Exploring the Integration of Adversity Quotient in Project-Based Learning: A Needs Assessment toward Enhancing Entrepreneurial Readiness of University Students

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ABSTRACT

This study aims to analyze the need for developing a Project-Based Learning (PjBL) learning model integrated with Adversity Quotient (AQ) to improve students' entrepreneurial readiness. The background of this study is the importance of cultivating students' fighting spirit, motivation, and resilience in facing entrepreneurial challenges. The study population included all students of STKIP Andi Matappa who had taken entrepreneurship courses, with a sample of 226 students from three study programs: Mathematics Education, Guidance and Counseling, and Elementary School Teacher Education. Data were obtained through a questionnaire on entrepreneurial needs and readiness, focus group discussions, and open interviews. The results of the analysis indicate that students have a very high need for the PjBL learning model (89%), learning that supports AQ development (96%), and the implementation of the AQ-integrated PjBL model (95%). In addition, although students' entrepreneurial knowledge and skills are already good, aspects of motivation and mental readiness still need to be strengthened. This finding confirms the urgency of developing an integrated AQ PjBL learning model to equip students with knowledge, skills, and resilience in entrepreneurship.

Keywords: Project-Based Learning, Adversity Quotient, Learning Needs, Entrepreneurial Readiness, Higher Education.

INTRODUCTION

Entrepreneurship education plays a crucial role in equipping students with the knowledge, skills, and character needed to face the challenges of the workplace while simultaneously encouraging the creation of new business opportunities (Liu et al., 2022; Sucipto et al., 2025; Wang et al., 2022; Mahmudin, 2023). In line with the demands of the era of globalization and technological advancement, students are not only required to understand business theory but also to develop creativity, critical thinking, and mental resilience in the face of uncertainty and business risks. Nevertheless, various studies reveal that most students still tend to be oriented towards finding work after graduation, rather than creating jobs, due to limited motivation, risk-taking skills, and low resilience to failure (Cacciotti et al., 2020; Ferreira et al., 2017; Gao et al., 2024; Maulida et al., 2024). This situation indicates that entrepreneurship education in higher education still requires innovation in learning strategies that are more applicable and oriented towards strengthening entrepreneurial character.

The Project-Based Learning (PjBL) model is an innovative learning approach widely used in entrepreneurship education. PjBL emphasizes project-based learning that actively engages students in analyzing real-world problems, designing solutions, and producing products or services relevant to community needs (Alsmadi et al., 2024; Efstratia, 2014; Kristianti et al., 2023; Wahyudin et al., 2024). Previous research has shown that PjBL can improve students' collaboration, communication, and problem-solving skills. However, a persistent weakness is the lack of strong emphasis on students' psychological aspects, particularly in developing resilience and readiness to face failure. Therefore, PjBL requires strengthening through the integration of non-cognitive aspects that can train students to be more resilient and adaptive to the dynamics of the business world (Guo et al., 2020; Rehman et al., 2024).

In this context, Adversity Quotient (AQ) is a crucial concept that can be integrated into entrepreneurship education. AQ, encompassing the dimensions of Control, Origin, Ownership, Reach, and Endurance (CO_2RE), emphasizes an individual's ability to navigate difficult situations, understand the causes of problems, take responsibility for decisions, limit the impact of adversity, and maintain long-term resilience.

Several recent studies have confirmed the relevance of AQ in enhancing psychological resilience and entrepreneurial readiness. For example, a study by Maharani et al. (2020) found that AQ is positively related to the courage to take business risks, while research by Nuraeni et al. (2022) showed that students with high AQ are better able to navigate market uncertainty. On the other hand, Gultom et al. (2024) reported that entrepreneurship education that does not address resilience tends to fail to foster students' long-term motivation for entrepreneurship. This fact highlights the importance of integrating AQ into project-based learning to create a more holistic approach (Wardana et al., 2025).

