafting, sharing resources, and exchanging peer feedback. Alongside the formal course, informal or semi-structured spaces such as a class forum for casual conversation or an interest-based hive can support social interaction that is related to, but not limited by, the curriculum.

From the perspective of community, the main argument for blended designs is that they allow online and face-to-face interaction to reinforce one another. Relationships established in the classroom carry over into the online space, and online interaction in turn deepens classroom relationships. Rovai and Jordan (2004) found that blended courses produced a stronger sense of community than both traditional and fully online courses, and a small study by Lund and Watkin (2007) reported that university students whose face-to-face teaching was supplemented with WebCT material developed a significantly greater sense of community over a year than a comparison group, even though the online communication tools were used only minimally. Wighting's (2006) study of high school students similarly suggested that the use of computers in teaching did not detract from, and might add to, students' sense of classroom community. Although this evidence comes largely from higher education and from small samples, it suggests that blended designs offer a promising context for cultivating belonging in secondary schools.

The Greek experience of emergency remote teaching offers an instructive contrast. When the shift online was abrupt, teachers' priorities were understandably focused on the continuity of content delivery, and many lacked the preparation needed to design for interaction (Jimoyiannis et al., 2021). Online educational communities that aim to foster belonging have to be designed deliberately, and the post-pandemic period offers an opportunity to do so under considerably more favourable conditions.

3 SENSE OF COMMUNITY AND SENSE OF BELONGING

3.1 Sense of community

The most influential definition of the psychological sense of community comes from community psychology. McMillan and Chavis (1986) defined it as a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together. They argued that this feeling rests on four interrelated elements. The first, membership, refers to the feeling of having invested part of oneself in a group and therefore of having a right to belong, and it involves boundaries, emotional safety, identification, personal investment, and a common system of symbols. Membership is closely tied to influence, which McMillan and Chavis conceived as bidirectional, since members need to feel that they have some say in what the group does, while the cohesiveness of the group depends in turn on its ability to influence its members. A community also endures because it is rewarding to its members, and the third element, integration and fulfilment of needs, captures the expectation that the resources received through membership will meet members' needs, an expectation made easier by shared values. The fourth element, shared emotional connection, draws the others together. It reflects the commitment and belief that members have shared, and will continue to share, history, common places, time together, and similar experiences, and it is strengthened by positive interaction, by the quality of shared events, and by the honouring of members.

This model has been adapted for educational settings. Rovai (2002a) described classroom community in terms of spirit, trust, interaction, and commonality of expectations and goals, and he later developed the Classroom Community Scale (Rovai, 2002b), which measures two related dimensions. The first, connectedness, reflects feelings of cohesion, spirit, trust, and interdependence among members, whereas the second, learning, reflects the extent to which members share educational goals and experience the community as supporting their learning. The distinction between a social and a learning dimension is important for the argument of this article, because it shows that a sense of community in an educational setting concerns not only friendship but also a shared orientation towards learning.

The concept has also been extended to virtual environments. Blanchard (2007) developed a measure of sense of virtual community and found that it shares the core elements identified by McMillan and Chavis, while also reflecting features specific to online settings, such as the way members come to recognise one another through their online contributions.

3.2 Sense of belonging

The sense of belonging is closely related to, but not identical with, the sense of community. Hagerty et al. (1992) defined it as the experience of personal involvement in a system or environment, such that persons feel themselves to be an integral part of that system or environment. In educational research, the most widely cited definition comes from Goodenow (1993, p. 80), who described school belonging, or psychological membership, as "the extent to which students feel personally accepted, respected, included, and supported by others in the school social environment." Goodenow also developed the Psychological Sense of School Membership scale, which remains one of the most widely used instruments with adolescents.

The literature on the subject uses a number of related terms, including school belonging, school connectedness, school bonding, school attachment, and school engagement, sometimes interchangeably. Allen et al. (2018) observed that this terminological inconsistency has fragmented research on the topic, and in a later integrative review Allen et al. (2021) proposed a framework that helps to bring conceptual order to the field. In their account, belonging depends on the competencies that enable a person to connect with others, on the opportunities to belong that are offered by available groups, places, and times, on the motivation or desire to connect, and on the subjective perception of fitting in. This framework is particularly useful for thinking about online communities, because it reminds us that providing an online space creates an opportunity to belong, while belonging itself also depends on students' competencies, motivations, and perceptions.

