

THE EFFECT OF THE PROJECT-BASED LEARNING (PJBL) MODEL ON FISH-BASED FOOD PROCESSING ON THE COGNITIVE, PSYCHOMOTORIC, AND ENTREPRENEURIAL SPIRIT OF MTS STUDENTS

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Article Info

Received: April 15, 2026

Revised: May 10, 2026

Accepted: July 23, 2026

Online Version: July 31, 2026

Abstract

This study aims to examine the effect of the Project-Based Learning (PjBL) model on cognitive learning outcomes, psychomotor skills, and entrepreneurial spirit of Madrasah Tsanawiyah (MTs) students on fish-based food processing material. Using a quantitative approach with a quasi-experimental design, this study compared the project-based experimental class (n=30) and the control class (n=28) who learned conventionally. Data analysis was conducted using the non-parametric Mann-Whitney U test. The results proved that PjBL had a highly significant positive effect ($p < 0.05$) overall; where the experimental class consistently outperformed the control class with a more even distribution of abilities. The novelty of this study lies in the successful integration of culinary vocational pedagogy with micro-scale edupreneurship incubation in early adolescence. Specifically, this study makes an important contribution to the literature on economic education by proving that entrepreneurial character, self-efficacy, and understanding of basic business calculations can be naturally cultivated through simulations of real-life project completion. The implications of these findings encourage educational institutions to transform rote curricula into product-based learning. This research recommends implementing mini-business ecosystems in schools, such as Market Day, to continuously bridge academic knowledge with real-world economic practices.

Keywords: Project-Based Learning, Cognitive Learning Outcomes, Psychomotor, Entrepreneurial Spirit, Food Processing.



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INTRODUCTION

Today's modern education demands a transformation of the learning process so that it does not just transfer theoretical knowledge, but is also able to equip students with practical skills, in-depth knowledge, and the attitudes needed to build an entrepreneurial culture (Rodrigues, 2023). In the

context of food processing education, the application of the Project-Based Learning (PjBL) model has proven effective in increasing understanding of material, honing technical skills, and building independence and teamwork ([Nieto et al., 2024](#)). Through active involvement in designing, formulating, and serving real food products, students directly integrate cognitive mastery with psychomotor experiences (Nieto et al., 2024). Without project-based learning and direct experience, the learning process risks becoming passive and less than optimal in equipping students with the competencies needed in the real world ([Nieto et al., 2024](#)); ([Rodrigues, 2023](#)).

Apart from academic and technical mastery, developing an entrepreneurial spirit from an early age is a very urgent issue to overcome the challenge of youth unemployment in the future ([Mncwango & Adanlawo, 2025](#)). Experience-based learning and project approaches have proven to be superior in building sensitivity to see business opportunities, increasing creativity, and fostering entrepreneurial alertness compared to conventional methods ([Abd Rahim et al., 2022](#)); ([Pratomo & Wardani, 2021](#)). Interactive learning experiences that provide direct inspiration can encourage the formation of an entrepreneurial mindset while increasing students' self-efficacy ([Abd Rahim et al., 2022](#)); ([Cui et al., 2021](#)). In addition, structured learning interventions are effective in strengthening business insight and skills that support future business success ([Mncwango & Adanlawo, 2025](#)).

Conceptually, comprehensive learning outcomes encompass students' holistic development across the cognitive, affective, and psychomotor domains ([Ofem et al., 2024](#)). In practice-based subjects such as Crafts, the cognitive domain focuses on understanding basic theory, measured through conceptual understanding evaluations, while the psychomotor domain focuses on mastering technical skills, assessed through observing the product-making process ([Yulastri et al., 2018](#)). Aligning these two domains is crucial for theory to translate into tangible skills ([Ofem et al., 2024](#)). In line with this, an entrepreneurial spirit can be fostered through hands-on product-making projects that train students to analyze material requirements, calculate cost estimates, determine selling prices, and plan promotional strategies ([Nurjamiah et al., 2020](#)); ([Yulastri et al., 2018](#)). Project-based learning has been proven effective in strengthening students' self-efficacy, positive attitudes toward the business world, and mental readiness for entrepreneurship ([Fernández-Pérez et al., 2019](#)); ([Nurjamiah et al., 2020](#)).