However, studies combining PjBL and AQ are still very limited, especially in Indonesia. Most previous studies only tested the effectiveness of PjBL in improving entrepreneurial skills or examined the influence of AQ on individual success, without integrating the two into a single integrated learning model. Furthermore, studies that reveal students' needs for an AQ-integrated PjBL learning model are still rare. Thus, there is a significant research gap related to the absence of a conceptual model that combines PjBL and AQ as a strategy to strengthen students' entrepreneurial readiness. This study aims to address this gap by conducting a needs analysis as the basis for designing an AQ-integrated PjBL learning model. The results are expected to provide theoretical contributions to the development of entrepreneurship learning strategies and practical contributions to improving students' readiness to face the challenges of the business world.

METHOD

A descriptive approach was used because this study focuses on describing actual phenomena related to student needs in developing learning models, rather than on hypothesis testing. A needs assessment design was chosen so that researchers could systematically map the gap between existing learning conditions and the desired ideal conditions (Aljohani et al., 2022). Thus, the research results can provide a conceptual basis for the development of a PjBL model integrated with Adversity Quotient (AQ). The integration of Project-Based Learning (PjBL) with Adversity Quotient (AQ) is based on the assumption that project-based learning not only hones cognitive and practical skills but also demands non-cognitive aspects such as resilience, adaptability, and courage to face challenges. AQ, developed by Stoltz (1997), emphasizes an individual's ability to respond to difficulties while remaining productive and solution-oriented.

Population and Sample

The population of this study included all students of STKIP Andi Matappa who had taken the Entrepreneurship course, as they were considered to have prior experience in understanding the basic concepts of entrepreneurship. From this population, a sample of 226 third-semester students was obtained through a purposive sampling technique to meet the research criteria, namely students who already had prior knowledge but were still in the early stages of developing entrepreneurial skills and attitudes. The research sample composition was divided into three study programs:

a. 32 students from the Mathematics Education Study Program, representing students with a background in the exact sciences.
b. 73 students from the Guidance and Counseling Study Program, representing the social sciences with a focus on communication skills, empathy, and personal development.
c. 121 students from the Elementary School Teacher Education Study Program, as the largest group, reflecting prospective educators who need integrated pedagogical and entrepreneurial skills.

Research Instruments

To obtain comprehensive data regarding student needs in the development of the Project Based Learning (PjBL) learning model integrated with Adversity Quotient (AQ), this study uses several main instruments, namely:

a. Entrepreneurial Needs and Readiness Questionnaire
   The questionnaire was designed to measure students' level of need for the PjBL learning model and their readiness for entrepreneurship. This instrument covers three main aspects: students' need for PjBL implementation; the need for learning that supports the development of AQ; and the need for integration of PjBL with AQ. The questionnaire also includes indicators regarding entrepreneurial knowledge, practical skills, mental readiness, and motivation.
b. Focus Group Discussions were conducted to explore students' experiences and views related to entrepreneurship learning in more depth.
c. Open interviews were conducted with several selected students purposively to obtain more personal and in-depth data. These interviews explored the students' motivations, hopes, and obstacles in developing an entrepreneurial mindset.

Data Analysis

The research data were analyzed by combining quantitative and qualitative approaches, where the

questionnaire data on students' entrepreneurial needs and readiness were processed using descriptive statistics in the form of scores, percentages, and averages to measure the level of need for the AQ integrated PjBL model, while data from FGDs and open interviews were analyzed thematically to explore students' challenges, motivations, and expectations, then both results were combined through triangulation to provide a comprehensive picture of the need to develop a learning model that is appropriate to the research context.

