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The Role of Self-Determination Theory in Fostering Generation Alpha's Learning Motivation in Digital Learning Environments

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A Research Article

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Abstract
Generation Alpha is the first cohort of digital natives whose learning socialization occurs through smart devices, personalization algorithms, and hybrid learning environments from an early age, making their learning motivation difficult to fully explain through conventional motivational models. This study aims to investigate the role of three basic psychological needs in Self-Determination Theory (SDT) autonomy, competence, and relatedness in shaping Generation Alpha's learning motivation within digital learning environments and to explore how digital self-efficacy features in learners' accounts. Using a qualitative case-study design, data were collected through in-depth interviews, classroom observations, and documentation involving 17 junior high school students, along with teachers and parents at SMP Kihajar Makassar. Thematic analysis revealed six main themes: autonomy in digital learning, competence through instant feedback, relatedness with teachers and parents, digital self-efficacy, distraction and digital self-regulation, and learning engagement. The themes combined SDT concepts with students' own descriptions of using technology. Students who described operating platforms independently also described retrying tasks and seeking extra resources, suggesting that digital self-efficacy may link competence to motivated behavior; this interpretation is tentative. Meanwhile, digital distraction poses a significant challenge that requires active self-regulation and parental support. Theoretically, the competence satisfaction in digital learning is tied to confidence in using the technology itself. Practically, lessons and platforms should offer choice, informative feedback, and adult guidance. The empirical novelty of this study lies in its contextual integration of SDT with digital self-efficacy specifically tailored to Generation Alpha's characteristics within an Indonesian secondary education context.

Keywords: *Self-Determination Theory; Learning motivation; Generation Alpha; Digital learning; Autonomy; Competence; Relatedness.*

1. Introduction

Digital transformation in education has shifted from being a mere teaching aid to a comprehensive learning ecosystem, marked by the growing adoption of adaptive learning platforms, hybrid classrooms, and artificial-intelligence-based recommendation systems across various levels of education. This phenomenon has been further accelerated by the post-pandemic normalization of online learning, in which educational institutions in many countries have retained elements of blended-learning models even after face-to-face instruction fully resumed. Bibliometric studies of the post-pandemic online-learning literature show a sharp increase in research productivity on online learning readiness, student engagement, and self-regulation in digital environments, indicating that this issue is not merely an emergency response but a long-term structural shift in educational practice (Aristovnik et al., 2023). This shift calls for a new understanding of how learning motivation is formed as teaching–learning interactions become increasingly mediated by digital interfaces rather than dominated by conventional face-to-face interaction.

Generation Alpha, commonly defined as the cohort born between 2010 and 2024, is the first generation whose entire cognitive and social development has taken place alongside touchscreen devices, virtual assistants, and highly personalized digital content (McCrindle & Fell, 2020). This generation is described as an even more advanced digital-native cohort than Generation Z, having interacted with AI-based assistants since toddlerhood, showing a strong preference for multimodal content that combines visual, auditory, and kinesthetic elements, and demanding a personalized learning

experience suited to each individual's pace and learning style (Cimene et al., 2024). At the same time, a meta-analysis found a small positive association between media use and attention-related (ADHD-related) behaviors in children and adolescents (Nikkelen et al., 2014), raising concern about vulnerability to digital distraction during learning; the evidence is correlational, and the very idea of a uniformly skilled "digital native" generation has been challenged (Kirschner & De Bruyckere, 2017). This dual characteristic high technological fluency alongside possible attentional difficulties makes Generation Alpha a unique and still poorly understood subject for the study of learning motivation, warranting an in-depth, contextual exploration of learners' subjective experiences rather than surface-level measures such as scores or frequency of technology use.

The issue of learning motivation among Generation Alpha cannot be reduced to mere interest in technology, since an abundance of technology may in fact produce a shallow and transient form of motivation if not balanced by the fulfillment of more fundamental psychological needs. Various reports indicate that using digital devices during learning, when unaccompanied by adequate self-regulation, reduces students' ability to maintain focus and complete academic tasks, as found in studies on digital distraction in secondary and higher-education classrooms (Aivaz & Teodorescu, 2022). This condition gives rise to a digital-education paradox: on the one hand, technology offers personalization and interactivity that can enhance intrinsic motivation, but on the other hand, the same technology can become a source of distraction that erodes learning engagement if instructional design fails to attend to learners' basic psychological needs.

Self-Determination Theory (SDT), developed by Ryan and Deci, offers a relevant explanatory framework for understanding this paradox, as the theory asserts that intrinsic motivation and optimally internalized forms of extrinsic motivation can flourish only when three basic human psychological needs autonomy, competence, and relatedness are satisfied within the social environment in which an individual is active (Ryan & Deci, 2000). Autonomy refers to the need to feel like the source or regulator of one's own behavior; competence refers to the need to feel effective and capable of interacting with the environment; and relatedness refers to the need to feel meaningfully connected to others (Ryan & Deci, 2017). A comprehensive meta-review synthesizing sixty SDT meta-analyses confirms that the validity of these three basic needs is consistently supported across life domains, including education, health, and work, establishing SDT as one of the most empirically supported motivational frameworks to date (Ryan et al., 2022).

Prior research has begun linking SDT to digital-learning contexts, with much of it conducted with university students or adult learners and fewer studies with school-age students. Chiu (2022) surveyed 1,201 Grade 8 and 9 students in Hong Kong during pandemic online learning and found that perceived autonomy, competence, and relatedness all predicted engagement, with relatedness the strongest predictor of behavioral, emotional, and agentic engagement and competence the strongest predictor of cognitive engagement. Meanwhile, Xia et al. (2022) developed an SDT-informed design approach for inclusive AI-based education, emphasizing that AI systems must be deliberately designed to support rather than replace learners' needs for autonomy and competence. In the Indonesian context, the application of SDT to technology-based English-language learning has also begun to draw attention; De Vega and Rahayu (2023), for instance, found that autonomy, competence, relatedness, and motivation were positively correlated with university students' English-learning achievement in digital classrooms at two Indonesian higher-education institutions, while Rahayu et al. (2024) reported that AI-based writing tools such as Grammarly and QuillBot can support psychological needs such as autonomy and relatedness in writing instruction, but also carry risks of over-reliance. These studies consistently indicate the relevance of SDT in digital contexts, yet, to our knowledge, few have examined Generation Alpha learners qualitatively, and Chiu (2022), the closest precedent at the junior high level, relied on survey data. How early adolescents themselves describe need satisfaction in everyday digital learning therefore remains open.

