Constructing Pathways to Success: Resilience in Vocational Education

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Abstract

This study examines the development of resilience-promoting environments within vocational education, focusing on *Ettore Bugatti Vocational High School* in France. Using a constructivist epistemology and an inductive qualitative approach, this research explores the contextual and experiential factors of resilience process that contribute to student perseverance in a vocational school setting and overcome educational obstacles such as school dropouts, academic failures, etc. Data were collected over a three-year period (2015–2018) through semi-structured interviews, focus groups, classroom observations, and document analysis, ensuring a comprehensive understanding of observable resilience processes. Findings reveal 25 resilience indicators across five dimensions: interpersonal relationships, personal development, emotional resilience, educational strategies, and socio-cultural integration. Rather than seeking generalization, this study highlights the co-construction of knowledge within a specific socio-educational environment, offering insights that are transferable to similar vocational institutions. The results underscore the importance of institutional policies, pedagogical strategies, and school culture in shaping resilience, reinforcing the need for holistic approaches to reducing dropout rates in vocational education. This research contributes to the broader discussion on educational resilience by demonstrating how context-specific interventions can create supportive learning environments that empower students to navigate challenges and persist in their academic and professional trajectories. Future studies could further explore the applicability of these resilience indicators in diverse cultural and educational settings, enhancing our understanding of resilience as a dynamic and contextually embedded process.

Keywords: Resilience, Constructivism, Vocational Education, School Dropout, Contextual Knowledge

Introduction

Resilience, broadly defined as the capacity to overcome challenges and recover from adverse experiences, plays a crucial role in educational contexts. This is particularly true in vocational education settings, where students often face unique challenges linked to socio-economic vulnerabilities and educational disruptions (Ungar, 2013). This study focuses on how the Ettore Bugatti Vocational High School in Mulhouse[1], France, fosters resilience among its students by emphasizing protective factors and implementing targeted intervention strategies to combat school dropouts. While previous research highlights the role of resilience in improving socio-emotional skills and academic performance (Masten, 2001; Rutter, 1985; Luthar & Cicchetti, 2000; Southwick & al., 2014), there remains a lack of understanding about how specific institutional policies and initiatives contribute to building resilient learning environments in education, particularly in addressing school dropout in vocational school. This paper seeks to fill this gap by providing an in-depth analysis of resilience process through initiatives at Ettore Bugatti Vocational High School, supported by empirical data and insights from academic literature.

Unlike vocational education models in North America, which often operate within post-secondary institutions, vocational high schools (*lycées professionnels*) in France are distinct secondary schools specifically designed to prepare students for rapid workforce entry after middle school. These institutions are not an alternative track within general education but standalone schools that offer specialized technical and professional training. Students typically enter vocational high schools at the age of 15, immediately following their completion of middle school. Unlike general or technological high schools, which emphasize academic and theoretical preparation, vocational high schools in France focus on developing professional skills with the objective of ensuring direct employment opportunities upon graduation or facilitating access to further technical education (Lefer Sauvage & al., 2024). Vocational training is structured around two main qualifications: the

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[1] A 2015 study by INSEE (the French National Institute for Statistics and Economic Studies) highlighted that early school leaving is primarily an urban phenomenon, with vocational courses disproportionately affected. This trend continues, with Mulhouse remaining particularly affected. The dropout rate in Mulhouse is around 10%, one of the highest in the Alsace region. The city's socio-economic conditions exacerbate this problem, with around 30% of the population living below the poverty line. At the regional level, data show that the Mission for the Prevention of Early School leaving in this region supports nearly 1,400 young people aged 16 to 18, compared to over 1,700 in 2021-20221. In response to these persistent challenges, a number of new initiatives have been launched, including the "Ambitions Mulhouse" plan, which has been awarded a €7 million grant over five years as part of France 2030's "Innovation in schooling"[1]. These data and initiatives underscore the critical need for innovative and context-specific approaches to combat early school leaving, enhance school persistence, and reduce educational inequalities.

Certificat d'Aptitude Professionnelle (CAP)[2], a two-year program centered on foundational vocational skills for students aiming for quick access to entry-level jobs, and the *Baccalauréat Professionnel (Bac Pro)[3]*, a three-year program that integrates general education with advanced technical training, equipping students with the competencies required for higher-level technical positions or specialized post-secondary studies.

This model is fundamentally different from vocational education in North America, particularly in the US where work-based learning is often optional or occurs at the post-secondary level. In France, these practical experiences are a core part of the curriculum, reinforcing the connection between education and employability. However, vocational high schools face persistent challenges, including social stigmatization and higher dropout rates compared to general and technological high schools. Studies by Caro (2017) and Many (2021) highlight the strong correlation between socio-economic precarity and school dropout, particularly in vocational settings where students often come from disadvantaged backgrounds. Financial instability and limited parental educational attainment further restrict access to academic support, exacerbating inequalities and increasing dropout risks. Recognizing these challenges, France has introduced targeted policies to address school dropout, particularly in vocational education. Initiatives such as Relay Programs focus on providing individualized interventions, remedial education, and specialized psychological support. Despite the multiplicity of measures implemented by the French education system to combat school dropout in vocational schools, challenges persist.