3.3 Relating the two concepts

Although the two constructs are closely intertwined, they can be meaningfully distinguished. *Sense of community* refers primarily to a perceived property of a collective, namely the feeling that a group is cohesive and that its members trust one another, share goals, and are connected. *Sense of belonging*, on the other hand, refers primarily to the individual's

relationship with that collective, that is, to the feeling of being accepted, valued, and included in it. A class may therefore have a strong overall sense of community from which some students nevertheless feel excluded, and, conversely, a student may feel that she belongs to a small subgroup within a class that lacks cohesion as a whole. In practice the two concepts overlap considerably, and belonging is itself part of McMillan and Chavis's (1986) element of membership. In this article, the term sense of community is used when the collective qualities of an online educational community are discussed, and the term sense of belonging when the focus is on the individual adolescent's experience within it.

3.4 Sense of community and belonging in online settings

Whether a sense of community and belonging can develop in online environments was long a matter of debate. Early skepticism held that computer-mediated communication, deprived of nonverbal cues, would inevitably remain impersonal. Research on social presence challenged this view by showing that people adapt their communication in order to project themselves socially in text-based media, and the CoI framework treats social presence as both achievable and important in online learning (Garrison et al., 2000). Studies of online learners suggest that belonging can indeed develop online, but that it depends on design and facilitation. In a qualitative study of postgraduate online learners, Peacock et al. (2020) found that interaction and engagement, the culture of the learning environment, and the support available to learners were all central to their sense of belonging. Rovai (2002a) similarly emphasised that building community at a distance requires deliberate attention to transactional distance, social presence, equality of participation, small-group activities, and the facilitation style of the instructor.

For adolescents, online settings present both distinctive opportunities and specific risks. Young people are frequent users of social media and often experience online spaces as important for their social lives, and Allen et al. (2014) reviewed evidence suggesting that social media use can support adolescents' social connectedness, while also noting potential pitfalls such as exposure to exclusion and social comparison. Educational platforms, however, are not social media. They are institutional spaces with an explicit academic purpose, in which the teacher is always present, and adolescents may therefore experience them as an extension of school surveillance rather than as a space of their own. Designing online educational communities in which adolescents feel genuinely at home, rather than merely compliant, is consequently a pedagogical challenge, and it is one to which Section 6 returns.

4 WHY BELONGING MATTERS FOR ADOLESCENTS' WELL-BEING

4.1 Belonging, eudaimonic well-being, and adolescent development

Well-being can be understood in two broad ways. The *hedonic* tradition equates well-being with happiness, positive affect, and life satisfaction, whereas the *eudaimonic* tradition, which goes back to Aristotle's notion of *eudaimonia* (εὖζῆν, living well), understands well-being as flourishing, that is, as the realisation of one's potential through activity that is meaningful and in accordance with virtue. Ryff (1989) operationalised psychological well-being in eudaimonic terms through six dimensions, namely self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. From the perspective of self-determination theory, Ryan et al. (2008) described eudaimonia as a way of living focused on intrinsically valued goals, pursued autonomously and with mindfulness, in a way that satisfies the basic psychological needs, and Seligman's (2011) PERMA model similarly places positive relationships alongside positive emotion, engagement, meaning, and accomplishment as pillars of flourishing. Layered models of emotional intelligence and of human consciousness likewise portray personal growth as a progression towards greater self-awareness, self-regulation, and social awareness, in which the capacity to understand and connect with others belongs to the higher levels of functioning (Drigas&Karyotaki, 2019b; Drigas& Papoutsi, 2021).

What these frameworks share is the conviction that relationships with others are not a peripheral contributor to well-being but one of its constitutive elements. Self-determination theory makes this explicit by identifying *relatedness*, together with autonomy and competence, as one of three basic psychological needs whose satisfaction is essential for growth, integrity, and well-being (Ryan & Deci, 2000). A sense of belonging can, in this view, be understood as the subjective experience of relatedness being satisfied in a particular context. To ask whether online educational communities can strengthen adolescents' belonging is therefore to ask whether they can contribute to adolescents' flourishing in the full, eudaimonic sense of the term.