A synthesis of the existing literature reveals three interrelated research gaps. The theoretical gap lies in the still-inadequate conceptual elaboration of how the three SDT basic needs interact with the distinctive generational constructs of Generation Alpha, raising the question of whether the conventional SDT model could usefully be complemented by a candidate concept such as digital self-efficacy in technology-mediated learning contexts. The empirical gap is evident in the predominance of

questionnaire-based research on SDT variables (Chiu, 2022; De Vega & Rahayu, 2023), with limited attention to how learners describe all three basic needs together, in their own words and from multiple perspectives. The methodological gap is reflected in the tendency of research on Generation Alpha to remain descriptive and survey-based (for example, the descriptive-comparative design of Cimene et al., 2024), leaving a lack of qualitative insight into how these learners actually experience and interpret the fulfillment of their psychological needs.

To directly address these three gaps, this study presents a qualitative case-study approach to explore Generation Alpha's digital learning experiences at the junior high school level. The specific objectives of this study are: (1) to empirically examine how the needs for autonomy, competence, and relatedness manifest in learners' real digital learning experiences; (2) to explore whether and how digital self-efficacy features in learners' accounts as a possible link between basic needs and learning motivation; and (3) to explore how learners navigate digital distractions through self-regulation strategies.

In line with these objectives, the study addressed three research questions: RQ1. How do Generation Alpha junior high school students describe the fulfillment of their needs for autonomy, competence, and relatedness in digital learning?, RQ2. In what ways, if any, does digital self-efficacy appear in students' accounts as connected to their competence and learning motivation?, and RQ3. How do students, with their teachers and parents, describe the navigation of digital distraction and the role of self-regulation?

1.1 Self-Determination Theory and the Three Basic Psychological Needs

SDT views human beings as organisms that are naturally growth-oriented, capable of achieving optimal motivation when their social environment supports rather than thwarts three basic psychological needs (Deci & Ryan, 2000). Unlike behaviorist motivational theories that emphasize external reinforcement, SDT differentiates motivation according to its degree of internalization, ranging from amotivation, controlled extrinsic motivation, and internalized extrinsic motivation, to pure intrinsic motivation, on the assumption that the quality of motivation not merely its quantity determines learning outcomes and learners' psychological well-being (Ryan & Deci, 2017). In a learning context, autonomy is reflected in the extent to which learners feel they have choice and control over their learning process; competence is reflected in a felt sense of mastery over material and learning challenges; and relatedness is reflected in the quality of learners' relationships with teachers, parents, and peers throughout the learning process. These three needs are universal, yet their expression may vary across cultural contexts and developmental stages, so their application to child and early-adolescent populations requires indicators operationalized according to learners' cognitive and social developmental stage. Although SDT treats the needs as universal (Ryan & Deci, 2020), scholars continue to debate how far their relative importance and expression vary across cultures and settings (Vansteenkiste et al., 2020), and Chiu (2022) reported a different ordering of needs for school students in online learning than is typical of classroom studies. This debate is unresolved for early adolescents in digital contexts.

Empirical evidence for the validity of SDT continues to grow and strengthen. A meta-review synthesizing sixty SDT meta-analyses concluded that the satisfaction of basic psychological needs is consistently and positively associated with well-being and adaptive outcomes, while frustration of these needs is associated with maladaptive outcomes across life domains (Ryan et al., 2022). Within education specifically, meta-analyses indicate that need-supportive environments are associated with more autonomous motivation, and autonomous motivation with better engagement and achievement (Bureau et al., 2022; Howard et al., 2021). The Indonesian context further enriches this evidence: research on private primary-school teachers in Makassar (a qualitative study of teachers' views) found that an operational curriculum deliberately accommodating learners' autonomy, competence, and relatedness was reported to increase participation, classroom inclusiveness, and learners' sense of ownership over their learning process (Herlina et al., 2025). These findings support SDT as an appropriate framework for analyzing Generation Alpha's learning motivation, although evidence from child and early-adolescent samples in digital learning contexts, particularly outside Western settings, is still limited.

1.2 Generation Alpha as Digital Natives

Generation Alpha is distinguished from earlier digital-native generations by having been exposed, from birth, to smart-assistant technology, recommendation algorithms, and touch interfaces, resulting in learning preferences that are multimodal and demand high interactivity (Cimene et al., 2024). Research

on Generation Alpha's learning behavior emphasizes that this generation is growing up in an ecosystem that is not only digital but hyperconnected, mobile-device-oriented, and visually saturated, making conventional lecture-based and passive-seating teaching approaches increasingly irrelevant to their learning needs (Cimene et al., 2024; McCrindle & Fell, 2020), although these claims rest largely on descriptive and practitioner-oriented sources. At the same time, intensive media use in childhood has been associated with attention-related difficulties (Nikkelen et al., 2014), and large-scale assessment data link device-related distraction in mathematics lessons with lower performance among 15-year-olds (OECD, 2023). These findings are correlational, however, and critics argue that the "digital native" label overstates uniform technological skill and masks large individual differences among young people (Kirschner & De Bruyckere, 2017). This tension between digital fluency and self-regulatory vulnerability is precisely what makes the fulfillment of basic psychological needs particularly structured competence and autonomy crucial in preventing technological interactivity from turning into counterproductive distraction.