In this context, we conducted action research at the Ettore Bugatti Vocational High School from 2015 to 2018 to understand the phenomenon of academic resilience in relation to the school perseverance policy advocated by the institution, which yielded positive results. This study as part of a broader school retention program, leverages data collected from administrators, teachers, and students through semi-structured interviews, focus groups, and participant observation (Creswell & Poth, 2018). Adopting a constructivist perspective, this research seeks to valorize knowledge produced within the specific socio-educational context of Ettore Bugatti Vocational High School, capturing the unique individual and collective experiences of its stakeholders (Charmaz, 2014; Corbin & Strauss, 2015). Closely aligned with an ethnographic approach in education, it emphasizes the lived realities of both the researcher and participants, documenting the multidimensional processes of resilience as they are perceived and co-constructed. This

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2 Equivalent in the United States to Career and Technical Education (CTE), particularly CTE Programs, which allow students to obtain industry certifications (e.g., in mechanics, cooking, personal care, etc.), enabling them to enter the job market directly after the equivalent of high school.

3 Equivalent in the United States to the Associate Degree (2 years) or a Technical Certificate from a community college or technical school, providing advanced training and qualifications for more specialized jobs.

descriptive paradigm fosters a deep understanding of the interplay between individual agencies and collective resilience within the vocational school setting. By addressing these foundational aspects, the article aims to bridge the gap between the theoretical underpinnings of resilience and the practical challenges of combating school dropout. This dual focus seeks to provide actionable insights for creating resilient educational environments capable of supporting students who have experienced significant disruptions, including repeated school failures (Mercier, 2023).

The article begins with a literature review that contextualizes resilience in education, examining its conceptual foundations, theoretical frameworks, and specific relevance to vocational education. It then presents the case of Ettore Bugatti Vocational High School, whereas the resilience-oriented institutional strategies implemented to address dropout prevention. This is followed by the results section, which introduces 25 resilience indicators identified through the study, categorized into five key dimensions: interpersonal relationships, personal development, emotional resilience, educational strategies, and socio-cultural integration. Then, the methodology section outlines the constructivist and inductive research design, emphasizing the grounded theory approach used to analyze and interpret data for defining results. The discussion situates these findings within existing resilience research, highlighting their implications for educational policy and practice, particularly in vocational settings. Finally, the conclusion reflects on the study's contributions, acknowledges its limitations, and proposes directions for future research, emphasizing the need for continued exploration of resilience-building mechanisms in diverse educational contexts.

Conceptual and Epistemic Foundations of Resilience in Education

Resilience, a concept explored across multiple disciplines—including psychology, sociology, and educational sciences—refers to the capacity of an individual, a group, or a system to adapt positively to adversity. The term originates from the Latin *resilientia*, meaning "to bounce back" or "to recover." Its scientific use dates back to Francis Bacon (1626), who employed it to describe the phenomenon of echo. In physics, resilience is defined as a material's ability to return to its original shape after deformation. In human sciences, particularly in francophone educational research, resilience is understood as an individual's ability to navigate and adapt to adverse environments successfully (Terrisse & Larose, 2001). The concept gained prominence in France through the work of neuropsychiatrist Boris Cyrulnik in the 1990s. Drawing on his personal experience as a Jewish child deported during World War II, Cyrulnik (2002) explored why some children recover from psychological trauma while others develop long-term distress or perpetuate cycles of suffering. His research led to the notion of resilience tutors—key figures such as teachers or mentors who provide supportive and protective environments, particularly for

children facing adversity (Cyrulnik, 2020).

In this study, the concept of resilience in education has been explored through the lens of trauma, in reference to the work of Boris Cyrulnik (2002, 2019), who conceptualizes resilience as a process of reconstruction following adversity. In this perspective, a rupture or traumatic event, whether personal, social, or academic, can act as a defining moment in a student's trajectory, either leading to disengagement or serving as a catalyst for personal growth. School dropout, understood as an educational rupture, can thus be analyzed as a form of "trauma" to describe a moment of existential discontinuity that affects an individual's self-perception and development (Pourtois & al., 2012). In the context of *Ettore Bugatti Vocational High School*, dropout is not merely a symptom of academic failure but a marker of a deeper rupture in a student's sense of belonging and self-construction within the school environment. From a resilience-based perspective, educational institutions can play a critical role in transforming these ruptures into opportunities for reconstruction, providing students with the support systems, pedagogical frameworks, and social connections necessary to rebuild their confidence and engagement.

In vocational education, where students often arrive after academic difficulties or personal setbacks, the school environment must act as a protective space that nurtures self-reinvention. This aligns with Cyrulnik's (2002) assertion that resilience is not solely an individual trait but a socially mediated process, requiring external support, guidance, and structured interventions. By linking the concept of trauma to the resilience-building process, we suggest the idea that vocational schools are not merely sites of technical training but also spaces of social and psychological reconstruction. It raises important questions about how educational policies and institutional practices can be designed to provide students with the necessary conditions to transform adversity into a steppingstone for personal and academic perseverance. These reflections contribute to a broader understanding of resilience as an active, socially supported process, rather than an inherent trait, offering new perspectives on how schools can become catalysts for identity reconfiguration and long-term success.