The question acquires particular weight in adolescence, a period in which the need for relatedness is both intensified and frequently frustrated. Eccles et al. (1993) proposed the concept of *stage–environment fit*, arguing that the transition to secondary school often coincides with a developmental phase in which adolescents need more autonomy, closer relationships with adults outside the family, and greater peer connection. Secondary schools, however, often offer fewer opportunities for close relationships with teachers, more competitive and controlling practices, and larger, more impersonal settings, and the resulting mismatch can contribute to declines in both motivation and well-being. Environments that support belonging can thus be seen as a way of restoring the fit between adolescents' developmental needs and their school context.

This developmental perspective also connects belonging with identity. Adolescence is a period in which young people explore who they are and where they fit, and communities of practice theory emphasises that participation in communities shapes identity (Wenger, 1998). Being recognised as a legitimate member of a learning community, whose contributions are valued, can therefore support the development of an identity as a capable learner and a respected member of a group, which is itself an important dimension of flourishing during these years.

4.2 Evidence on belonging and adolescent mental health

The theoretical link between belonging and well-being is supported by a substantial body of empirical research, and the association between school belonging and adolescent mental health is among the most robust findings in the field. The National Longitudinal Study of Adolescent Health in the United States, with a sample of more than 12,000 adolescents, found that perceived connectedness to school and to family was protective against a range of risk behaviours, including emotional distress, suicidal thoughts and behaviour, violence, and substance use (Resnick et al., 1997). Later research confirmed and extended these findings. In a longitudinal study of New Zealand adolescents, Jose et al. (2012) found that social connectedness across family, school, peer, and community contexts predicted increases in well-being over time, while well-being in turn predicted later connectedness, which suggests a reciprocal relationship. Arslan (2018) reported that school belonging was associated with fewer emotional and behavioural problems among Turkish adolescents, and Pittman and Richmond (2007) found that, among students in late adolescence, a sense of belonging to the university was associated with better academic and psychological adjustment.

These individual studies are corroborated by meta-analytic evidence. Korpershoek et al. (2020), who synthesised 82 correlational studies of secondary school students published between 2000 and 2018, found small to moderate positive correlations between school belonging and social-emotional outcomes, together with positive associations with motivation and achievement and small negative associations with absence and dropout. Importantly, these associations were broadly consistent across grade levels and socio-economic groups, and Section 5 returns to their implications for learning.

Against this background, there are signs that adolescents' sense of belonging has recently been under pressure. 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 in countries where smartphone access and internet use were higher. The OECD's PISA reports document the distribution of school belonging among 15-year-olds across participating systems, including Greece, and note that students from disadvantaged and immigrant backgrounds often report lower belonging (OECD, 2019, 2023). The school closures of the pandemic period disrupted the everyday social life of schools still further. In a study of 226 Greek secondary school students' views on what fostered their belonging during the COVID-19 pandemic, Tate et al. (2024) found that students valued approachable, understanding, and caring teacher communication, inclusion, safety, and equality, as well as group work, creative lessons, and opportunities for social connection. A parallel study with Australian secondary students identified emotional support, support for learning, social connection, and respect, inclusion, and diversity as the teacher-level practices that strengthened belonging (Allen et al., 2023).

These findings matter for the argument of this article in two respects. They show, first, that the need for belonging among Greek adolescents is real and was felt acutely during a period in which schooling moved online. They also suggest that the practices that foster belonging, such as caring communication, inclusion, group work, and opportunities for connection, are not tied to the physical classroom and can, in principle, be enacted in online and blended spaces as well. Whether and how this happens depends on design and facilitation, which is the subject of Section 6.

5 WHY BELONGING MATTERS FOR LEARNING

5.1 Belonging, motivation, and learning across face-to-face and online settings

If belonging is constitutive of well-being, the next question is whether it is also beneficial for learning. Research suggests that it is, primarily through its effects on motivation and engagement. Goodenow and Grady (1993) found that adolescents' sense of school belonging was strongly associated with their expectancy of success and with the value they placed on schoolwork, more strongly in fact than the academic values of their friends. Osterman's (2000) influential review reached a similar conclusion, showing that students' experience of acceptance influences many dimensions of their behaviour and particularly their engagement. Students who feel that they belong are more likely to participate, to persist when work becomes difficult, to hold positive attitudes towards school and teachers, and to internalise educational values.