1.3 Learning Motivation, Digital Self-Efficacy, and Engagement in Digital Learning

A study of 80 college students found that online learning readiness predicted expected academic outcomes through learners' emotional states, in particular satisfaction (Chien et al., 2022). Another study found that online learning readiness significantly affects self-regulation ability, particularly among Chinese college learners new to online learning, indicating that experience and habituation in interacting with the digital environment also shape learners' self-regulatory capacity (Dai et al., 2023). Relatedly, AI-supported personalization is often presented as a way to tailor material to learners' pace and needs, yet evidence on its motivational benefits is mixed, and SDT-informed work warns that AI tools may weaken users' sense of control when they replace rather than support learner agency (Rahayu et al., 2024; Xia et al., 2022). This inconsistency suggests that technological personalization alone does not automatically increase motivation, but rather depends on the extent to which the technology's design fulfills users' basic psychological needs, as emphasized in the SDT design framework for AI-based education (Xia et al., 2022). Findings from De Vega and Rahayu (2023) among Indonesian EFL university students further reinforce this argument, showing a consistent positive correlation between autonomy, competence, relatedness, and motivation with respect to language-learning achievement across two digital-classroom contexts with differing technological characteristics; because these data are correlational and self-reported, they cannot show that need satisfaction caused better outcomes. Taken together, these studies draw mainly on university or adult samples (Chien et al., 2022; Dai et al., 2023; De Vega & Rahayu, 2023), so their implications for Generation Alpha learners are uncertain.

Self-efficacy theory holds that beliefs about one's capability influence effort, persistence, and task choice (Bandura, 1997); applied to technology, it is plausible that learners who feel capable of using learning technology persist more when learning digitally. Empirical tests of digital self-efficacy as a mediator between SDT needs and motivation are, however, scarce, and the studies reviewed here do not test it directly. Digital self-efficacy overlaps conceptually with SDT's competence need, but the two are not identical: SDT treats competence as an innate psychological need, whereas self-efficacy is a domain-specific belief about one's capability to perform particular actions (Bandura, 1997; Ryan & Deci, 2017). Whether digital self-efficacy expresses, mediates, or is distinct from competence remains an open theoretical question. Related evidence comes from the Rahayu et al. (2024) study on the use of AI-based writing tools such as Grammarly and QuillBot in writing instruction, which showed that aligning AI-tool design with the needs for autonomy, competence, and relatedness can enhance the confidence and engagement of both novice and experienced writers, although the same study warns of over-reliance on AI and a weakened sense of control over one's writing. Similarly, Rahayu et al. (2026) found that the motivational success of project-based learning in EFL writing classrooms depends heavily on explicit support for these three basic needs, with skill-development themes and monitoring/accountability closely related to competence, engagement and participation related to autonomy, and the learning environment and equitable participation related to relatedness. These studies concern writing instruction in language-learning settings rather than the general digital learning of Generation Alpha, so their relevance is indirect. In addition, self-regulation has been identified as an important correlate of how productively learners use digital technology and how easily they are absorbed by digital distraction (Aivaz & Teodorescu, 2022; Chien et al., 2022; Dai et al., 2023). This synthesis suggests that the

relationship between basic psychological needs and learning motivation in digital environments may not be entirely direct and may be partly mediated by constructs such as digital self-efficacy and self-regulation, meaning that models testing only direct relationships risk overlooking important mechanisms that explain variation in outcomes among digital-native learners.

Building on this synthesis, the present study positions itself at the intersection of three lines of inquiry that have thus far developed relatively separately: research on SDT in digital education, which has relied mainly on quantitative or mixed-method designs and, in several cases, on university samples (Chiu, 2022; De Vega & Rahayu, 2023; Xia et al., 2022); research on Generation Alpha's generational characteristics, which has generally been descriptive and survey-based (Cimene et al., 2024); and research on self-regulation and digital distraction, which has generally not been explicitly linked to the SDT framework. Notably, SDT research in the Indonesian context including studies on primary-school teachers (Herlina et al., 2025) and on project-based and AI-assisted writing instruction (Rahayu et al., 2024; Rahayu et al., 2026) has begun to address more varied educational levels and more varied technological contexts, yet to our knowledge none has specifically targeted Generation Alpha as a cohort with unique digital-native characteristics. By integrating these three lines of inquiry into a single conceptual framework explored in depth through a qualitative case-study approach among Generation Alpha learners at the junior high school (early-adolescent) level, this study is expected to yield a more contextual, richly detailed (thick description), and meaningful understanding of the psychological mechanisms underlying the learning motivation of the most contemporary digital-native generation.

1.4 Critical Synthesis: Conflicting Evidence, Theoretical Disagreements, and Unresolved Issues

Three tensions run through this literature. First, evidence on which need matters most is inconsistent. De Vega and Rahayu (2023) reported similarly strong correlations for all three needs ($r = .60$ to $.65$) among university students, whereas Chiu (2022), working with Grade 8 and 9 students, found relatedness to be the strongest predictor of most engagement dimensions and attributed the divergence from autonomy-centered findings partly to pandemic conditions and to cultural differences in how autonomy is experienced (see also Iyengar & Lepper, 1999). Second, features often presented as motivating can have the opposite effect: meta-analytic evidence shows that rewards and controlling contingencies can undermine intrinsic motivation (Deci et al., 1999), a longitudinal classroom study reported lower motivation and satisfaction in a gamified course than in a non-gamified one (Hanus & Fox, 2015), and feedback research shows that its effects depend on content and use rather than on speed alone (Hattie & Timperley, 2007). Third, AI-based personalization may support competence yet also reduce learners' sense of control and encourage over-reliance (Rahayu et al., 2024; Xia et al., 2022).

Theoretical positions also differ on how digital self-efficacy relates to SDT. SDT treats competence as a basic psychological need whose satisfaction supports autonomous motivation (Ryan & Deci, 2017, 2020), whereas social-cognitive theory treats self-efficacy as a domain-specific belief that predicts effort and persistence (Bandura, 1997). Proposals to extend SDT with a technology-specific construct must therefore specify whether the construct expresses competence, mediates its effects, or is a separate variable. In addition, the usefulness of the "digital native" concept itself is contested (Kirschner & De Bruyckere, 2017), which bears directly on assumptions in much Generation Alpha research.