Furthermore, research in education shows that resilience encompasses multiple dimensions, from the individual capacity of students to persist despite challenges, to the ability of educational institutions to withstand external pressures such as economic instability, policy shifts, or large-scale crises like pandemics (Zins & al., 2004). At the student level, resilience is reflected in perseverance, emotional regulation, and sustained engagement despite adversity (Duckworth & Seligman, 2005). Empirical research highlights the importance of positive school climates, strong teacher-student relationships, and support structures, including psychological counseling and extracurricular activities, in fostering resilience (Weist & al., 2012; Fredricks & Eccles, 2006). Teachers, as central figures in the educational process, also require resilience to navigate the demands of their profession. Their ability to adapt, manage stress, and sustain long-term motivation depends

on professional development opportunities, collegial support, and institutional leadership (Benard, 1991). More broadly, the concept of educational resilience extends to entire school systems, requiring robust governance, resource allocation, and community engagement to withstand disruptive factors (Agasisti & al., 2018).

In social studies, the concept of resilience is shaped by cultural and environmental contexts, with notable differences in its manifestation across societies (Ngnafeu, 2024). In collectivist cultures, resilience is often linked to community support and collective well-being, whereas in individualistic contexts, it is more associated with self-reliance and personal agency (Dweck, 2006, Many, 2021, Ngnafeu, 2024). Increasingly, researchers are examining the impact of environmental factors on resilience within educational settings. For instance, studies on vocational education highlight the influence of school infrastructure, natural light, air quality, and flexible learning spaces on student engagement and academic performance (Barrett & al., 2015). Beyond physical conditions, also school culture—including teacher-student relationships and parental involvement—plays a crucial role in reinforcing resilience (Luthar & Cicchetti, 2000; Bukowski & al., 2000). Programs promoting social-emotional learning have thus been integrated into educational policies to strengthen resilience through emotional regulation, goal-setting, and interpersonal skills.

Over time, the understanding of resilience has evolved from an emphasis on risk and protective factors to a recognition of personal agency and self-efficacy (Braud, 2017). Yeager (2012) highlights the importance of a growth mindset in fostering resilience, arguing that students' belief in their ability to develop personal strengths enhances academic achievement and adaptability. Research consistently demonstrates that positive interactions between students and teachers, as well as parental involvement, help mitigate stress and foster resilience (Pianta & al., 2003; Gutman & Feinstein, 2008; Wong, 2008). While the effectiveness of resilience-building strategies varies according to socio-economic and cultural contexts, a key theme recurring is the need for holistic approaches that integrate educational, psychological, and social support mechanisms.

Given the increasing recognition of resilience as a fundamental determinant of educational success, schools and policymakers are embedding resilience-building strategies within curricula and institutional frameworks (Masten, 2001; Luthar & Cicchetti, 2000; Southwick & al., 2014). Structured programs that teach coping strategies, promote emotional regulation, and create psychologically safe learning environments have been shown to improve students' ability to navigate academic and personal challenges (Yeager & Dweck, 2012; Zins & al., 2004; Gutman & Feinstein, 2008). However, the effectiveness of these interventions depends on their articulation between national educational policies and institutional-level strategies. Studies on school resilience indicate that while national policies provide the structural foundation for resilience-building initiatives, their success depends on how they are implemented at the local level through governance, teaching

methodologies, and student support systems (Blaya, 2010; Morel, 2014; Lamamra & Masdonati, 2009). Without a coherent alignment between macro-level policies and micro-level institutional strategies, resilience programs risk being fragmented and ineffective. At the heart of these efforts lies the concept of resilience in the context of vocational education takes on a multifaceted character. It encompasses not only academic perseverance but also the ability to navigate the complex interplay between theoretical learning and practical, work-based experiences. As Lamamra and Masdonati (2009) argue, resilience in vocational settings involves adaptability to the demands of the professional world, the capacity to manage the transition between classroom and workplace environments, and the development of a robust professional identity (Lefer Sauvage & Mercier, 2022). The unique challenges faced by vocational high school stem from various factors. Jellab (2015) points out that many students enter these institutions having already experienced academic setbacks, often compounded by socio-economic disadvantages. This background creates a complex tapestry of needs those traditional educational approaches may struggle to address. Consequently, fostering resilience becomes not just an educational goal but a necessary survival skill for many students. By cultivating a supportive and inclusive educational environment, Bugatti High School operationalizes resilience within a structured conceptual framework that emphasizes the importance of strong student-educator relationships, academic and emotional support resources, and a sense of belonging within the school community. The school's approach reinforces the idea that resilience is not solely an individual trait but a capacity that emerges within a structured and responsive educational environment.

Our analysis focuses on two key dimensions of resilience observed through policies and initiatives embedded by the school. On the one hand, collective resilience, which manifests through the coordinated mobilization of the school institution—where educational teams and teaching staff work together to overcome challenges and create a positive learning climate. On the other hand, individual resilience, which is observable in the transformation of students, including renewed interest in learning and positive changes in their attitudes toward school. These two dimensions intertwine and reinforce one another, forming a virtuous cycle conducive to academic success. The interaction between institutional policies, educational practices, and individual student responses creates a resilient school ecosystem, where both students and educators contribute to and benefit from a shared culture of perseverance. In the next section, we will present the specific policies implemented at Ettore Bugatti Vocational High School. This will include an utterance of the various initiatives designed to foster a supportive learning environment, strengthen mentorship, and integrate socio-professional partnerships.