Ideally, Craft learning for grades VIII A and VIII B at MTs Negeri 8 Muaro Jambi should achieve a complete balance between strong cognitive understanding, advanced psychomotor skills, and a creative entrepreneurial spirit. However, empirical conditions in the field actually indicate a concerning gap. Students' cognitive levels, psychomotor skills, and entrepreneurial spirit are currently still relatively low because they tend to be positioned as passive recipients of information. This gap is even more contradictory considering that the environment surrounding MTs Negeri 8 Muaro Jambi actually has abundant potential fishery resources. Unfortunately, these local fish commodities have not been optimally utilized by the community or the madrasah environment as value-added processed materials, but are instead sold in their raw form without any economic innovation.

The problem of low learning outcomes and a lack of entrepreneurial spirit in students is fundamentally driven by classroom instructional factors. Crafts instruction has been dominated by conventional methods and limited media, resulting in a monotonous learning process that fails to foster in-depth understanding and technical skills ([Haj et al., 2025](#)). Furthermore, teachers' reliance on general textbooks, without the courage to develop contextualized study materials relevant to local environmental potential, is a major obstacle ([Wildana et al., 2022](#)). Yet, the effectiveness of student learning outcomes is largely determined by the alignment between the applied learning model and the teaching materials provided ([Pangsuma et al., 2024](#)). Without study materials based on real-world practices and local business opportunities, Crafts subjects fail to provide meaningful learning experiences that can hone students' manual skills and business intuition ([Nurhikmah et al., 2025](#)); ([Wildana et al., 2022](#)).

Several previous studies have demonstrated the superiority of the Project-Based Learning (PjBL) model in bridging theory and practice ([Pearce et al., 2025](#)), improving cognitive understanding of food processing ([Nieto et al., 2024](#)), training problem-solving skills ([Oktasari et al., 2026](#)), fostering business attitudes ([Hanafi et al., 2024](#)), and encouraging the creation of competitive products ([Santoso et al., 2023](#)). However, the majority of these studies still focus on college or high school students in pure science subjects ([Oktasari et al., 2026](#)); ([Pearce et al., 2025](#)); ([Santoso et al., 2023](#)). Furthermore, the projects undertaken are often limited to fulfilling academic assignments without considering

market value ([Hanafi et al., 2024](#)), and do not address marketing strategies and product sustainability ([Nieto et al., 2024](#)); ([Santoso et al., 2023](#)).

Based on these limitations, the novelty of this study is the application of the PjBL model specifically designed for Craft subjects at the Madrasah Tsanawiyah (MTs) level, by highlighting the local potential of fish-based food processing. This study comprehensively integrates the improvement of cognitive learning outcomes, psychomotor skills, and the instillation of students' entrepreneurial spirit from an early age through the utilization of local fishery resources. On that basis, this study aims to analyze in depth the effect of the application of the PjBL model in fish-based food processing on cognitive learning outcomes, psychomotor skills, and the entrepreneurial spirit of grade VIII students at MTs Negeri 8 Muaro Jambi, so that it can be a solution for contextual, meaningful Craft learning and provide real-life skills for students.

RESEARCH METHOD

2.1 Research Design

This research uses a quantitative approach with the True Experimental Design method. Specifically, the experimental design applied was a Posttest-Only Control Design. The choice of this design was considered the most appropriate to see the direct effect of the treatment given without bias from carrying out the initial test (pretest). In this design, research subjects are divided into two groups, namely the experimental class, which will receive learning using the Project-Based Learning (PjBL) model based on fish food processing, and the control class, which will receive learning using conventional methods according to school habits. After the treatment is complete, both groups will be given a posttest and final evaluation to measure students' cognitive learning outcomes, psychomotor skills and entrepreneurial spirit.

This research was carried out at MTs Negeri 8 Muaro Jambi. The implementation of the research is adjusted to the Crafts subject schedule for the current semester. The series of research activities, starting from the preparation stage, implementing learning about fish processing practices, to data collection and final evaluation, was carried out over a period of approximately one to two months so that the project-based observation process could run optimally.

2.2 Research Target/Subject

The population in this study was all eighth-grade students at MTs Negeri 8 Muaro Jambi. Considering the True Experimental Design method used, sampling was conducted randomly from the existing population. Based on this technique, two classes were selected as research samples: class VIII A and class VIII B. Through further drawing, one class was designated as the experimental group practicing the PjBL model, and the other class as the control group using conventional methods.