Self-determination theory offers an explanation for these findings. When the need for relatedness is satisfied alongside the needs for autonomy and competence, learners are more likely to experience intrinsic motivation and to internalise the value of activities that are not inherently interesting (Ryan & Deci, 2000). A student who feels connected to her

teacher and peers is more willing to invest effort in a task because it matters to the people who matter to her, whereas a student who feels excluded is likely to withdraw and to devote her energy to self-protection rather than to learning. The meta-analytic evidence supports this picture. Korpershoek et al. (2020) found small positive correlations between school belonging and academic achievement, together with small to moderate positive correlations with motivational outcomes such as mastery goal orientation, self-efficacy, and engagement, while Allen et al. (2018), in a meta-analysis of 51 studies with more than 67,000 students, identified teacher support and positive personal characteristics as the strongest predictors of school belonging and argued that belonging should be regarded as a core concern of schools rather than an optional extra. The fact that the association with achievement is weaker than the association with motivation and engagement is consistent with a model in which belonging influences achievement indirectly, by fostering the motivational and behavioural conditions under which learning takes place.

Research conducted in online and blended environments points to the same relationships. Rovai's (2002b) Classroom Community Scale explicitly includes a learning dimension, and studies using it have repeatedly found that students' sense of classroom community is associated with their perceived learning. Shea et al. (2006) showed that, in fully online and web-enhanced college courses, students' sense of learning community was strongly predicted by teaching presence and was in turn linked to perceived learning, while Rovai and Jordan (2004) reported that the blended course in their study yielded higher scores on both connectedness and learning than the traditional and fully online courses.

In secondary education the evidence is thinner, but it points in the same direction. Wighting's (2006) mixed-methods study of 181 students in an urban high school found that students whose teachers used computers frequently and consistently scored higher on the learning dimension of classroom community. In their open-ended responses, the students associated both community and learning with a feeling of belonging, with trust in peers and teachers, and with the use of computers, and they regarded connectedness to their peers as the most important of these factors. The ACE framework (Borup et al., 2020) likewise positions community as a source of affective, behavioural, and cognitive support for adolescent learners in online and blended courses. Taken together, these studies suggest that the link between belonging and learning observed in physical schools also holds, at least in part, when interaction is extended into online spaces.

5.2 How belonging shapes the learning process

Establishing that belonging and learning are associated leaves open the question of how the one influences the other, and several interrelated mechanisms can explain why belonging in an online educational community may benefit learning. The most fundamental concerns psychological safety. Learning involves exposing one's partial understanding, making mistakes, and asking questions, and in a community whose members trust one another students are more likely to post a tentative answer, ask for help, or challenge an idea, all of which are essential to cognitive presence (Garrison et al., 2000). For adolescents, who are often acutely sensitive to the judgement of their peers, such safety is especially important. Safety also frees attentional resources, since attention is shaped by emotional as well as cognitive processes, and a student preoccupied with the risk of being judged has less attention available for the task itself (Drigas&Karyotaki, 2019a).

Safety in turn supports sustained participation. In online environments participation is voluntary in a way that physical attendance is not, and feeling part of the community becomes a key reason to return to the forum, to read peers' contributions, and to respond to them (Hrastinski, 2009; Rovai, 2002a). Sustained participation also gives students access to the social resources of the community, since those who feel they belong are more likely to seek and receive help from peers and teachers, and the scaffolding available to them is extended accordingly (Borup et al., 2020). The same relational foundation underpins collaborative knowledge construction. Collaborative learning depends on members' willingness to build on each other's ideas, and trust together with a shared sense of purpose makes productive collaboration more likely, whereas a lack of trust tends to produce superficial cooperation or free-riding (Kreijns et al., 2003). Over time, being recognised as a contributing member of such a community also supports the development of an identity as a learner and a sense of competence, which sustain motivation in their own right (Ryan & Deci, 2000; Wenger, 1998). Belonging thus influences learning not through a single pathway but through a chain of mutually reinforcing processes that run from safety to participation, from participation to collaboration, and from collaboration to identity.

These mechanisms become especially visible in foreign language learning, which is intrinsically social and requires learners to take communicative risks in front of others. Online educational communities can offer language learners additional opportunities to use the target language in authentic, low-stakes written interaction, to collaborate on texts, and to receive peer feedback. In a supportive community, a learner of English who would hesitate to speak in class may contribute in an asynchronous forum, where she has time to formulate her message and where the community norm is one of encouragement. The example illustrates a broader point, namely that the learning benefits of online communities are mediated by the quality of the relationships within them.