Ettore Bugatti Vocational High School: Strategies and Policies for Building a Resilient Educational Environment

Ettore Bugatti Vocational High School is a telling example of how resilience-focused policies can transform an institution struggling with dropout issues. By 2014, recognizing the urgent need for intervention, the Academic Inspectorate initiated a school-wide reform aimed at placing students back at the center of the educational process. The goal was to restore engagement and motivation by creating conditions for academic success, ensuring that students acquired both the knowledge and competencies necessary for professional integration. The school's educational philosophy was redefined around three fundamental principles: *"listening," "benevolence," and "consideration."*

To operationalize this vision, working groups were established, uniting teachers and student support staff to diagnose key dropout factors and develop a local institution-wide response strategy. The experience emphasized the importance of teacher-student relationships, leading to a training program in partnership with the LISEC research laboratory and the University of Haute Alsace. It is in this context that we intervened in the establishment to conduct research between 2015 and 2018. This initiative aimed to harmonize teaching practices and enhance student engagement, positioning teachers as agents of resilience rather than just knowledge providers. As M. Neher, the school principal, explained, "We cannot change students, but we can help them see school in a more positive light through their interactions with teachers."

This approach, however, faced resistance from some educators, who feared that emphasizing benevolence could be misinterpreted as leniency and undermine discipline. Some teachers argued that students exploited this approach to justify behaviors such as chronic tardiness, a critical issue in vocational education, where workplace readiness is a key competency. M. Neher acknowledged these concerns but clarified that the policy was not about lowering expectations but about ensuring that students feel valued while maintaining institutional standards. "The student must be welcomed and respected, but always within the framework of school expectations," he stated. The roots of this philosophy can be traced back to the school's founding principles in 1949, when the original director of Ettore Bugatti Vocational School advocated a clear vision of his education policy: "*The student must be carefully supported, monitored, and guided.*"

To address school dropout and enhance student resilience, *Ettore Bugatti Vocational High School* implemented a comprehensive educational policy structured around five key areas of action, each designed to create a more inclusive, supportive, and engaging learning environment.

The first pillar focused on improving student integration and support, ensuring that newly enrolled students experienced a smooth transition into the school community. The *SAS (Airlock) Program* was introduced as a flagship initiative, providing structured

mentorship and personalized guidance for students during their first four weeks at the school. Each student was paired with two teachers who helped them navigate the school environment, establish peer connections, and feel welcomed and supported. Additionally, the *AITP (Adapted Initial Training Paths) Program* allowed students to adjust their learning trajectories, offering customized timetables and alternative pathways such as apprenticeships or vocational stream changes, ensuring that students found a program suited to their needs and aspirations. These initiatives align with research emphasizing the importance of a positive school climate in fostering resilience (Luthar & Cicchetti, 2000).

The second key area involved strengthening academic supervision and student support, fostering teacher collaboration and ensuring that students remained engaged and motivated. The *Educational Alliances Project* was introduced to bridge the gap between general education subjects (e.g., math, French) and vocational workshop training (e.g., mechanics, bodywork). By integrating theoretical instruction with practical application, this approach provided students with a more cohesive learning experience, reinforcing the real-world relevance of their studies. Additionally, the LATI (Individualized Temporary Reception Facility) was established to provide structured academic and behavioral support for students struggling with classroom engagement. LATI facilitators helped students reflect on conflict situations, work through personal difficulties, and receive academic tutoring, fostering self-awareness and personal growth. These initiatives align with Ungar's (2017) findings on the importance of providing structured and responsive academic support to foster resilience.

The third component of the strategy centered on innovative pedagogical approaches, designed to actively engage students in their learning. By incorporating project-based learning and active participation methodologies, the school aimed to reduce disengagement and increase student investment in their education. These strategies were particularly effective in vocational education, where hands-on learning and experiential engagement play a crucial role in reinforcing theoretical knowledge (Riquelme, 2022). Programs such as the *Educational Alliances Project* also helped students see the connections between academic subjects and their vocational training, making learning more meaningful and applicable to real-world challenges.

The fourth key area focused on enhancing workplace learning experiences, reinforcing apprenticeship programs and industry partnerships to prepare students for professional integration. Strong relationships with local businesses and industry leaders allowed students to gain valuable hands-on experience, bridging the gap between school-based learning and workforce expectations. The *L4 Trophy Project* provided a particularly impactful example, in which students refurbished a vehicle for humanitarian use in Morocco, applying technical skills, teamwork, and problem-solving abilities while contributing to a social cause. These opportunities were essential in helping students develop adaptability, confidence, and a professional identity, reinforcing findings from

Lamamra & Masdonati (2009) on the role of workplace learning in fostering vocational resilience.

Finally, the fifth pillar emphasized improving the overall learning environment, optimizing infrastructure and school culture to create a welcoming and inclusive atmosphere. Research highlights the role of physical space and environmental design in supporting student engagement and well-being (Barrett & al., 2015). The school actively worked on creating recreational spaces, such as a student lounge and a cultural hub, to encourage peer interaction and a sense of belonging. Additionally, extracurricular activities—including motor sports journalism, a magic club, and dance programs—offered students alternative avenues for self-expression and community engagement, strengthening social integration and emotional well-being.

By embedding resilience-building strategies across these five key areas, *Ettore Bugatti Vocational High School* successfully developed a structured, student-centered approach to dropout prevention. This case study demonstrates that resilience is not solely an individual trait but a dynamic process shaped by institutional policies, pedagogical strategies, and school culture. The findings highlight the importance of multifaceted interventions in vocational education, showing how a supportive, well-structured environment can empower students to overcome challenges, stay engaged in their education, and build long-term perseverance.