2.3 Research Procedure

This research procedure was carried out through three main, interconnected stages: preparation, implementation, and evaluation. In the preparation stage, the researcher developed PjBL-based learning tools, such as modules, lesson plans, and student worksheets (LKPD) with a focus on fish-based food processing. The researcher also developed and validated research instruments, including test questions, observation sheets, and questionnaires. Furthermore, in the implementation stage, learning was conducted in two different classes. In the experimental class, students were invited to observe the potential of local fish, design processed products, prepare budgets, practice product manufacturing, and design sales strategies in accordance with the PjBL approach. Meanwhile, the control class learned using the usual classroom theoretical delivery method. Finally, in the evaluation stage, after all the materials and projects were completed, the researcher administered a final test (posttest) and conducted a comprehensive assessment of the psychomotor domain and entrepreneurial spirit of students in both classes.

2.4 Instruments and Data Collection Techniques

To obtain comprehensive data related to the three dependent variables studied, this study used several data collection instruments, namely:

1. Cognitive Learning Outcomes: Data were collected through a written test in the form of multiple-choice or essays administered at the end of the lesson (posttest). This test measured students' conceptual understanding of fish-based food processing techniques.

2. Psychomotor Learning Outcomes: Data were collected through direct observation using a performance assessment sheet (performance rubric). This instrument assessed students' technical aspects, such as cleanliness, smooth cooking process, teamwork, and the quality of the final processed fish.
3. Entrepreneurial Spirit: Data were measured using a scaled questionnaire (e.g., a Likert scale) containing indicators of self-efficacy, creativity, and entrepreneurial intention. Furthermore, the observation sheet was used to assess students' sensitivity when determining selling prices and packaging their processed products.

2.5 Data analysis technique

The collected data was then analyzed to answer the research hypotheses. Data analysis was conducted in the following stages:

1. Descriptive Analysis: Used to describe the average, highest, and lowest achievement profiles for the cognitive, psychomotor, and entrepreneurial domains in both groups.
2. Prerequisite Analysis Test: Before conducting the hypothesis test, the data must meet statistical requirements, namely the normality test (to ensure the data are normally distributed) and the homogeneity test (to ensure the variances of the two groups are equal).
3. Hypothesis Test: Because this study involved one independent variable (PjBL) and three dependent variables (cognitive, psychomotor, and entrepreneurial), the inferential statistical analysis technique used was multivariate analysis of variance (MANOVA). However, if the prerequisite analysis test was not met, a nonparametric statistical technique, the Mann-Whitney U test, was used ([Kuswanto, 2024](#)).

RESULTS AND DISCUSSION

3. 1 Description of research data

After a series of data collection was completed, the first step in this analysis was to describe the research data. This description aims to provide a general overview of the learning achievement profile of students who were divided into two observation groups, namely the experimental class and the control class. The learning outcomes in the Craft subject were measured and grouped into three main domains, namely theoretical understanding (cognitive), performance skills (psychomotor), and character building (entrepreneurial spirit). A summary of the comparison of descriptive statistics from the two classes, including the average value (mean), the lowest value (minimum), the highest value (maximum), the level of skewness of the data distribution (skewness), and the level of sharpness of the data (kurtosis), is presented in detail in Table 1 below.

Class	Statistical Value	Practical Arts Learning Outcomes		
		Cognitive	Psychomotor	Entrepreneurial spirit
Experimental class	Mean	82.67	85.84	78.50
	Minimum	70.00	71.88	57.50
	Maximum	100.00	100.00	100.00
	Skewness	0.27	0.20	0.05
	Kurtosis	-0.98	0.68	0.07
	N	30	30	30
Control Class	Mean	67.50	72.55	64.73
	Minimum	30.00	53.13	50.00
	Maximum	100.00	93.75	80.00
	Skewness	-0.18	0.18	0.22
	Kurtosis	-0.08	0.15	-0.27
	N	28	28	28

Source: processed primary data, 2026

Based on the statistical data in Table 1, a clear difference in learning outcomes is evident between the Experimental Class (30 students) and the Control Class (28 students). In general, the Experimental Class demonstrated better and more even achievement across the three assessed aspects. The following is an overview:

1. Material Understanding (Cognitive)

In the Control Class, student understanding varied greatly, with an average of 67.50, and some students still struggled significantly (the lowest score was 30.00). In contrast, students in the Experimental Class had a much better understanding, with an average of 82.67. Their abilities were also much more evenly distributed, as evidenced by the absence of students falling significantly behind, with the lowest score reaching 70.00.