RESULT AND DISCUSSION

RESULTS

The initial stages of analysis and design of the learning model are generally divided into 4 parts, namely Analysis of Student Needs and Readiness, Analysis of the Content of the Adversity Quotient Integrated PjBL Learning Model, Analysis of the Objectives of Developing the Adversity Quotient Integrated PjBL Learning Model and Analysis of the Characteristics of the Structure of the Adversity Quotient Integrated PjBL Learning Model to Improve Student Entrepreneurial Readiness. The results obtained at each stage can be described as follows:

Analysis of Student Needs and Readiness

An initial investigation was conducted to identify the needs of 32 third-semester students at STKIP Andi Matappa in the Mathematics Education Study Program, 73 in the Guidance and Counseling Study Program, and 121 in the Elementary School Teacher Education Study Program, with a total of 226 students. To determine this, a questionnaire was given regarding student needs and readiness and discussions were conducted through Focus Group Discussions (FGDs) and open interviews with students at STKIP Andi Matappa. This discussion aimed to dig deeper into the challenges faced by students and identify needs that need to be answered through the development of learning models. In detail, the results of the needs analysis assessment of the PjBL learning model integrated with Adversity Quotient can be seen in table 1 below.

Table 1. Assessment Results of the Adversity Quotient Integrated PjBL Learning Model Needs Questionnaire

Indicator	Item	Score	Total Score	Percentage (%)	Average (%)
The Need for a PjBL Learning Model	1	748	904	83	89
	2	898	904	99	
	3	721	904	80	
	4	812	904	90	
	5	734	904	81	
	6	897	904	99	
	7	807	904	89	
Learning Needs that Support Adversity Quotient *Development*	8	889	904	91	96
	9	891	904	91	
	10	802	904	94	
	11	877	904	93	
	12	898	904	80	
	13	868	904	86	
	14	844	904	91	
The Need for an Integrated PjBL Learning Model with Adversity Quotient	15	821	904	91	95
	16	890	904	98	
	17	844	904	93	
	18	867	904	96	
	19	871	904	96	
	20	889	904	98	
	21	856	904	95	
	22	822	904	91	
	23	819	904	91	

	24	834	904	92	
	25	805	904	89	
	26	867	904	96	
	27	890	904	98	
	28	826	904	91	
	29	889	904	98	
	30	876	904	97	
	31	890	904	98	
	32	894	904	99	
	33	801	904	89	
	34	845	904	93	
	35	874	904	97	
	36	855	904	95	
	37	804	904	89	
	38	866	904	96	
	39	873	904	97	
	40	849	904	94	

Source: Data Analysis 2025

Based on Table 1 in general, the results of the needs analysis show that students have a high interest in the implementation of the Project Based Learning (PjBL) learning model with an average achievement of 89%, a very large need for learning that supports the development of Adversity Quotient (AQ) with an average of 96%, and a very high need for the implementation of the PjBL model combined with Adversity Quotient with an average achievement of 95%. These findings indicate that the development of the PjBL model integrated with Adversity Quotient (AQ) is very feasible to implement, because it is in accordance with the needs of students not only in deepening academic aspects, but also in building resilience, motivation, and readiness to face various challenges in the real world, including in the context of entrepreneurship. To see the overall results can be seen in Table 2 below.

Table 2. Summary Results of the Assessment of the Integrated PjBL Learning Model Needs Questionnaire Adversity Quotient

Rated aspect	Earned Score	Average Total Percentage (%)	Category
The Need for a PjBL Learning Model	5617	89	Very high
Learning Needs that Support Adversity Quotient Development	6069	96	Very high
The Need for an Integrated PjBL Learning Model AQ	2217	95	Very high
Conclusion of Needs Analysis of Integrated PjBL Learning Model with Adversity Quotient		93	Very high

Source: Data Analysis 2025

Based on the calculations in the table above, the analysis of student needs across several aspects yielded an average score of 93%, which falls into the Very High category. This indicates that students have a strong need for the development of the proposed learning model, making it relevant, urgent, and has significant potential to address challenges and support the development of desired competencies.

In addition, a questionnaire was conducted regarding student readiness for entrepreneurship. The analyzed questionnaire results are presented in Table 3 below.