The existing evidence also has limitations. Much of it is self-reported or correlational (Chiu, 2022; De Vega & Rahayu, 2023; OECD, 2023), draws on university or adult samples (Chien et al., 2022; Dai et al., 2023), or concerns writing instruction rather than general digital learning (Rahayu et al., 2024, 2026), and the studies of Generation Alpha that exist are mostly descriptive (Cimene et al., 2024). Unresolved issues therefore include how early adolescents describe need satisfaction in everyday digital learning, whether digital self-efficacy plays any role in linking competence to motivation, and how adult support shapes the self-regulation of digital distraction. The present study explores these questions through a qualitative case.

2. Methods

2.1 Research Design

Unlike structural models used for statistical testing, the conceptual framework in this qualitative case-study research functioned as a sensitizing framework—an initial conceptual lens that directed the focus of observation, interview questions, and data analysis in the field. This study employed a single-case study design to explore a contemporary phenomenon within its real-life context at a specific educational institution (Yin, 2018). A single case was chosen because the aim was an in-depth, context-bound understanding of how need satisfaction is experienced in one digital learning setting rather than statistical generalization (Creswell & Poth, 2018; Stake, 1995). The design was guided by the three research questions stated in the Introduction. The framework integrated six core concepts: the three SDT basic psychological needs (autonomy, competence, and relatedness), digital self-efficacy as a candidate bridging concept to be explored (operationalized here as learners' expressed confidence in using digital platforms independently, as described in their own accounts rather than measured by a scale; cf. Bandura, 1997), and learning motivation and learning engagement as the primary outcomes.

2.2 Setting and Participants

The study was conducted at SMP Kihajar Makassar, an institution that actively implements digital learning platforms and hybrid classroom environments. The school was selected as an information-rich, purposively chosen single case because it actively implements digital learning platforms and hybrid classroom environments. It is not presented as representative of Indonesian schools. Participants were selected through purposive sampling based on the following strict criteria: (a) junior high school students belonging to the Generation Alpha cohort who had used a digital learning platform regularly for at least one semester; (b) teachers who directly facilitated digital learning in the participating classes; and (c) parents or guardians who actively accompanied their children's digital learning activities at home. The final sample comprised 17 students (detailed in Table 1), 4 digital-learning teachers, and 8 parents, allowing the phenomenon to be triangulated from multiple, complementary perspectives.

Sample size was judged using the information power model (Malterud et al., 2016) rather than data saturation alone. Four considerations supported a sample of this size: the study aim was narrow (three basic needs and related digital experiences); the sample was specific (Generation Alpha junior high school students with at least one semester of regular platform use); the study drew on an established theory (SDT); and each student interview, supplemented by teacher, parent, observation, and documentation data, offered rich information for cross-case analysis. The student sample included nine boys and eight girls from Grades 7 (n = 5), 8 (n = 7), and 9 (n = 5) to capture variation in age, gender, and platform use (Table 1).

2.3 Data Collection

The interview guides and observation sheets were developed based on the core SDT constructs and were validated through expert judgment by three experts specializing in educational psychology, qualitative methodology, and child development. Interviews with the 17 students were designed to be brief (20–30 minutes) and utilized visual aids, such as picture cards and simple learning scenarios, to accommodate the cognitive developmental stage of early adolescents. Interviews with teachers and parents lasted between 45 and 60 minutes to capture a broader systemic context.

The student interview protocol was semi-structured and organized around five areas: (1) autonomy (choice of time, media, and task strategies); (2) competence and feedback; (3) relatedness with teachers, parents, and peers; (4) use of digital platforms and confidence in using them; and (5) distraction and self-regulation. Teacher and parent protocols covered the same areas from an adult perspective.

Interviews were conducted in Bahasa Indonesia, audio-recorded, and transcribed verbatim. Excerpts reported in this article were translated into English for reporting, and the original Indonesian wording is retained beside each translated excerpt so that readers can judge the translation.

Classroom observations used the observation sheet, with field notes written during and immediately after each session. Documentation comprised school LMS records and records of at-home learning activities, which were used to cross-check what participants reported.

The field research was completed in April 2026. Data collection was strictly preceded by obtaining written informed consent from parents or guardians, as well as verbal and written assent from the students themselves. All participation was completely voluntary, and all participant identities were strictly anonymized during data transcription and reporting.

2.4 Data Analysis

Data trustworthiness was maintained using data source triangulation (comparing data across students, teachers, and parents) and method triangulation (cross-verifying interviews, classroom observations, and platform documentation). Member checking was conducted by returning interview summaries to the participants to ensure interpretative alignment. An audit trail was maintained to systematically record all methodological and analytical decisions, including codebook revisions, merging or splitting of codes, and the reasons for changes to themes. The collected qualitative data were analyzed using reflexive thematic analysis following the Braun and Clarke approach (Braun & Clarke, 2006, 2021), in which themes are understood as constructed by the researcher through an active, reflexive process rather than as simply emerging from the data (See Table 1). The analytical process occurred in cyclical stages:

a. Familiarization and Open Coding: Identifying initial units of meaning from the raw interview transcripts, observation notes, and school LMS documents. Codes were generated both deductively, from the SDT constructs in the sensitizing framework, and inductively, from students' own descriptions (for example, notification-related distraction).

b. Categorization: Grouping open codes into distinct categories based on their conceptual proximity to the three SDT basic needs and digital self-efficacy, comparing categories across students, teachers, and parents.

c. Theme Development: Synthesizing the categories into final overarching themes that directly explained the psychological mechanisms underlying the students' learning motivation. Candidate themes were checked against the coded extracts and the full dataset before being defined and named. Table 2 illustrates this progression from excerpt to code, category, and theme, following the matrix-display approach of Miles et al. (2014).

Qualitative data analysis software (NVivo 14) was utilized to assist in the systematic management, tracking, and mapping of the codes. Coding and theme development were carried out by the research team using NVivo 14. Because reflexive thematic analysis treats themes as the product of the researchers' interpretive work, inter-coder agreement statistics were not computed; quality was supported by the audit trail, member checking, and triangulation (Braun & Clarke, 2021).