The impact of these policies was significant. The dropout rate, which stood at 21% in 2012-2013, dropped to 15% in 2014-2015 and further declined to 12% by 2015-2016. These results confirm Agasisti's (2018) findings on the capacity of schools to foster academic resilience through structured and supportive environments. The study at Ettore Bugatti Vocational High School aligns with Morel's (2014) research, which emphasizes that effective dropout prevention requires a combination of interventions at the student, institutional, and social levels. Bugatti's experience illustrates how a well-coordinated educational policy can transform a school into an environment where resilience is reinforced through both internal school dynamics and external partnerships. By integrating individualized support with structural and pedagogical reforms, the school not only reduced the risk of dropout but also provided students with the tools to overcome difficulties and persist in their education. Bugatti High School does not merely support at-risk students—it actively creates a learning environment that promotes student well-being and personal development, allowing each student to build an academic and professional path suited to their abilities and aspirations. From this experience, several key lessons emerge, which can inform broader dropout prevention strategies and resilience-building efforts in vocational education. First, resilience is not an innate quality but a capacity that can be developed through an intentional combination of supportive policies, structured pedagogy, and institutional engagement. Second, while benevolence and consideration are crucial for fostering student engagement, they must be complemented by clear academic

and behavioral expectations, ensuring that students understand and respect the principles of the educational and professional environments they will enter.

Building on these insights, the next section will identify 25 key indicators of school resilience, derived from this study. These indicators will illustrate the interplay between individual, institutional, and environmental factors, offering a structured framework for assessing and reinforcing resilience in educational settings. By analyzing these elements, we can further inspire from these strategies to prevent dropout and create sustainable learning environments that empower students to persist, adapt, and succeed in their academic and professional paths.

Results: Mapping Resilience Key indicators at Ettore Bugatti Vocational School High School

In the quest to understand and foster resilience within educational settings, particularly in vocational high schools, the case of Ettore Bugatti Vocational High School offers a unique opportunity for in-depth analysis. Having examined the school's history, challenges, and innovative approaches to combat dropout rates, we now turn our attention to a critical aspect of this success story: the identification of key resilience indicators within the school policies and initiatives. The process of mapping resilience is crucial for several reasons. First, it allows us to move beyond theoretical constructs and identify tangible, qualitative factors that contribute to student resilience in a real-world setting. Second, by pinpointing these indicators, we can provide a blueprint for other institutions seeking to replicate Ettore Bugatti's success in fostering a resilience-promoting environment. Finally, this mapping exercise contributes to the broader field of resilience research in education by offering empirical data from a specific vocational education context. Through a comprehensive analysis of multiple data sources, including observations, meeting minutes, the school's institutional project, interviews conducted with teachers and students, archives, and documents provided by the school, as well literature review on resilience process, we identified 25 distinct indicators of resilience. We classify these indicators, grounded in both French and international research span, in five key categories: i) interpersonal relationships and social support, ii) personal development and self-awareness, iii) emotional and psychological resilience, iv) educational and cognitive strategies, v) and environmental and social integration. Each dimension is supported by academic references, verbatim excerpts from interviews with students and teachers, demonstrating how these resilience factors manifest in daily school life.

The first dimension, interpersonal relationships and social support, emerged as one of the most influential in fostering student resilience. Students who felt listened to, respected, and supported by their peers and educators exhibited higher levels of engagement and perseverance (Chalmel, 2015; Tedeschi & Calhoun, 2004; Tedeschi &

Calhoun, 2004; Cyrulnik, 2002; Bowlby, 1988). The following table presents key indicators from this category.

Table 1: Interpersonal relationships and social support dimension

Indicators	Description	Verbatim Excerpts
The encounter	Promoting values of self-awareness through making contact, confrontation, and acceptance (Chalmel 2015; Cyrulnik, 2004); Chapelle, 2004); Tedeschi & Calhoun, 2004).	"I met with my mentor, who helped me realize my potential and accept my past." (Former Dropout)
The affective bond	Establishing a healthy affective relationship with others (Cyrulnik, 2002); Bowlby, 1988).	"Authority should not be imposed immediately; first, a relationship must be established, especially a relationship of trust." (Teacher)
Mutual aid	Encouraging cooperation and peer support to foster a strong community (Humbeek & al. 2012); Eisenberg & Mussen,1989).	"The mutual aid among students fostered a sense of belonging and confidence." (Former Dropout)
Friendship	Creating safe spaces where students can rely on their peers (Goussot, 2014); Furman & Buhrmester,1985).	"Having friends who supported me was crucial for staying in school." (Former Dropout)
Mediation process	Facilitating dialogue and conflict resolution through trusted figures (Goussot, 2014); Bush & Folger, 2004).	"The principal suggested meeting with the education counselors, and that changed everything for me." (Interview Report)
Interaction	Promoting relationship of pedagogical and educational reciprocity, cooperation, and mutual understanding (Goussot,2014; Vygotsky,1978)	"The contact I have with students is above all 'human' based on respect and recognition of their qualities." (Teacher). "My teachers encouraged interactive learning which made classes more engaging." (Former dropout)
Love	Encouraging a powerful	"My teachers' caring attitude made me

	driving force in generating social bonds and affection (Cyrulnik, 2019; Fredrickson, 2013)	feel valued and loved." (Former Dropout)

The second dimension, personal development and self-awareness, focuses on the internal mechanisms that allow students to redefine their self-perception (Goussot, 2014; Bandura, 1977), develop confidence, and articulate their experiences in a meaningful way (Chalmel, 2015; Rogers, 1975). Students who engaged in self-reflection and storytelling reported a stronger sense of purpose and academic persistence (Cyrulnik, 2019; Pennebaker, 1997; Cyrulnik, 2017; McCullough & al., 2000).