2. Practical Skills (Psychomotor)

The practical aspect was the Experimental Class's main strength, with the highest average achievement of 85.84. Students in this class appeared much more agile and confident. Remarkably, the lowest student score in the Experimental Class (71.88) was nearly equal to the overall average score in the Control Class (72.55).

3. Character (Entrepreneurial Spirit)

Developing entrepreneurial character was the biggest challenge in the Control Class, where the average score was the lowest (64.73), with no students scoring above 80.00. However, in the Experimental Class, students' entrepreneurial character developed significantly better, with an average score of 78.50. In fact, several students in the experimental class demonstrated a maximal entrepreneurial spirit, achieving scores of 100.00.

Overall, learning in the Experimental Class proved more effective than in the Control Class. The approach used not only drastically increased students' average scores but also successfully addressed the issue of ability disparities, preventing students from falling significantly behind in theory, practice, and entrepreneurial attitudes.

3. 2 Prerequisite Analysis Test Results

1. Data Normality Test

A normality test is conducted to determine whether the distribution of student learning outcome data follows a normal distribution. Given the relatively small sample size in each class (30 students in the Experimental Class and 28 students in the Control Class), the test results are primarily focused on the Significance (Sig.) value in the Shapiro-Wilk column. Data are considered normally distributed if the Sig. value is greater than the threshold of 0.05 (Sig. > 0.05).

Table 2. Results of Data Normality Test

Class		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Cognitive	Experimental class	0.204	30	0.003	0.873	30	0.002
	Control Class	0.133	28	.200*	0.969	28	0.550
Psychomotor	Experimental class	0.129	30	.200*	0.960	30	0.303
	Control Class	0.101	28	.200*	0.988	28	0.982
Entrepreneurial spirit	Experimental class	0.109	30	.200*	0.990	30	0.989
	Control Class	0.140	28	0.171	0.976	28	0.760

Source: processed primary data, 2026

Based on the test table in Table 2, the following results were obtained:

a) Cognitive Domain (Abnormal)

In this domain, the data distribution was not uniform. The cognitive understanding data in the Control Class was shown to be normal (Sig. 0.550). However, in the Experimental Class, the significance value was only 0.002 (far below 0.05). This indicates that the cognitive data in the experimental class were not normally distributed.

b) Psychomotor Domain (Normal)

The practical skills of students in both classes showed a reasonable and proportional distribution of scores. Both classes were shown to be normally distributed, with the Sig. value for the Experimental Class being 0.303 and the Control Class being 0.982 (both greater than 0.05).

c) Entrepreneurial Spirit Domain (Normal)

A similar situation also occurred in the entrepreneurial spirit assessment. The data in both groups were shown to be normally distributed. This is indicated by the Sig. value. The Experimental Class had a mean of 0.989 and the Control Class a mean of 0.760.

Test Conclusion: Although the data in the Psychomotor and Entrepreneurial Spirit domains proved normal, the failure of the normality assumption in the Cognitive domain (Experimental Class) had statistical consequences. Because at least one group of data was not normally distributed, this provides strong justification (the rationale) for shifting the overall research hypothesis testing to non-parametric statistical methods (such as the Mann-Whitney test).

2. Data Homogeneity Test

The homogeneity test is the second most important requirement after the normality test before conducting parametric statistical analysis (especially multivariate analysis such as MANOVA). This test, which uses Box's M Test, aims to determine whether the distribution of data variance between the experimental and control classes is equal (homogeneous).

Table 3. Box's Test of Equality of Covariance Matrices

Box's M	80.821
F	12.684
df1	6
df2	22414.162
Sig.	0.000

Source: processed primary data, 2026

Based on the test table, the Sig. value was 0.000. Because this figure is less than the 0.05 threshold (Sig. < 0.05), it can be concluded that the data variance between the two classes is not homogeneous (significantly different).

Test Conclusion: Given that the data was previously shown to be non-normal (in the cognitive domain) and is currently shown to be non-homogeneous, the requirements for using parametric statistics (such as MANOVA) are not met. Therefore, the most appropriate analytical step is to use non-parametric statistics (such as the Mann-Whitney Test) to answer the research hypothesis.

3.3 Mean Difference Test Results

Because the data were proven to be non-normal and non-homogeneous, hypothesis testing was conducted using non-parametric statistics, namely the Mann-Whitney U Test. This test aims to determine whether there is a real (significant) difference between the learning outcomes of the Experimental Class and the Control Class.