Table 1
Illustration of Theme Development from Excerpt to Code, Category, and Theme

Illustrative excerpt (participant)	Initial code	Category	Theme
"If the material is in a video, ... I choose to watch the video first." (Student B)	Choosing media format	Control over time, media, and task strategy	Autonomy in digital learning
"... I feel confident that I really understand the material. If it's not good yet, I try again." (Student C)	Using instant scores to judge mastery; retrying	Feedback as information about mastery	Competence through instant feedback
"... my teacher always says it's okay to ask." (Student F)	Teacher invites questions; not afraid of mistakes	Teacher and parent support	Relatedness with teachers and parents
"... I usually try it myself first. If I get it wrong, I just try again." (Student I)	Trying new features independently; retrying after errors	Independent use of platforms	Digital self-efficacy
"... a WhatsApp or TikTok notification pops up. I get curious and check it first ..." (Student L)	Notification-triggered task switching	Sources of distraction and control strategies	Distraction and digital self-regulation
"... I look for a video or read	Seeking additional	Initiative and active	Learning

other material to understand it better." (Student P)	resources	participation	engagement

Note. Codes and categories illustrative are drawn from the excerpts reported in the Results

Researcher reflexivity. The researchers recognize that familiarity with SDT and a favorable view of digital learning could shape what was noticed and how excerpts were interpreted. Researcher bias was managed through member checking, triangulation across students, teachers, and parents and across interviews, observations, and documents, an audit trail of analytic decisions, and a search for contrasting cases (for example, students who described being distracted or relying on adults).

3. Results and Discussion

3.1 Results

Thematic analysis of the qualitative data collected from the field yielded six main themes describing how Generation Alpha learners experienced and interpreted their basic psychological needs within Self-Determination Theory (SDT) during digital learning. To ensure participant confidentiality, all identities have been anonymized using alphanumeric codes. Before examining these themes in depth, the comprehensive demographic profiles of the 17 junior high school students who participated as core informants in this study are presented in Table 2 below.

Table 2
The Demographic Profile of the Participants Involved in this Study

Participant Code	Gender	Grade / Class	Daily Screen Time	Digital Platform Used
Student A	Male	Grade 8-A	2–3 Hours	Google Classroom & Quizizz
Student B	Female	Grade 7-B	3–4 Hours	School LMS & YouTube Kids
Student C	Male	Grade 9-A	2–3 Hours	Ruangguru & School LMS
Student D	Female	Grade 8-B	4 Hours	Google Classroom & Canva
Student E	Male	Grade 7-A	3 Hours	School LMS & Duolingo
Student F	Female	Grade 9-B	2–3 Hours	Google Classroom
Student G	Male	Grade 8-A	3–4 Hours	School LMS & Quizizz
Student H	Female	Grade 7-C	2 Hours	Google Classroom
Student I	Male	Grade 8-B	4 Hours	School LMS & Kahoot
Student J	Female	Grade 9-A	3 Hours	Google Classroom & YouTube
Student K	Male	Grade 7-B	2–3 Hours	School LMS
Student L	Female	Grade 8-A	4–5 Hours	Google Classroom & WhatsApp
Student M	Male	Grade 9-C	3 Hours	School LMS
Student N	Female	Grade 7-A	4 Hours	School LMS & TikTok Education
Student O	Male	Grade 8-C	2 Hours	Google Classroom
Student P	Female	Grade 9-B	3–4 Hours	School LMS & YouTube
Student Q	Male	Grade 8-B	3 Hours	Google Classroom

Thematic analysis produced six main themes describing how the basic psychological needs within Self-Determination Theory (SDT) were interpreted by Generation Alpha learners during digital learning. These six themes are: (1) autonomy in digital learning, (2) competence through instant feedback, (3) relatedness with teachers and parents, (4) digital self-efficacy, (5) distraction and digital self-regulation, and (6) learning engagement. Each theme reflects a different dimension of learners' experience within a technology-based learning environment. The thematic structure follows the study's conceptual framework, which positions autonomy, competence, and relatedness as basic psychological needs influencing learning motivation in a digital context. Findings are presented descriptively with participants' own words; interpretation and comparison with prior studies are reserved for the Discussion.

Figure 1
Overview of Thematic Findings on the Fulfillment of SDT Basic Psychological Needs in Generation Alpha's Digital Learning



3.1.1 Autonomy and Competence in Digital Learning

Autonomy was a prominent theme in learners' accounts. Learners described flexibility in determining their study time, choosing learning media, and managing their own task-completion strategies, and several linked this flexibility to feeling calmer or understanding material faster.

> *"Kalau belajar di HP, biasanya saya lakukan setelah makan malam. Rasanya lebih tenang dibanding kalau harus langsung setelah pulang sekolah* [When I study on my phone, I usually do it after dinner. That way I feel calmer than if I have to do it right after school]" (Student A, interview, 19/04/2026)

Another learner similarly explained:

> *"Kalau materinya dalam bentuk video, saya lebih cepat paham dibanding membaca PDF, jadi saya pilih menonton video dulu* [If the material is in a video, I understand it faster than reading a PDF, so I choose to watch the video first]" (Student B, interview, 19/04/2026)

Observation notes indicated that learners used digital platforms' personalization features to determine the sequence of learning activities.

The second dimension of this theme concerns learners' accounts of instant feedback in relation to their sense of competence during digital learning. Learners described various forms of immediate feedback, such as automatic scores, progress indicators, and real-time answer correction, as helping them judge their level of mastery of the material; several said it made them feel more confident. They also described using feedback to reflect on their results, correct mistakes, and try again until achieving a better outcome.