Table 2: Personal development and self-awareness dimension

Indicators	Description	Verbatim Excerpts
Telling the story	Encouraging students to reflect on their personal experiences to build resilience by expressing feelings, emotions and intentions (Cyrulnik, 2019); Pennebaker,1997).	"Talking about my experiences with someone who listened helped me process my struggles." (Former Dropout)
Dialogue	Encouraging open communication to foster resilience (Cyrulnik, 2019; Freire, 1970).	"Regular dialogues with my counselor helped me track my progress and stay motivated." (Former Dropout)
Creativity	Using creative expression as a means of overcoming adversity (Cyrulnik,2002; Runco 2004)	"Expressing my struggles through creative projects was therapeutic." (Former Dropout)
Self-connection	Promoting self-awareness and development potential (Goussot, 2014; Bandura, 1977)	"For me, the SAS program allows us to see and understand the student and the training they could do by analyzing what they liked and disliked compared to their initial idea". (Teacher)
Historical-cultural aspect	Appropriating social and cultural history through autobiographical	"Expressing my struggles through creative projects was therapeutic." (Former Dropout)

	narrative (Cyrulnik, 2019); Bruner,1991).	

The third dimension, emotional and psychological resilience, emphasizes the emotional well-being of students and their ability to regulate emotions, find hope, and maintain a positive outlook despite challenges. The ability to forgive past failures, maintain dreams, and cultivate kindness was found to be a powerful predictor of academic perseverance (Cyrulnik, 2019; Cyrulnik, 201; Chalmel, 2015; Snyder, 2002; Rogers, 1975).

Table 3: Emotional and psychological resilience dimension

Indicators	Description	Verbatim Excerpts
Understanding	Promoting a relationship of affective communion with others(Chalmel, 2015; Rogers, 1975).	"Empathy from my teachers made me feel understood and supported." (Former Dropout)
Forgiveness	Teaching students to move past failure and focus on growth and helping them to escape from mental rumination of psychological (Cyrulnik; 2017; McCullough & al. 2000).	"Learning to forgive those who hurt me freed me from a lot of pain." (Former Dropout)
Dreaming	Encouraging students to set goals and aspire to a better future (Cyrulnik, 2019; Snyder 2002).	"Despite difficulties, dreaming about a better future kept me hopeful." (Former Dropout)
Kindness	Creating an atmosphere where students feel cared for (Cyrulnik, 2019 ; Neff , 2003)	"Acts of kindness from my teachers and peers made a significant difference." (Former Dropout)
Faith	valuing spiritual experience is necessary in some circumstances and for some people to foster resilience (Cyrulnik , 2017; Pargament & al. 2000)	"My spiritual beliefs gave me hope and patience during tough times". (Former dropout)
Generosity	Encouraging this essential	"Helping others in need made me

	ingredient of resilience consists in transforming wounds into bonding force (Cyrulnik, 2004); Post, 2005)	realize the power of generosity." (Former Dropout)
Self-esteem	Providing reinforcement that builds self-confidence (Goussot, 2014; Bush & Folger 2004).	"Building self-esteem through positive reinforcement was vital." (Teacher)

The fourth dimension, educational and cognitive strategies, reflects the impact of adaptive teaching methods and learning strategies on student resilience (Goussot, 2014; Dweck, 2006). The findings highlight the school's innovative pedagogical approaches that foster resilience through adaptive learning and collective problem-solving (Chalmel, 2015; Woolley & al., 2010).

Table 4: Educational and cognitive strategies dimension

Indicators	Description	Verbatim Excerpts
Compensation	Helping students leverage their strengths to overcome weaknesses (Goussot, 2014); Dweck, 2006)	"I was able to explore different areas like art, which compensated for my lack of interest in mechanics." (Former Dropout)
Joint thinking	Facilitates group cohesion and stimulates collective intelligence (Chalmel (2015); Woolley & al. (2010).	"Group discussions encouraged critical thinking and improved my capacity to reason." (Former Dropout)
Active listening	Ensuring that teachers adjust their teaching based on student needs through active listening (Chalmel; 2015; Rogers & Farson;1957)	"Having someone who listened without judgment helped build my trust." (Former Dropout)
Intrapsychic and interpsychic area of proximal development	Valuing elements, symbols, objects, and resources in the environment which contribute to development (Laniado, 2008);	"The rituals and traditions we followed helped in my overall development." (Former Dropout).

	Vygotsky, 1978)	

Finally, the fifth dimension, environmental and social integration, examines the impact of school culture, infrastructure, and external partnerships on student resilience (Huet, 2014; Louv, 2005). A sense of belonging, structured support systems, and workplace exposure were found to be critical for preventing dropout and foster resilience (Goussot, 2014; Baumeister & Leary, 1995).