Table 3. Assessment Results of the Student Readiness Questionnaire for Entrepreneurship

Indicator	Item	Score	Score Total	Percentage (%)	Average (%)
Entrepreneurial Knowledge	1	735	904	81	86
	2	789	904	87	
	3	813	904	90	
	4	812	904	90	
	5	722	904	80	
Entrepreneurial Readiness	6	690	904	76	87
	7	856	904	95	
	8	748	904	83	
	9	765	904	85	
	10	855	904	95	
Mental Readiness and Motivation	11	654	904	72	82
	12	567	904	63	
	13	839	904	93	
	14	810	904	90	
	15	839	904	93	

Source: Data Analysis 2025

Based on Table 3 above, it can be seen that students' knowledge of entrepreneurship is considered good, with an average score of 86%. This means they have a sufficient understanding of the basic concepts of entrepreneurship, although a small number still have weaknesses. Regarding readiness, the average score of 87% indicates that students are generally ready to start a business, especially in terms of practical skills and simulation experience. Meanwhile, mental readiness and motivation are lower, with an average score of 82%. This indicates that some students still lack confidence and tend to give up easily when faced with business risks. Overall, students have good knowledge and readiness for entrepreneurship, but they still need to strengthen their mental and motivational aspects to be more resilient and consistent in undergoing the entrepreneurial process.

Based on the results of the questionnaire and focus group discussions (FGDs), it was revealed that, in general, students still greatly need learning models that meet their learning needs and the needs to face various challenges, both academic and non-academic. Some of the key needs that emerged can be summarized as follows:

a. Students feel the need for real-life examples, such as successful entrepreneurs, to gain a more comprehensive understanding of the business world. Many students are unfamiliar with the business management process or the challenges faced by entrepreneurs, resulting in low interest in entrepreneurship.
b. Communication and problem-solving skills are rarely practiced in lectures, even though these skills are crucial for preparing students for the workplace and business world.
c. Some students exhibit a declining enthusiasm for learning, lack long-term goals, and give up easily when faced with difficulties. Fear of failure, lack of confidence in taking risks, and an inability to recover from setbacks remain significant issues.
d. Most students are still focused on finding employment after graduation, such as as employees or lecturers. Their mindset for creating their own jobs remains weak because their fighting spirit and entrepreneurial mindset have not yet developed optimally.

Content Analysis of the Integrated PjBL Learning Model Adversity Quotient

The content of the learning model analyzed relates to the integration of Adversity Quotient, specifically the CO_2RE (Control, Origin, Ownership, Reach, and Endurance) aspects, into each stage of the PjBL learning model. This is presented in the integration matrix in Table 4 below.

Tabel 4. Matriks Integrasi Adversity Quotient pada Model Pembelajaran PjBL

PjBL Syntax Stages	CO2RE aspect	Benefits for Students

Phase 1: Determining the Basic Question	**Origin:** Students recognize that they determine the direction of the project. **Ownership:** Fully involved in selecting the problem and business solution.	Students are calmer, more focused, and less prone to panic when they encounter difficult problems.
Phase 2: Designing the Project Plan	**Control:** Students learn to manage time, assignments, and processes with self-direction. **Ownership:** Feel responsible for the projects they undertake.	Students are more independent, responsible, and serious in carrying out their respective roles.
Phase 3: Scheduling and Conducting the Investigation	**Control:** Manage field activities with the team **Endurance:** Able to deal with rejection, change, and data dynamics in the field	Students become disciplined, consistent, and accustomed to working according to targets despite obstacles.
Phase 4: Monitoring and Guidance	**Endurance:** Not giving up when ideas don't go according to plan **Control:** Learning to control your emotions and stay productive	Students learn to remain optimistic, not giving up easily just because of one problem.
Phase 5: Testing Project Results	**Reach:** Learn that product failure is not the end **Origin:** Take responsibility for the success/failure of the project	Students are more confident, ready to accept input, and proud of their hard work.
Phase 6: Experience Evaluation and Reflection	All aspects of CO2RE: Students reflect on how Adversity Quotient is formed in each phase of the project	Students do not give up easily, are willing to learn from failure, and are ready to face the next challenge.