> *"Kalau nilai saya langsung keluar dan bagus, saya jadi yakin kalau saya benar-benar paham materinya. Kalau belum bagus, saya coba lagi sampai nilainya naik* [When my score comes out right away and it's good, I feel confident that I really understand the material. If it's not good yet, I try again until the score goes up]" (Student C, interview, 19/04/2026)

Another learner added:

"Kalau langsung tahu jawaban saya salah, saya bisa langsung lihat jawaban yang benar dan coba lagi [When I find out right away that my answer is wrong, I can immediately see the correct one and try again]" (Student D, interview, 19/04/2026)

A similar experience was shared by a learner who valued the speed of the response:

"Saya senang kalau langsung dapat respons, jadi bisa langsung membetulkan tanpa menunggu lama. Kalau terlalu lama, kadang saya sudah lupa bagian mana yang salah [I'm happy when I get a response right away, so I can fix things immediately without waiting long. If it takes too long, sometimes I've already forgotten which part was wrong]" (Student E, interview, 19/04/2026)

Observation notes indicated that learners displayed enthusiasm upon receiving immediate evaluation results. They tended to repeat exercises, correct inaccurate answers, and strive to improve their scores on subsequent attempts.

3.1.2 Relatedness and Digital Self-Efficacy

This theme concerns learners' accounts of relatedness with teachers and parents. Learners described support from teachers and parents as helping them cope with academic and technical challenges and as making them feel safe to ask questions and to try.

"Kalau saya tidak paham sesuatu, guru saya selalu bilang tidak apa-apa untuk bertanya. Jadi saya tidak takut kalau jawaban saya salah [When I don't understand something, my teacher always says it's okay to ask. So I'm not afraid if my answer is wrong]" (Student F, interview, 19/04/2026)

Student F described a teacher who welcomed questions. A similar experience was shared by another learner who said that a teacher's encouragement made them willing to keep trying:

"Setiap saya selesai mengerjakan tugas, guru saya selalu memberi semangat dan bilang saya sudah berusaha keras. Jadi saya tidak takut salah dan selalu ingin mencoba [Every time I finish a task, my teacher always encourages me and says I've tried hard. So I'm not afraid of making mistakes and I always want to try]" (Student G, interview, 19/04/2026)

Beyond the teacher's role, parental support also emerged as an important part of learners' experience of studying at home. One learner explained:

"Kalau belajar di rumah, biasanya saya selesaikan sendiri. Kalau ada yang sulit, baru saya minta bantuan ayah atau ibu [When I study at home, I usually finish things on my own. If I come across something difficult, only then do I ask my dad or mom for help]" (Student H, interview, 19/04/2026)

Observation notes indicated that teachers gave learners opportunities to ask questions, discuss, and share opinions during learning. Documentation of at-home learning activities indicated that parents helped when learners had difficulties with material or digital devices.

A further set of accounts concerned learners' use of digital devices and platforms. Several learners described operating technology independently, exploring app features, retrying after errors, searching for materials, and completing tasks without others' help.

"Kalau ada fitur baru di aplikasi, saya biasanya coba sendiri dulu. Kalau salah, saya coba lagi [If there's a new feature in the app, I usually try it myself first. If I get it wrong, I just try again]" (Student I, interview, 19/04/2026)

Student I described exploring a new feature through independent trial and error. A similar experience was shared by a learner who used technology as an additional learning resource:

"Saya lebih suka belajar lewat aplikasi karena bisa langsung cari materi atau video kalau tidak paham sesuatu [I prefer learning through apps because I can immediately look for materials or videos when I don't understand something]" (Student J, interview, 19/04/2026)

Growing independence in using learning platforms was also reflected in the following experience:

"Sekarang saya sudah bisa masuk kelas online sendiri, buka materi, dan mengerjakan tugas tanpa perlu bantuan lagi [Now I can log into the online class by myself, open the material, and do the assignment without needing help anymore]" (Student K, interview, 19/04/2026)

Observation notes indicated that most learners could operate digital learning platforms independently, including accessing materials, uploading assignments, and using features available on the Learning Management System (LMS). These accounts describe independent platform use and persistence after errors. Participants did not directly connect their confidence in using technology to their motivation to learn; any link between digital self-efficacy and motivation is therefore treated as an interpretation in the Discussion rather than as a finding of the Results.

3.1.3 Digital Self-Regulation and Learning Engagement

Learners described digital distraction as a challenge that accompanied easy access to learning resources. Notifications from social media, messaging applications, and digital games were commonly mentioned sources of disruption during learning. Nevertheless, learners displayed varying degrees of self-regulatory ability in managing these disruptions. Some learners were able to control the impulse to access other applications and refocus their attention on learning tasks, while others still required guidance from teachers or parents to remain focused.

"Kalau lagi belajar, kadang ada notifikasi WhatsApp atau TikTok. Saya jadi penasaran dan cek dulu, terus lupa masih ada tugas yang belum selesai [When I'm studying, sometimes a WhatsApp or TikTok notification pops up. I get curious and check it first, then I forget there's still an unfinished assignment]" (Student L, interview, 19/04/2026)

Student L described losing track of an unfinished assignment after checking a notification. In contrast, another learner described a different strategy:

"Saya biasanya menyelesaikan semua tugas dulu, baru setelah itu boleh buka media sosial atau menonton video [I usually finish all my assignments first, and only after that am I allowed to open social media or watch videos]" (Student M, interview, 19/04/2026)

However, not all learners were able to maintain self-control consistently. One learner explained:

"Kadang setelah selesai satu tugas saya buka game sebentar, tapi malah main lebih lama dari belajar [Sometimes after finishing one assignment I open a game for a while, but I end up playing longer than I study]" (Student N, interview, 19/04/2026)

Observation notes indicated that learners' attention shifted when notifications appeared or when they switched to another application during learning. In some situations, teachers provided reminders to redirect learners' focus back to learning activities, and at home parents supervised device use.

The final dimension of this theme concerns learning engagement, described by learners as active participation during digital learning. Learners' accounts of engagement included their willingness to ask questions, participate in discussions, take the initiative to seek additional learning resources, and consistently complete assigned tasks. Some learners linked engagement to teachers' invitations to ask questions (Student O).