The strength of these claims should nevertheless be weighed against the limits of the evidence. Most studies of belonging and learning are correlational, and the relationships are likely to be reciprocal, since students who succeed academically may come to feel that they belong, just as belonging may support success. Much of the research on online community also comes from higher education and relies on self-reported perceived learning rather than objective measures. Even so, the convergence of theory, correlational evidence, and qualitative accounts across settings provides a reasonable basis for the claim that a sense of belonging can act beneficially on the learning process, and it justifies design-based and experimental research to test this claim in online and blended secondary school communities.

6 DESIGN PRINCIPLES FOR CULTIVATING BELONGING IN ONLINE EDUCATIONAL COMMUNITIES

The preceding sections suggest that online educational communities can contribute to adolescents' belonging, but only when they are deliberately designed and facilitated. This section translates the theoretical and empirical literature into an integrated set of design principles for secondary school teachers. The principles draw on McMillan and Chavis's (1986) four elements of sense of community, read together with the CoI framework and with the findings of studies conducted with adolescents, and the correspondence between these elements and possible practices is summarised in Table 2.

Table 2: Elements of sense of community and corresponding design practices in online educational communities

Element (McMillan & Chavis, 1986)	What adolescents need to experience	Indicative design practices	Indicative platform tools
Membership	"This is our space and I am part of it."	Welcoming onboarding, personal introductions, a group name and visual identity, co-created netiquette	Course homepage, profiles, introductory forum, hives
Influence	"My voice changes what we do."	Student choice of topics and roles, polls, student-moderated threads, visible responses to feedback	Questionnaires and polls, forum moderation, group areas
Integration and fulfilment of needs	"Being here helps me learn and get support."	Peer-help forums, resources students actually need, timely feedback	Forums, learning paths, assignments with feedback
Shared emotional connection	"We share experiences and stories."	Collaborative projects, celebration of achievements, informal social spaces, shared artefacts	Wikis, blogs, e-portfolios, informal forum

The most consistent finding in the literature is that blended designs support community more strongly than either purely face-to-face or purely online designs (Rovai & Jordan, 2004), and this finding provides the foundation on which the other principles rest. For a secondary teacher it means that the online community should not be treated as a separate world but as an extension of the class. Discussions that begin online can be taken up in the classroom and vice versa, students' online contributions can be referred to and acknowledged face-to-face, and the purpose of each online activity can be made clear to students. When students see that what happens on eClass matters in the classroom, they have good reason to invest in it.

Within such a continuous space, the sense of membership has to be established from the very beginning. McMillan and Chavis (1986) linked membership to boundaries, emotional safety, and a common system of symbols, and each of these can be cultivated online. At the start of the school year the teacher can open the online community with a personal welcome, invite students to introduce themselves in a low-stakes way, for example by sharing a favourite song or an object that represents them, and co-create with the class a short set of norms for respectful online interaction. A name or visual identity chosen by the students themselves strengthens identification, while closed spaces such as eClass groups or e-me hives restricted to the members of a class provide the boundaries within which emotional safety becomes possible.

Membership, however, is unlikely to take root without a strong and caring teaching presence. Teaching presence is the strongest predictor of students' sense of learning community in online courses (Shea et al., 2006), and teacher support is among the strongest predictors of school belonging in adolescence (Allen et al., 2018). Greek students' own accounts point in the same direction, emphasising teacher communication that is approachable, understanding, and caring (Tate et al., 2024). In practice this means that teachers need to be visibly present in the online space, responding to posts,

acknowledging contributions by name, summarising discussions, asking follow-up questions, and modelling the tone they hope students will adopt. Salmon's (2000) five-stage model of e-moderation, which leads from access and motivation through online socialisation, information exchange, and knowledge construction to development, is a useful reminder that socialisation is a stage to be supported rather than skipped.

A caring presence creates the conditions for engagement, but it is the nature of the tasks that determines whether engagement turns into genuine collaboration. Requirements of the kind "post once and reply twice" rarely build community. Collaboration is far more likely to generate shared emotional connection when it is organised around authentic tasks with a common product, such as a class wiki, a collaborative digital story, a podcast, or a guide written for younger students. Small groups are more conducive to trust than whole-class discussion (Rovai, 2002a), and rotating roles such as facilitator, summariser, and resource finder help to ensure that all members participate. In the terms of Riel and Polin (2004), task-based communities of this kind can serve as a gateway to more lasting practice-based and knowledge-based communities.