Source: Data Analysis 2025

In detail, the results of the content analysis assessment of the integrated PjBL learning model Adversity Quotient can be seen in table 5 below.

Table 5. Results of the Validator's Assessment of the Adversity Quotient Integration Matrix on the Content of the PjBL Learning Model

Indicator	Item	P1	P2	Average (%)	Criteria
Relevance	1	5	4	90	Very Relevant
	2	4	4	80	Relevant
	3	5	5	100	Very Relevant
	4	4	4	80	Relevant
	5	4	4	80	Relevant
Average Overall Score of Relevance Indicators		4,40	4,20	86	Very Relevant
Comprehensiveness	6	5,00	5,00	100	Very Relevant
	7	5,00	4,00	90	Very Relevant
	8	5,00	5,00	100	Very Relevant
	9	4,00	5,00	90	Very Relevant
	10	5,00	5,00	100	Very Relevant
Average Overall Score of Comprehensiveness Indicator		4,80	4,80	96	Very Relevant
Clarity	11	5,00	5,00	100	Very Relevant

	12	4,00	4,00	80	Relevant
	13	4,00	4,00	80	RELEVAN
	14	5,00	4,00	90	Very Relevant
	15	4,00	4,00	80	Relevant
Average Overall Score of Clarity Indicator		4,40	4,20	86	Very Relevant

Source: Data Analysis 2025

The validation results from two validators indicate that the integration of Adversity Quotient in the PjBL stages was generally considered relevant and highly relevant. The relevance aspect averaged 86%, reflecting the suitability of the indicators to the learning objectives and student needs. In terms of comprehensiveness, all items scored an average of 96%, indicating that the syntax encompasses the stages, CO_2RE aspects, and comprehensive benefits. Meanwhile, the clarity aspect scored an average of 86%, indicating that the wording and systematic presentation of the syntax are easy for users to understand. The overall results can be seen in Table 6 below.

Table 6. Recapitulation of Validators 1 and 2 Based on Assessment Aspects

Rated aspect	Average of Assessors 1	Average of Assessors 2	Total Average (%)	Category
Relevance	4,40	4,20	86	Very Relevant
Comprehensiveness	4,80	4,80	96	Very Relevant
Clarity	4,40	4,20	86	Very Relevant
Overall Average			89	Very Relevant

Source: Data Analysis 2025

Based on the recapitulation results of the two validators, the integration of Adversity Quotient is generally evident at each stage of the PjBL learning model, tailored to the benefits students receive. This is evident from the average score of the two validators, which was 89%. This is categorized as very relevant. Therefore, the Adversity Quotient-integrated PjBL syntax is suitable for use as a reference in learning implementation.

Analysis of the Objectives of Developing an Integrated PjBL Learning Model with Adversity Quotient

In the objective analysis stage, the main activity is carried out by linking the results of the student needs analysis with the learning outcomes established in the study program. The initial step is to review the study program's Course Learning Outcomes (CPMK), including aspects of attitude, knowledge, general skills, and specific skills. From the results of this review, the outcomes most relevant to entrepreneurship development and student resilience are selected. Next, the model development objectives are mapped according to the CPMK. Academic objectives, such as mastering entrepreneurial concepts, developing a business plan, or implementing a problem-based project, are directed to support the CPMK in the knowledge and specific skills aspects. Meanwhile, character-strengthening objectives, such as building self-confidence, increasing motivation, and fostering resilience in the face of obstacles, are mapped to the CPMK in the attitude and general skills aspects. The overview of the objectives of developing the PjBL learning model integrated with Adversity Quotient is outlined in Table 7 below.