The decision-making principle is very simple: If the Asymp. Sig. (2-tailed) value is less than 0.05, then there is a significant difference between the two classes.

Table 4. Hypothesis Test Results (Mann-Whitney U)

	Kognitif	Psikomotorik	Kewirausahaan
Mann-Whitney U	187.00	93.50	101.50
Wilcoxon W	593.00	499.50	507.50
Z	-3.71	-5.1	-4.97
Asymp. Sig. (2-tailed)	0.00	0.00	0.00

Source: processed primary data, 2026

Based on the test results in Table 4, a significance value (Asymp. Sig. 2-tailed) of 0.000 was obtained for the three measured learning domains, namely the cognitive, psychomotor, and entrepreneurial spirit domains. Because the significance value in these three domains is much smaller than the threshold of 0.05 (Sig. < 0.05), the research hypothesis is accepted. This provides convincing statistical evidence that there are very significant differences in learning outcomes in the aspects of material understanding (cognitive), practical skills (psychomotor), and character formation (entrepreneurial spirit) between students in the experimental class compared to the control class.

3.4 Discussion

Based on the results of statistical analysis using the Mann-Whitney U test, this study conclusively proves that there are highly significant differences in cognitive, psychomotor, and entrepreneurial achievement between MTs students in the experimental and control classes ($p < 0.05$). The experimental class, which received the Project-Based Learning (PjBL) intervention, consistently outperformed the control class, which used conventional methods. This success is due to the essential characteristics of PjBL, which positions students as active subjects in solving real-world problems, particularly in the context of designing and producing culinary products, particularly in the context of fish-based food processing.

1. Increasing Cognitive Capacity through Active Constructivism

In the realm of cognitive understanding, the experimental class recorded an average score of 82.67, compared to the control class, which only achieved 67.50. Beyond simply improving scores, the PjBL method has proven to be able to improve student understanding. In the fish-based food processing lesson, MTs' students were not only taught theoretical knowledge about fish types; they were required to independently investigate nutritional content (such as protein and omega-3 fatty acids), sanitation/food hygiene techniques, and even simple biochemical reactions during fish processing (e.g., boiling, smoking, or frying).

This aligns with the basic philosophy of Vygotsky's constructivism theory, where knowledge is actively constructed through interaction and problem-solving. During the PjBL project planning stage, MTs students were required to develop recipes, select natural preservatives, and understand hygienic processing techniques. These findings are supported by research by ([Chen & Yang, 2019](#)), which concluded that PjBL has a positive effect on the acquisition of conceptual knowledge because students must truly "understand" the basic theory before they can cook or process ingredients. In line with this, ([Peng et al., 2024](#)) also confirmed that the investigation stage in PjBL significantly reduces the gap in academic understanding between students, creating an equitable learning ecosystem.

2. Optimizing Psychomotor Skills through Experiential Learning

The most encouraging news from this study is in the psychomotor domain, where the experimental class achieved the highest average score of 85.84. This proves that PjBL is a highly catalytic platform for developing MTs students' technical vocational skills. Unlike control classes, which may simply see a teacher demonstrate cooking methods, the experimental class provides hands-on experience.

When students directly touch raw ingredients, scale fish, fillet (separate meat from bones), mix spices, and use cooking utensils with the right level of precision, they are practicing David Kolb's Experiential Learning theory. This multisensory experience builds muscle memory that cannot be acquired from reading a textbook alone. An empirical study by ([Mashud et al., 2025](#)), showed that the PjBL model stimulates up to 40% more motor independence than conventional methods. Furthermore, research ([Noerper et al., 2025](#)) confirms that physical involvement in collaborative project creation fosters students' self-confidence and flexibility, a crucial competency in culinary-based Craft subjects.

3. Incubating an Entrepreneurial Spirit from Adolescence (MTs)

Developing an entrepreneurial spirit in adolescent students at Islamic schools (madrasah) is often a challenge. However, the PjBL intervention has proven successful in breaking this deadlock, with the experimental class achieving an average score of 78.50, significantly higher than the control class, which remained at 64.73. Some students in the experimental class even achieved a perfect score.

This transformation is highly rational because fish-based food processing within the PjBL framework simulates the ecosystem of a micro-scale culinary industry (such as making fish nuggets, fish balls, or otak-otak). Students in the experimental class don't stop at the "food is cooked" stage.