"Kalau guru memberi kesempatan bertanya, saya biasanya langsung bertanya kalau ada materi yang belum saya pahami. Saya merasa lebih cepat paham kalau langsung berdiskusi [When the teacher gives us a chance to ask questions, I usually ask right away if there's material I haven't understood. I feel like I understand faster when I discuss it directly]" (Student O, interview, 19/04/2026)

Student O described asking questions right away when the teacher gave the opportunity. A similar pattern appeared among learners who showed initiative in independently expanding their understanding:

"Kalau saya tidak paham sesuatu saat pelajaran, saya cari video atau baca materi lain supaya lebih paham [If I don't understand something during the lesson, I look for a video or read other material to understand it better]" (Student P, interview, 19/04/2026)

Learning engagement was also reflected in learners' sense of responsibility in completing academic tasks:

> *"Saya selalu berusaha mengumpulkan tugas sebelum tenggat waktu karena saya ingin semuanya selesai tepat waktu* [I always try to submit my assignments before the deadline because I want everything finished on time]" (Student Q, interview, 19/04/2026)

Observation notes indicated that learners who were active during digital learning more frequently asked questions, responded to material, and participated in class discussions.

3.2 Discussion

This section interprets the findings in relation to SDT and prior research, including studies whose results differ from those reported here. Because the data are self-reported accounts from one school, the interpretations below are analytic propositions rather than causal claims.

3.2.1 Basic Psychological Needs in Learners' Digital Learning Experiences

The accounts are broadly consistent with SDT's proposition that autonomy, competence, and relatedness relate to learning motivation (Ryan & Deci, 2017, 2020). Learners who described choosing when, how, and in what order to study (Students A and B) reported feeling calmer or understanding faster, which fits the view that perceived choice supports a sense of ownership of learning. Their use of immediate feedback to judge mastery and try again (Students C to E) fits SDT's account of competence, in which informational rather than controlling feedback supports intrinsic motivation, and research showing that the effects of feedback depend on its content and use more than on its timing (Hattie & Timperley, 2007). Accounts of teachers who welcomed questions and encouraged effort, and of parents who helped with difficulties (Students F to H), fit the relatedness need and the finding that autonomy-supportive, involved teaching is associated with student engagement (Reeve & Cheon, 2021).

Several findings from other studies complicate this picture. Chiu (2022), working with Grade 8 and 9 students in Hong Kong, found relatedness to be the strongest predictor of most engagement dimensions, whereas De Vega and Rahayu (2023) found similarly strong correlations for all three needs among university students. The present qualitative data do not allow the needs to be ranked, so differences from these survey-based results may reflect context (post-pandemic hybrid learning rather than emergency remote learning), method, or culture rather than a contradiction. Evidence on instant feedback is also mixed: rewards and controlling contingencies can undermine intrinsic motivation (Deci et al., 1999), and a gamified course produced lower motivation and satisfaction than a non-gamified one in a longitudinal classroom study (Hanus & Fox, 2015). Students here described feedback as information for correcting mistakes, but several of the platforms they used (for example, Quizizz, Kahoot, and Duolingo; Table 1) include scoring features that can also be experienced as controlling, and the present data cannot distinguish these experiences.

3.2.2 Digital Self-Efficacy as a Tentative Bridging Concept

Digital self-efficacy appeared in students' accounts as independent use of platforms, exploring features, and retrying after errors (Students I to K). It did not appear as an explicit explanation of why students were motivated, and students did not directly connect their confidence with technology to their motivation. The claim that digital self-efficacy bridges competence and learning motivation is therefore an interpretation that this study cannot confirm; it is better treated as a proposition for testing. The interpretation is nevertheless plausible for three reasons. First, students who described independent platform use also described persistence (trying again) and initiative (seeking videos and other materials; Students I, J, and P), behaviors that self-efficacy theory associates with strong capability beliefs (Bandura, 1997). Second, SDT scholars argue that technology-supported learning should be designed to build users' competence (Ryan & Deci, 2020; Xia et al., 2022). Third, work on AI writing tools reports that digital tools can strengthen writers' sense of competence, although they can also encourage over-reliance (Rahayu et al., 2024).

Alternative explanations must also be considered. Independent platform use could reflect familiarity, school requirements, or habit rather than confidence that fuels motivation; confidence and motivation may influence each other in both directions; and the accounts may have been shaped by the interview

prompts. Conceptually, SDT treats competence as an innate need, whereas self-efficacy is a domain-specific belief about capability (Bandura, 1997; Ryan & Deci, 2017), and whether digital self-efficacy is a form of competence, a mediator, or a separate construct remains unresolved. Studies that measure digital self-efficacy, need satisfaction, and motivation together, and that include students with low digital self-efficacy, are needed to test the proposition.

3.2.3 Balancing Digital Distraction with Self-Regulation

Students' accounts of notification-driven task switching (Student L), delayed gratification (Student M), and extended game play (Student N) suggest that need-supportive conditions may not be sufficient on their own to sustain focus when attractive alternatives are one tap away. This is consistent with research on digital multitasking in learning (Aivaz & Teodorescu, 2022) and with PISA 2022 data in which students who reported being distracted by other students' use of digital devices in mathematics lessons scored lower on average (OECD, 2023); both are correlational and do not show that distraction explains the present participants' motivation. Teacher reminders and parental supervision (Section 3.1.3) suggest that adult support complements learners' own self-regulation, in line with SDT's emphasis on structure and involvement in the social context (Ryan & Deci, 2017) and with teachers' views reported in Indonesian SDT-based curriculum work (Herlina et al., 2025). The varied self-regulation described by students also fits critiques of a uniform "digital native" image (Kirschner & De Bruyckere, 2017): technological fluency did not translate into uniform focus.

3.2.4 Academic Contribution and Theoretical Implications

This study makes three contributions. First, it adds qualitative evidence from early adolescents themselves, triangulated with teacher, parent, observation, and documentation data, to a literature dominated by surveys and university samples. Second, it offers a testable proposition: in technology-mediated learning, competence satisfaction may be expressed through learners' confidence in using the technology itself, which may help turn competence into persistence and initiative. The proposition is tentative because the data show co-occurrence in accounts rather than a mechanism. Third, it shows that adult support from teachers and parents remains part of how Generation Alpha learners manage digital distraction, which qualifies the assumption that digital natives need little guidance. Theoretically, the findings suggest that SDT's three needs remain useful for understanding early adolescents' digital learning, but that how the needs are met may depend on technology skills and on the self-regulation of distraction; extending SDT with technology-specific constructs should be tested rather than assumed.