Table 7. Mapping of Student Entrepreneurial Readiness Indicators

CPMK	Student Entrepreneurial Readiness Indicators	Objectives of Developing the Integrated PjBL Model AQ
ATTITUDE Internalizing the spirit of independence, struggle, and entrepreneurship	Have the confidence to start a business. Don't give up easily when facing obstacles. Have the motivation to try and innovate.	Forming the character of students who are resilient, brave in taking risks, and have a high fighting spirit through problem-based projects integrated with Adversity Quotient values (Control, Origin, Ownership, Reach, Endurance).
KNOWLEDGE Mastering knowledge across scientific fields in line with developments in science and technology, while taking local wisdom into account.	Understand the basic concepts of entrepreneurship. Identify business opportunities based on local wisdom. Possess interdisciplinary insight in product/service design.	Equipping students with contextual entrepreneurial knowledge, based on cross-disciplinary knowledge and local wisdom, so that it can be applied in real projects.
GENERAL SKILLS Able to examine the implications of the	Able to analyze real-world problems in society. Able to work in a team.	Training students to think critically, collaboratively, and creatively in completing projects that are relevant to

development or implementation of science and technology, taking into account and applying humanities values in accordance with their expertise, based on scientific principles, procedures, and ethics, in order to produce solutions, ideas, designs, or art criticism.	Able to generate creative solutions through projects.	community needs, while honing resilience through the integration of Adversity Quotient.
SPECIAL SKILLS Able to design, implement, analyze, and follow up on business management concepts in entrepreneurship.	Able to develop a business plan. Able to manage business resources. Able to evaluate the successes and obstacles of a business project.	Guiding students to be skilled in planning, implementing, and evaluating business through real projects, and being able to survive challenges with the Adversity Quotient principle.

The analysis results for the development objectives of this model have been validated by two experts. The overall assessment results can be seen in Table 8 below.

Table 8. Summary of Validator 1 and 2 Assessments Based on Mapping of Student Entrepreneurial Readiness Indicators

CPMK	Rated aspect	Average of Assessors 1	Average of Assessors 2	Total Average (%)	Category
Attitude	Relevance	4	5	90	Very Relevant
	Comprehensiveness	4	5	90	Very Relevant
	Clarity	4	4	80	Very Relevant
Knowledge	Relevance	4	5	90	Very Relevant
	Comprehensiveness	5	5	100	Very Relevant
	Clarity	5	4	90	Very Relevant
Special Skills	Relevance	4	5	90	Very Relevant
	Comprehensiveness	4	4	80	Very Relevant
	Clarity	5	5	100	Very Relevant
General Skills	Relevance	5	4	90	Very Relevant
	Comprehensiveness	3	4	70	Very Relevant
	Clarity	4	3	70	Very Relevant
Average				**87**	**Very Relevant**

Source: Data Analysis 2025

Based on Table 7 above, the course learning outcomes (CPMK), which include aspects of attitude, knowledge, specific skills, and general skills, received a highly relevant assessment with an overall average of 87%. The attitude aspect received a high score, indicating that the indicators are appropriate in developing student independence and fighting spirit. The knowledge aspect was also considered highly relevant because the indicators compiled cover conceptual understanding to contextual application. For specific skills, the validation results confirmed that the indicators are able to represent competencies in student business planning, implementation, and evaluation. Meanwhile, the general skills aspect received a slightly lower score than the other aspects, but was still categorized as highly relevant, making it suitable for developing students' analytical, collaborative, and creative abilities. Overall, these validation results confirm that the CPMK design is appropriate and worthy of being used as a basis for developing an integrated PjBL model with Adversity Quotient.

Analysis of the Structural Characteristics of the Integrated PjBL Learning Model Adversity Quotient to Increase Students' Entrepreneurial Readiness

The results of the analysis of the structural characteristics of the PjBL learning model integrated with the Adversity Quotient can be seen in Table 9 below.