Table 5: Environmental and social integration dimension

Indicators	Description	Verbatim Excerpts
Connecting to the world	Providing real-world applications for student skills (Huet, 2014); Louv, 2005).	"Exploring the outside world and creating partnerships broadened my perspective." (Former Dropout)
Integration and cooperation	Reinforcing students' sense of belonging in school, giving meaning to existence and identity (Goussot, 2014); Bau-meister & Leary, 1995).	"Belonging to a group where cooperation was encouraged gave my life meaning." (Former Dropout)

These findings underscore the strategic interventions implemented at Ettore Bugatti Vocational High School, illustrating that resilience is not an abstract concept but rather a contextually embedded and dynamic process shaped by educational policies, institutional practices, and student experiences. By identifying and systematically mapping key resilience indicators, this study provides a comprehensive understanding of the factors that contributed to the school's success in reducing dropout rates and fostering student perseverance and well-being. Beyond the specific case of Ettore Bugatti, these findings offer valuable insights for educators, policymakers, and researchers seeking to develop resilience-based strategies in various educational settings. They highlight the importance of institutional environments in shaping student resilience and emphasize that effective dropout prevention requires a holistic approach that integrates socio-emotional support, pedagogical innovation, and structured academic supervision.

Methodology: A Constructivist Grounded Theory Approach

This study is rooted in a constructivist epistemology, which acknowledges that knowledge is socially constructed through interactions and experiences within a specific

context. In line with Lincoln & Guba (2011), Charmaz (2014), and Paquay & al. (2021), our research approach embraces subjectivity, interpretation, and co-construction of meaning between researchers and participants. We do not seek to generalize findings but rather to develop an in-depth, contextualized understanding of resilience in vocational education, specifically within the setting of Ettore Bugatti Vocational High School. To achieve this, we employed grounded theory methodology (Corbin & Strauss, 2015), which allows for the emergence of theory from fieldwork rather than imposing pre-existing theoretical frameworks. This inductive and iterative process was particularly suited to examining how resilience is fostered within a specific institutional setting, as it provided the flexibility to capture complex, dynamic social interactions that shape student perseverance. As Patton (2015) asserts, grounded theory is not intended to test pre-established hypotheses but to build a theoretical model derived directly from empirical data.

Our research design combined multiple qualitative data collection methods, enabling us to triangulate findings and ensure a holistic understanding of resilience-building practices. The data collection process spanned three years and involved a variety of sources:

- Interviews: Conducted with school management (n=4), teachers (n=7), and students who had experienced dropout but re-engaged successfully (n=12).
- Focus Groups: Discussions with teachers (n=7) to capture collective insights on resilience-building strategies.
- Observations: Conducted in classrooms and school spaces (n=13), documenting teacher-student interactions and resilience-related initiatives.
- Document Analysis: School archives, project reports, internal memos, and policy documents (n=13) were examined to trace institutional approaches to dropout prevention.
- Photographic Data: Collected to capture visual representations of resilience-promoting environments (n=52).

This multi-method approach allowed us to develop a nuanced understanding of the conditions that contribute to student resilience, emphasizing the interplay between individual agency, institutional structures, and social support systems. A key aspect of our methodological stance was the active engagement of participants in the research process, reflecting the co-construction of knowledge (Grenier & Pauget, 2007). Teachers, students, and administrators were not merely subjects of study but active contributors in identifying the factors influencing resilience. In accordance with Jonnaert (2001) and Paredes (2023), this approach aligns with socio-constructivist perspectives, which stress the importance of situated learning, dialogue, and reflexivity in knowledge production with the others. Data analysis was conducted using Atlas.Ti qualitative software, enabling efficient coding, categorization, and thematic interpretation. Following Charmaz's (2014) constructivist

grounded theory principles, we adopted an iterative coding process, beginning with open coding to identify recurring themes, followed by axial coding to establish relationships between resilience factors, and finally selective coding to synthesize findings into a cohesive theoretical framework. In alignment with phenomenological hermeneutics (Paquay & al., 2010), our interpretative approach sought to immerse the reader in the lived experiences of students and educators, enabling a rich, contextually embedded understanding of resilience. The research did not seek universal laws or predictive models but instead aimed to describe, interpret, and explain how resilience takes shape within a particular institutional environment.

Ethical considerations were central to our research process. Informed consent was obtained from all participants, including signed waivers from parents of student participants. Data collection adhered to confidentiality and anonymity protocols, ensuring that student and teacher identities were protected. Additionally, the research was collaboratively validated through feedback sessions with school stakeholders, allowing them to engage in discussions about preliminary findings and contribute to the refinement of interpretations. Ultimately, this study offers a situated, empirical understanding of resilience-building in vocational education, highlighting how institutional policies, pedagogical practices, and socio-emotional support structures contribute to student perseverance. By employing a constructivist grounded theory approach, we aim to provide not a universally applicable model but a deep, contextualized exploration of resilience in one vocational high school—insights that can inform future research and practice within similar educational settings.

Discussion

This study, conducted within the specific context of Ettore Bugatti Vocational High School, offers valuable insights into the factors contributing to student resilience in vocational education settings. By identifying 25 resilience indicators grouped into five interrelated categories, the study provides a structured framework for assessing and strengthening resilience within schools. These findings align with previous research emphasizing the importance of supportive environments in fostering student persistence and engagement (Luthar & Cicchetti, 2000; Ungar, 2008). The multidimensional nature of resilience, as observed in this study, resonates with Bronfenbrenner's (1979) ecological systems theory, which highlights the interdependence between individual development and environmental influences. The interaction between interpersonal relationships, personal development, emotional well-being, educational strategies, and school culture underscores the complexity of resilience-building processes. This perspective supports the work of Masten (2001) and Rutter (1985), who emphasize that resilience is not a fixed trait but a dynamic process shaped by interactions with one's environment. While these findings contribute to a deeper understanding of resilience in vocational education, it is important

to acknowledge the limitations of this study. As an exploratory qualitative study, conducted in a specific institutional and socio-cultural context, the results cannot be broadly generalized. The unique characteristics of Ettore Bugatti High School, its student population, and local economic conditions may have influenced the observed resilience mechanisms in ways that might not be replicated in other educational settings. This study does not seek universal applicability but rather aims to offer a nuanced, contextually embedded understanding of resilience in vocational education.