3.2.5 International Relevance

Although the data come from one Indonesian school, the findings speak to issues that are international. SDT posits universal needs while allowing cultural variation in how they are experienced (Ryan & Deci, 2020); Chiu (2022) found a different ordering of needs in Hong Kong, and cultural interpretations of autonomy differ (Iyengar & Lepper, 1999). Concerns about device-related distraction and about whether technology improves learning appear in international assessment data and policy reports (OECD, 2023; UNESCO, 2023). The findings cannot be generalized statistically, but they may be transferable to similar settings, that is, schools with blended learning, early adolescent learners, and active parental involvement (the parents in this sample were selected for supporting home learning), and they provide hypotheses for cross-national studies.

3.2.6 Educational and Policy Implications

For education, the findings suggest that digital lessons offering structured choice, informative feedback, and approachable teachers and parents may support need satisfaction, and that explicit teaching of platform skills and self-regulation strategies may matter as much as providing devices. For policy, the evidence reviewed here supports guidance that treats device use as a pedagogical decision, pairs technology adoption with teacher training and family communication, and monitors distraction, consistent with international policy recommendations (OECD, 2023; UNESCO, 2023). These implications are tentative because they derive from a single-case qualitative study; practical recommendations by stakeholder are given in the Conclusion.

4. Conclusion

This qualitative case study suggests that the application of Self-Determination Theory (SDT) to Generation Alpha learners in digital environments requires attention to their technological traits. In this school, learners' accounts of autonomy, competence, and relatedness were bound up with the digital platforms they use daily. An exploratory finding is that digital self-efficacy, understood as learners' confidence in using platforms independently, appeared alongside the competence need and may help link it to persistence and initiative. Because students did not explicitly connect the two, this link is offered as a proposition for testing, not as a demonstrated mechanism. Whether low digital self-efficacy leads to frustration and reduced engagement was not examined, because the study did not purposively include students with low digital self-efficacy; this question is left for future research. Digital distraction remained a challenge that students managed with varying success and with support from teachers and parents.

The main limitation of this study lies in its qualitative single-case design, which focused specifically on the junior high school context at SMP Kihajar Makassar. While these qualitative insights provide a deep, contextualized understanding of early adolescent Generation Alpha learners, the findings cannot be directly generalized to different educational levels, such as primary or tertiary education, or to schools with significantly lower levels of digital infrastructure. Further limitations should be noted. First, the data are largely self-reports from children, who may give socially desirable answers or find it hard to articulate their motivation, although triangulation with teachers, parents, observations, and documents partly mitigates this. Second, researcher bias is possible because interpretations were constructed by researchers familiar with SDT; member checking, reflexive practices, and an audit trail were used to manage it but cannot remove it. Third, data were collected over a short period, so the study cannot show how motivation and self-efficacy change over time. Fourth, interviews were conducted in Indonesian and excerpts were translated into English, which may have altered nuance. Fifth, students with low digital self-efficacy were not purposively sampled, so claims about them cannot be supported by the present data.

4.1 Practical Recommendations and Future Research

The following recommendations are drawn from the themes and the literature discussed above and should be treated as tentative given the single-case design.

Teachers. Design digital lessons that offer structured choices (for example, between video and text, or in the order of activities) while keeping learning goals clear; use feedback tools so that learners are told what to fix and how to retry, rather than only being scored or ranked; keep inviting questions and acknowledging effort; teach platform skills and routines for managing notifications explicitly rather than assuming digital fluency; and agree simple routines with parents, such as finishing tasks before using leisure applications.

School leaders. Provide onboarding in platform use for students, teachers, and parents; set clear and consistent norms for device use during lessons; provide professional development in need-supportive teaching; and create channels for teacher-parent communication about home learning.

Curriculum developers. Embed digital learning skills and self-regulation strategies as explicit learning outcomes; build flexible learning pathways, in line with differentiated learning in Indonesia's Kurikulum Merdeka; and design assessment tasks that give informative feedback and allow revision and resubmission.

Educational technology developers. Prioritize feedback that explains errors and invites another attempt over points or leaderboards that may feel controlling; include notification controls and focus modes; provide progress indicators that learners can use to judge their own mastery; and give parents appropriate, privacy-respecting views of children's progress.

Policymakers. Treat technology adoption as a pedagogical decision supported by evidence, with investment in teacher training, learners' digital skills, and family communication; develop guidance on device use in classrooms that addresses distraction; and support research that monitors both benefits and risks (OECD, 2023; UNESCO, 2023).

Future research should expand on these findings by employing quantitative or mixed-method designs to test the relationships proposed in this study's framework, including whether digital self-efficacy mediates the link between competence and motivation, across a larger and more geographically diverse sample of schools in Indonesia and other countries. Future studies should include students with varied levels of digital self-efficacy, use direct measures of motivation and longer observation periods, and examine whether instant-feedback features are experienced as informational or controlling. Additionally, longitudinal studies are recommended to track how the interaction between digital self-efficacy and basic psychological needs evolves as Generation Alpha learners transition into higher education and face more complex hybrid learning systems.

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Conflict of Interest

The author declares that there are no competing interests or conflicts of interest regarding the publication of this manuscript.

Declaration of AI Use

During the preparation of this manuscript, the author used AI-assisted tools solely to improve language clarity and readability. After using this tool, the author thoroughly reviewed and edited the content and take full responsibility for the final version of the publication.

Author Contributions Statements

R: Conceptualization, methodology, data collection, formal analysis, investigation, and writing. original draft, review, and editing.onceptualization, methodology, data collection, formal analysis, and writing. Original draft, review, and editing.

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Biography

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