Table 9. Results of the Validator's Assessment of the Structural Characteristics of the PjBL Learning Model Integrated with the Adversity Quotient

Indicator	Item	P1	P2	Average (%)	Criteria
Syntax	1	5	5	100	Very Relevant
	2	4	4	80	Relevant
	3	5	5	100	Very Relevant
	4	4	5	90	Very Relevant
	5	5	4	90	Very Relevant
	6	5	4	90	Very Relevant
	7	5	4	90	Very Relevant
	8	4	5	90	Very Relevant
Average Overall Score of Syntax Indicators		**4,63**	4,50	92	Very Relevant
Social Systems	9	4,00	5,00	90	Very Relevant
	10	5,00	5,00	100	Very Relevant
	11	5,00	5,00	100	Very Relevant
	12	5,00	5,00	100	Very Relevant
	13	5,00	5,00	100	Very Relevant
	14	4,00	4,00	80	Relevant
	15	5,00	5,00	100	Very Relevant
Average Overall Score of Social System Indicators		4,71	4,86	96	Very Relevant
Reaction Principles	16	5,00	5,00	100	Very Relevant
	17	4,00	5,00	90	Very Relevant
	18	5,00	5,00	100	Very Relevant
	19	5,00	5,00	100	Very Relevant
	20	5,00	4,00	90	Very Relevant
	21	4,00	5,00	90	Very Relevant
	22	4,00	5,00	90	Very Relevant
	23	5,00	4,00	90	Very Relevant
Average Overall Score of Reaction Principle Indicator		4,63	4,75	94	Very Relevant
Sistem Pendukung	24	5,00	5,00	100	Very Relevant
	25	4,00	4,00	80	Relevant
	26	4,00	4,00	80	Relevant
	27	5,00	4,00	90	Very Relevant
	28	4,00	5,00	90	Very Relevant
	29	5,00	5,00	100	Very Relevant
	30	5,00	4,00	90	Very Relevant
	31	5,00	4,00	90	Very Relevant
	32	5,00	5,00	100	Very Relevant
Average Overall Support System Score		4,67	4,44	91	Very Relevant
Instructional Impact and Herding Impact	33	5,00	4,00	90	Very Relevant
	34	4,00	4,00	80	Relevant
	35	4,00	4,00	80	Relevant
	36	5,00	4,00	90	Very Relevant
	37	4,00	5,00	90	Very Relevant
	38	5,00	5,00	100	Very Relevant
	39	5,00	4,00	90	Very Relevant
	40	5,00	4,00	90	Very Relevant
Average Overall Support System Score		4,63	4,25	89	Very Relevant
Total				**92**	Very Relevant

Source: Data Analysis 2025

Table 9 displays the summary results of the validity assessment of the learning model's structural characteristics, indicating that the majority of aspects were deemed valid to very valid. This indicates that the model structure meets the criteria for being highly relevant, both theoretically and practically, including the suitability of syntax, social systems, reaction principles, support systems, and instructional and guiding impacts. Therefore, the Adversity Quotient-integrated PjBL learning model has a strong basis for implementation, as it represents the integration of learning objectives, processes, and outcomes aimed at developing students' entrepreneurial readiness.

DISCUSSION

The results of the needs analysis, which showed high student demand for the PjBL model (89%), a need for learning that develops Adversity Quotient (AQ) (96%), and a high need for the implementation of AQ-integrated PjBL (95%), reflect the gap between relatively adequate technical entrepreneurial competencies and non-cognitive aspects—especially psychological resilience—that are still weak among students. These findings align with studies showing that PjBL is effective in improving collaborative skills, problem-solving, and the creation of tangible products, but does not always address psychological resilience aspects unless explicitly designed for it. Review studies of Project-Based Learning confirm that PjBL produces a number of positive outcomes in the skill dimension, but non-cognitive outcomes depend on the specific instructional design (Guo et al., 2020).

Furthermore, the literature on the effectiveness of entrepreneurship education highlights that increased entrepreneurial intention or capacity is often mediated by factors such as self-efficacy, task challenge, and course characteristics—not simply exposure to the material. In other words, without interventions that foster resilience (AQ), increased knowledge does not automatically translate into entrepreneurial intention or readiness. This finding supports the interpretation that while students' entrepreneurial knowledge (average 86%) is good, weaknesses in mental readiness (average 82%) require interventions that target the psychological dimension (Nguyen & Nguyen, 2023).