Collaborative tasks also open a space for the second element of community, influence. Adolescents' need for autonomy is particularly strong, and a community in which only the teacher speaks and decides is unlikely ever to feel like "ours". Teachers can therefore involve students in choosing topics, setting deadlines, or designing activities, invite them to moderate discussions, and use short polls to ask how the community is working, making sure that students can see their views being acted upon.

The community should not, however, be confined to academic tasks. Kreijns et al. (2003) warned against restricting online interaction to task-related exchanges, and the social dimension of community needs its own space. An informal forum for casual conversation, a corner for sharing interests, or a place to celebrate birthdays and achievements can all foster this dimension, much as the closed social space described by Barbour and Plough (2009) extended opportunities for interaction beyond formal lessons in an online high school. Such spaces need clear norms and some oversight, yet they should still feel like places where students can be themselves.

Opening social spaces raises in turn the question of who actually occupies them, since belonging is not equally distributed. Students from socio-economically disadvantaged or migrant backgrounds, students with special educational needs, and students who are isolated in the physical classroom may also be at risk of exclusion online. Teachers can monitor participation patterns, reach out privately to students who are absent from the online community, ensure that materials are accessible, and use grouping strategies that prevent existing cliques from being reproduced. Research on ICT in special education offers concrete guidance in this respect, as it has shown how digital tools can support students with dyscalculia and mathematical difficulties, visual impairments, or co-occurring ADHD and autism, including the development of their emotional and social skills (Bakola et al., 2019; Drigas& Kostas, 2014; Drigas et al., 2006; Pappas &Drigas, 2015). Mobile applications have also been used to address learning disabilities and mental health (Drigas et al., 2020), and robots combined with metacognitive and mindfulness practices have been proposed as a means of including autistic students (Mitsea et al., 2020). Under these conditions the online space may even give a voice to students who struggle socially in face-to-face settings, although this will happen only if the climate is genuinely inclusive.

The circle of support around an adolescent extends, of course, beyond the school. The ACE framework draws attention to students' personal community of support, including parents and siblings (Borup et al., 2020), and schools can help parents understand the purpose of the online community and encourage them to show interest in their children's participation. With adolescents, such involvement has to respect their growing autonomy, but awareness and encouragement from home can help to sustain their engagement.

All of these principles remain hypotheses until their effects are examined, and teachers and schools therefore need to ask whether the online community is actually fostering belonging. Validated instruments such as Rovai's (2002b) Classroom Community Scale or Goodenow's (1993) Psychological Sense of School Membership scale, adapted where necessary, can be combined with short reflective questionnaires, analysis of interaction patterns, and conversations with students. Such evaluation is best understood as formative, since its purpose is to improve the community rather than to grade students on their social participation.

7 CHALLENGES AND LIMITATIONS

The argument of this article should not be read as uncritical enthusiasm for online educational communities, and several challenges need to be acknowledged. The most basic of these concerns access. Participation in online communities presupposes devices, connectivity, and the skills needed to use them, and Livingstone and Helsper (2007) showed that young people's internet use is graded rather than binary, with differences in its quality and breadth linked to age, gender, and socio-economic status. Students with limited access at home may be excluded from the community or may

take part only superficially, so that online communities could deepen rather than reduce inequalities in belonging. Schools therefore need to provide access within the school and to design activities that do not depend on extensive connectivity at home.

Even where access is secured, there is a persistent risk that platforms remain repositories rather than communities. The default use of many LMSs is administrative, centred on uploading materials, collecting assignments, and posting grades, and under the pressure of the curriculum and of teachers' workload this default can easily prevail. The Greek experience of emergency remote teaching showed how quickly the focus can shift to content delivery when teachers lack time and preparation (Jimoyiannis et al., 2021), which suggests that cultivating community requires time, professional development, and institutional support rather than individual goodwill alone.

A subtler difficulty lies in the institutional character of educational platforms. Adolescents' contributions in these spaces are visible to teachers and sometimes to parents, and students may therefore experience them as places of evaluation rather than of genuine community, performing participation without feeling that they belong. Compulsory participation counted towards grades can intensify this effect. The tension between the teacher's role as facilitator of a community and as assessor cannot be eliminated, but it can be managed through transparent norms and through a clear separation between spaces for assessment and spaces for social interaction.