To further explore and refine the concepts identified in this study, future research could adopt different methodological approaches to expand the scope of resilience research in vocational and broader educational contexts. The following research avenues could provide additional insights into the mechanisms shaping student resilience:

- **Comparative studies across educational institutions**

  Research could examine how resilience factors vary across different types of schools, including primary, secondary, and higher education institutions (Zaffran & Vollet, 2018). Such studies would provide a broader understanding of the contextual influences on resilience-building strategies.

- **Cross-cultural studies**

  Investigating how resilience manifests in diverse cultural and socio-economic contexts—both within France and internationally—would enhance our understanding of the role of cultural norms, educational policies, and societal expectations in shaping resilience (Ungar & al., 2019).

- **Longitudinal studies**

  Tracking students' resilience trajectories over time could provide insights into the long-term impact of resilience-building initiatives. Examining how vocational education policies influence students' academic paths, career integration, and personal development would offer a dynamic perspective on resilience beyond school settings (Lamamra & Masdonati, 2009).

- **Interdisciplinary research**

  Combining insights from education, psychology, sociology, and neuroscience could contribute to a more holistic understanding of educational resilience. Research bridging cognitive development, emotional regulation, and social

integration could offer valuable perspectives on resilience-building strategies (Cyrulnik, 2019; Fletcher, 2013).

In addition to exploring different research methodologies, it would be beneficial to contrast the findings of this study with alternative resilience frameworks. While our research emphasizes environmental and institutional factors, other studies have highlighted more the role of individual psychological characteristics in resilience (Yeager & Dweck, 2012). A comparative analysis of institutional, psychological, and socio-cultural factors could enhance our understanding of resilience as a multidimensional phenomenon. The complexity of resilience in education requires ongoing research and critical examination to develop effective, context-sensitive strategies for supporting students in vocational education and beyond. By expanding research perspectives and testing resilience theories in diverse contexts, we can work towards a more comprehensive understanding of resilience in education, ultimately informing policies and practices that promote student success and well-being.

Limitations and Scope of the Study: A Constructivist Approach

It is important to emphasize that this study does not aim to compare different institutions or generalize its findings to other educational contexts. Instead, it is rooted in a constructivist approach and is based on an action research project conducted at Ettore Bugatti Vocational High School in partnership with the LISEC research laboratory at the University of Haute-Alsace. The primary objective was to highlight the efforts made by the institution to promote school persistence and to analyze the phenomenon of resilience within this specific context. As part of this partnership, approximately twenty researchers worked on various themes related to educational success, including school dropout prevention, self-esteem, pedagogy, and learning processes. Resilience was one of the topics explored among these themes. Reports were produced, and research findings were regularly shared with the school's educational team to provide constructive feedbacks, recognize their initiatives, and suggest areas for improvement. However, since this partnership ended in 2018, there is currently no funding available to extend this research or broaden its scope to other institutions. Moreover, the very nature of this study is to highlight the experiences and knowledge generated within a specific environment in interaction with its stakeholders. The goal is not to compare results or propose a universal model but rather to understand the dynamics of resilience in a particular context and support reflections on educational practices.

That being said, the findings from this study provide a valuable foundation for other researchers interested in further exploring this topic. They also offer insights for the broader educational ecosystem by identifying strategies that can be implemented to create

an environment conducive to fostering resilience in students at risk of dropping out. Additionally, the resilience indicators identified in this study could be used to develop assessment tools for measuring resilience processes at both institutional and individual levels. Currently, such an evaluation framework does not yet exist in the educational field, despite its potential to better support vulnerable students and strengthen initiatives aimed at promoting school persistence.

Conclusion

This study on Ettore Bugatti Vocational High School has provided valuable insights into the factors that contribute to building resilient educational environments in vocational education. By identifying 25 resilience indicators across five key dimensions, this research offers a structured yet context-sensitive framework for understanding how institutional policies, pedagogical strategies, and socio-emotional support systems interact to shape student perseverance. The findings underscore the importance of holistic, multi-faceted approaches to resilience-building that extend beyond individual characteristics to include environmental, relational, and structural elements. The success of Ettore Bugatti Vocational High School in reducing dropout rates highlights the potential impact of resilience-focused educational policies and practices when they are tailored to the specific needs of students. However, as a contextually grounded study, these findings are not intended for broad generalization but rather serve as a deep, qualitative exploration of resilience within one institutional setting. The insights gained contribute to a richer understanding of resilience in vocational education and offer practical considerations for schools seeking to strengthen student engagement and persistence. Moving forward, further research could apply and adapt these resilience indicators in other educational settings to explore how resilience manifests across diverse institutional, cultural, and socio-economic contexts. By continuing to refine our understanding of resilience-building processes, educators and policymakers can work towards creating environments that empower students to navigate challenges, develop agency, and achieve their full potential in both academic and professional spheres.

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