They are trained to consider product durability, design attractive packaging, calculate capital (Cost of Goods Sold), and develop effective marketing strategies.

According to the Entrepreneurial Intention theory developed by Ajzen, entrepreneurial intention is strongly influenced by an individual's belief in their abilities (self-efficacy). Project-based learning (PjBL) directly increased this confidence when MTs students saw that their processed fish products were popular, marketable, and had economic value. This aligns with findings (Rodriguez & Lieber, 2020), which confirm that project-based learning is the most effective pedagogical instrument for incubating edupreneurship traits at the secondary school level. Furthermore, ([Handayati et al., 2020](#)) also demonstrated that entrepreneurship education integrated through group projects fosters essential values supporting entrepreneurship, such as resilience (never giving up when cooking fails), team collaboration, and the courage to take risks.

Holistically, the learning outcomes in the experimental class provide evidence that the application of the Project-based learning (PjBL) model to fish-based food processing at the MTs level is not simply a conventional cooking method. PjBL successfully creates a holistic learning ecosystem: blurring the boundaries between nutritional/food science theory (cognitive), food preparation skills (psychomotor), and culinary business instincts (entrepreneurial spirit). Through real work, madrasa students are educated not only to be consumers, but also prepared to become a generation of independent creators and innovators who are relevant to real-world needs.

CONCLUSION

Based on statistical testing and in-depth analysis, this study conclusively concludes that the implementation of the Project-Based Learning (PjBL) model has a positive and highly significant impact on the learning outcomes of junior high school (MTs) students in fish-based food processing. The PjBL model has proven to be a holistic learning ecosystem that successfully bridges three educational dimensions simultaneously. On the cognitive dimension, PjBL successfully accelerated and consolidated understanding of basic theories, such as the nutritional value of fish and food sanitation- thus minimizing knowledge gaps among students. Psychomotor-wise, hands-on experience enabled students in the experimental class to demonstrate a significantly higher level of independence and technical flexibility in executing recipes compared to conventional classes. Furthermore, on the entrepreneurial spirit dimension, the in-class micro-culinary industry simulation successfully incubated an entrepreneurial mindset (edupreneurship) from an early age, where students were taught not only to create food products but also to design their selling points through packaging innovation and business feasibility calculations.

The success of this PjBL model intervention has strategic implications that need to be addressed by policymakers in madrasas. Schools need to encourage a paradigm shift in the curriculum in vocational subjects (such as Crafts) from a rote approach to learning that focuses on the creation of real-world projects. This requires infrastructure support and flexible timeframes, such as implementing a block scheduling system to ensure students complete the production phase within a single learning day, as well as a dedicated budget allocation policy to strengthen practical facilities. Furthermore, madrasas need to facilitate the development of educators' pedagogical capacity through regular training, enabling teachers to transform from mere lecturers into project managers and facilitators capable of developing authentic product- and performance-based assessment instruments.

Based on these findings and implications, several constructive recommendations for future action are available. Schools are strongly advised to regularly facilitate appreciation events such as Market Days, allowing students to validate their products with real consumers, practice marketing strategies, and gain hands-on experience in managing business capital. Subject teachers are encouraged to begin designing collaborative, cross-disciplinary projects, for example, integrating cooking practices with food chemistry in science lessons and profit and loss calculations in mathematics. Finally, for future researchers, it is hoped that there will be further studies with a larger sample coverage, exploration of other plant or animal material processing materials, as well as the implementation of long-term studies (longitudinal studies) to see the impact of cultivating this entrepreneurial spirit on students' career choices in adulthood.

ACKNOWLEDGMENTS

The author would like to express his gratitude to the principal, fellow teachers, and all beloved students for their support, guidance, and active participation so that the entire series of research activities could run smoothly.

AUTHOR CONTRIBUTIONS

Conceptualization, E.M. and I.S.; Methodology, E.M. and I.S.; Software, E.M.; Validation, E.M. and I.S.; Formal Analysis, E.M.; Investigation, E.M. and I.S.; Resources, I.S.; Data Curation, E.M.; Writing – Original Draft Preparation, E.M.; Writing – Review & Editing, E.M. and I.S.; Visualization, E.M.; Supervision, I.S.; Project Administration, I.S.; Funding Acquisition, I.S. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare that they have no financial or personal conflicts of interest with respect to the conduct of the research, authorship, and publication of this article. The entire research process is carried out purely for the benefit of scientific development.

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