Closely related is the possibility that online spaces reproduce, or even amplify, the social dynamics found offline, including exclusion, cliques, and conflict. Research on adolescents' use of social media points to both the benefits and the pitfalls of online connectedness (Allen et al., 2014), and online educational communities accordingly need clear norms, active moderation, and agreed procedures for dealing with conflict and cyberbullying. Concerns about adolescents' screen time and its relation to loneliness (Twenge et al., 2021) add a further caution, since online educational communities should not add indiscriminately to the time students spend online. The aim is not to move social life online but to use online spaces purposefully, in ways that complement and strengthen face-to-face relationships. Because such communities also generate data about students' participation and interaction, schools must in addition comply with data protection legislation, including the General Data Protection Regulation in the European Union, use institutionally approved platforms, and exercise caution in using learning analytics to monitor students' social behaviour.

Finally, the limitations of the evidence itself should be acknowledged. As noted in Section 5.2, much of the research on online community and belonging comes from higher education, relies on self-report measures, and is correlational. Studies with adolescents in online and blended secondary school settings are relatively few, and studies in the Greek context are rarer still. The design principles proposed in Section 6 should therefore be understood as theoretically grounded hypotheses that require empirical testing rather than as established prescriptions.

8 CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

This article has brought together research on online educational communities and research on adolescents' sense of community and belonging, in order to examine how platforms such as Open eClass and e-me might contribute to adolescents' well-being and learning in blended secondary education. In answer to RQ1, the synthesis began from the observation that an online educational community is not the same as an online platform. A community is a group of learners and teachers who share a purpose, interact over time, and develop norms and relationships, and it may take task-based, practice-based, or knowledge-based forms (Riel & Polin, 2004), which in secondary schools most often appear as class, project, and interest communities. Such communities can support learning by extending the time and space for interaction, enabling collaborative knowledge construction, distributing support, and making learning visible, yet these benefits depend on pedagogical design rather than on the technology itself (Means et al., 2013).

The review further suggests that blended designs offer the most favourable conditions for community, because when online spaces are continuous with the classroom, relationships formed face-to-face carry over online and online interaction in turn strengthens relationships in the classroom (Rovai & Jordan, 2004). Read through the distinction drawn in response to RQ2, between sense of community as a property of the group and sense of belonging as the individual's experience within it, this finding matters greatly for adolescents, for whom a sense of belonging is closely linked to mental health and to well-being in the eudaimonic sense of living and functioning well, since relatedness is one of the basic psychological needs whose satisfaction underpins flourishing (Ryan & Deci, 2000; Ryan et al., 2008). As RQ3 anticipated, belonging matters for learning as well, mainly through its effects on motivation, engagement, and the willingness to take intellectual risks (Korpershoek et al., 2020; Osterman, 2000). With regard to RQ4, the review indicates that the practices that foster belonging, such as caring teacher communication, inclusion, collaborative work, student voice, and opportunities for social connection, can in principle be enacted in online and blended spaces. The design principles proposed in Section 6 offer a framework for doing so, while the challenges discussed in Section 7 caution against naive optimism.

This analysis also opens several directions for future research. Instruments such as the Classroom Community Scale (Rovai, 2002b) were developed with adult learners, and their validity with adolescents and in Greek remains to be examined, possibly alongside adapted versions of the Psychological Sense of School Membership scale (Goodenow, 1993). Once suitable measures are available, design-based research that implements the principles proposed here in real eClass or e-me communities over a full school year would make it possible to observe how belonging develops and which practices make a difference. Comparative and longitudinal studies could complement such work by clarifying the direction of the relationships among online participation, belonging, well-being, and learning.

Quantitative work of this kind would benefit from being accompanied by research that listens to students themselves. Following Tate et al. (2024), qualitative studies could ask Greek adolescents how they experience online educational communities and what makes them feel that they belong, or do not belong, in these spaces, thereby grounding design in students' own experience. Such studies should pay particular attention to equity, examining whether online educational communities narrow or widen gaps in belonging between students from different socio-economic, cultural, and linguistic backgrounds and between students with and without special educational needs. Research within specific subjects is also needed, and studies in English as a foreign language, for instance, could examine how belonging in online communities relates to subject-specific outcomes such as willingness to communicate and language anxiety.

In the aftermath of the pandemic, schools have the infrastructure and much of the experience needed to use online spaces. What remains uncertain is whether these spaces will be used merely to distribute content or will be cultivated as communities in which adolescents feel accepted, valued, and connected. The literature reviewed here suggests that the second option is both feasible and worthwhile, provided that it is pursued with pedagogical intention, care, and critical awareness.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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