This research finding on the importance of AQ as a target for learning development has empirical support: field studies show a positive correlation between AQ (or a similar construct: resilience/adversity coping) with entrepreneurial intention and the ability to survive business risks. Quantitative research on various student populations found that AQ is significantly related to entrepreneurial intention and entrepreneurial self-efficacy—meaning that increasing AQ has the potential to improve students' practical and psychological readiness to start a business. These results provide a strong theoretical basis for the integration of CO_2RE (Control, Origin, Ownership, Reach, Endurance) into the PjBL syntax (Kurniawati & Marlena, 2018).

However, there is also literature that emphasizes a limitation—namely, that the effectiveness of entrepreneurship education is contextual. Several bibliometric reviews and systematic reviews indicate that the effect of entrepreneurship education on real-world outcomes (e.g., actual entrepreneurship after graduation) varies depending on institutional support, local risk culture, incubation facilities, and program sustainability (mentoring, access to capital, networking). This indicates that the development of the PjBL-AQ model must be complemented by a support system (mentoring, exposure to real entrepreneurs, market access/incubation) to ensure that the instructional impact is managed down to the behavioral/career decision level. Therefore, your recommendation to include support system components and herding impacts in the model structure aligns with the findings of this study (Sreenivasan & Suresh, 2023).

Expert validation (by two validators) demonstrating high scores for relevance, comprehensiveness, and clarity (overall average ~89–92%) strengthens the credibility of the model's content: the integration of CO_2RE appears theoretically and practically appropriate for each stage of the PjBL syntax (from problem definition, design, implementation, monitoring, outcome testing, to reflection). However, content validity—while essential—does not automatically guarantee effectiveness; empirical testing (pilot/quasi-experiment) is needed to determine whether AQ integration actually changes outcome variables such as resilience scores, entrepreneurial self-efficacy, entrepreneurial intentions, and entrepreneurial behavior. This aligns with literature emphasizing the need for experimental evaluation designs to test pedagogical mechanisms and transfer to tangible outcomes (Guo et al., 2020).

From an instructional design perspective, the resulting integration matrix you developed (linking each PjBL phase to the CO_2RE aspect) is a good practice and follows the principles of scaffolding: embedding elements of control (task and emotion management) in the planning/implementation phase, ownership in problem selection, endurance/reflective practice during monitoring and reflection, and reach to reframe failures in the testing phase. The PjBL literature supports a similar strategy—combining authentic experiences with structured reflection and feedback to change students' attitudes and dispositions, not just technical skills. By adding a formative assessment component to the AQ aspect (e.g., a standardized CO_2RE scale) and a coaching intervention, your model is more likely to produce sustainable psychological change (Guo et al., 2020).

However, some counter-research warns against potential over-claiming of PjBL/EE: without attention to learning quality (e.g., excessive workload, inadequate assessments, inadequate faculty mentoring), PjBL can create counterproductive stress for vulnerable students—and even reduce motivation and resilience. Therefore, AQ integration must be designed with a balance: challenging but structured projects, available emotional and instructional support, and impact measurement tools to monitor cognitive load and student well-being. This requires institutional policies to prepare faculty capacity and assessment tools (Liu et al., 2022).

CONCLUSION

The results of this study indicate that students have a very high need for the implementation of Project-Based Learning (PjBL) at 89%, a need for learning that supports the development of Adversity Quotient (AQ) at 96%, and a need for an AQ-integrated PjBL model at 95%. Although students' entrepreneurial knowledge and skills are classified as good with an average achievement of 87%, mental readiness and motivation are still relatively low, at 82%. This condition confirms that students' entrepreneurial readiness is not fully optimal because the aspect of resilience in facing failure still needs to be strengthened. Thus, the integration of AQ into the PjBL syntax is a relevant strategy to increase students' fighting spirit, resilience, and entrepreneurial readiness. These findings form the basis for the AQ-integrated PjBL learning model to be further developed and its effectiveness tested in the context of higher education.

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