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Developing Entrepreneurial Attitude through Soap Making Chemistry Practicum in High School: Need Analysis

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Abstract: This study aims to explore how chemistry practicum activities can contribute to the development of students' entrepreneurial attitudes at SMA Negeri 3 Ketapang. This study was conducted at SMA Negeri 3 Ketapang, West Kalimantan, with respondents consisting of 352 students in grades X and XI and 20 chemistry teachers. Data were collected through a 30-item questionnaire based on a five-point Likert scale, which measures six aspects of entrepreneurial attitude, namely self-confidence, task and result orientation, risk-taking, leadership, future orientation, and creativity. The results showed that students recorded the highest score on the risk-taking aspect (74.63%) and the lowest on creativity (56.99%). The teachers showed a similar pattern, with the highest score for the risk-taking aspect (69.00%) and the lowest for the creativity aspect (56.00%). There was little difference in scores between students and teachers, indicating that both groups value entrepreneurial attitudes in education. This study concludes that chemistry practicum enhances students' entrepreneurial attitudes, especially risk-taking and leadership. However, creativity needs more attention to be effectively integrated into the learning process.

Keywords: Chemistry Learning; Chemistry Practicum; Entrepreneurial Attitude.

Introduction

Education in the age of globalization plays a critical role in preparing a generation to face the challenges of the day. One area that is receiving increased attention is the development of entrepreneurial attitudes. Entrepreneurship is important not only in economic terms, but also in the development of adaptable, innovative, and proactive individuals. Define entrepreneurship as a dynamic process involving creativity, innovation, and courage in the face of uncertainty (Kuratko and Hornsby, 2021; (Mahmudin, 2023). Thus, incorporating entrepreneurship into education, particularly at the senior high school (SMA) level, is critical.

Given the challenges of today's ever-changing workplace, cultivating an entrepreneurial mindset is becoming more important. This attitude aims not only to develop new entrepreneurs, but also to provide students with practical life skills in a variety of fields (Darma et al., 2024; Sinaga et al., 2024). This is extremely important for high school students, particularly in areas such as SMA Negeri 3 Ketapang, West Kalimantan, which have economic potential but have not been maximized. However, based on initial observations, students at SMA Negeri 3 Ketapang still show a lack of initiative in exploring business opportunities around them. This challenge encourages the need for innovation in learning methods, one of which is through the integration of chemistry practicum activities in the learning process. Chemistry practicum, such as soap making, has great potential in encouraging students to develop entrepreneurial attitudes. With practicum activities, students not only understand chemical concepts, but

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also learn how chemical products such as soap can have economic value.

Research found that practicum-based learning can help students improve their critical thinking and creativity, both of which are important components of entrepreneurship (Sari and Kurniawati's, 2022). Furthermore, students' participation in practicum activities allows them to see the economic value of the products produced. Hands-on experience in the process of production can help students better understand the application of science in the business world (Wibowo, 2021). Therefore, this study aims to explore how chemistry practicum activities can contribute to the development of students' entrepreneurial attitudes at SMA Negeri 3 Ketapang. This research also identifies the factors that influence students' entrepreneurial attitude and how chemistry practicum can be optimized to develop entrepreneurial potential. SMA Negeri 3 Ketapang was chosen as the research site because it has a good chemistry lab and is staffed by competent educators. However, according to the Ketapang Education Office report (2023), students' entrepreneurial attitudes in this school can still be improved. This is the primary reason for making this school the subject of research, in order to contribute to the development of learning that is more applicable and relevant to students' needs in the age of globalization.

This study also referred to literature that demonstrates the significance of entrepreneurship integration in science education. For example, students who participated in entrepreneurship-based practicum activities had a significant increase in proactive and innovative attitudes (Nugroho and Wahyuni, 2020; (Supandi & Burhanudin, 2024). This finding emphasizes the significance of learning approaches that combine theory and practice in developing entrepreneurial attitudes. Thus, this research is expected to provide recommendations for curriculum development that is more responsive to market needs and scientific developments. A responsive curriculum is more effective in preparing students to face the world of work (Rahayu and Suryadi, 2022). In addition, the results of this study are also expected to contribute to the entrepreneurship education literature, especially in the context of science learning, which is still limited. In the rapidly changing digital era, instilling an entrepreneurial mindset early on will better prepare students to innovate and adapt. Thus, this research is expected to help improve the quality of education in Indonesia, particularly in areas with economic potential that has not been optimized. Furthermore, this study is applicable in a global context, where entrepreneurship is regarded as one of the keys to achieving inclusive and sustainable economic development (OECD, 2021).

This article discusses the needs analysis of entrepreneurial attitude development in SMA Negeri 3 Ketapang, West Kalimantan, through the integration of chemistry practicum, such as soap making . This research explores how practicum can encourage students to develop proactive, innovative, and adaptive attitudes. These attitudes are considered important for facing global and local economic challenges, as well as utilizing untapped regional potential. The emphasis on practicum-based learning is aimed at improving students' creativity and critical thinking skills, which are essential in shaping entrepreneurial character in the era of globalization.

Method

This study used descriptive and survey methods with structured questionnaires to collect data. This survey research aimed to describe the characteristics of students' entrepreneurial attitude and the role of teachers in its formation, without giving special treatment to the sample, hence there was no need for a control or experimental class.

The respondents in this study were divided into two groups. The first group consisted of 352 students from SMA Negeri 3 Ketapang in West Kalimantan, who were in grades X and XI. The second group consisted of 20 chemistry teachers who are members of Ketapang Regency's Subject Teacher Conference (MGMP) in West Kalimantan. Students were chosen to examine business motivation and entrepreneurial attitudes, whereas teachers were chosen to examine the role of teachers in shaping students' entrepreneurial attitudes.

Data were collected using a questionnaire that was prepared based on predetermined indicators of entrepreneurial attitudes. The questionnaire consisted of 30 statement items covering three main aspects of entrepreneurial attitudes: Entrepreneurial Aspirations, Entrepreneurial Skills, and Self-Confidence and Self-Reliance (PISA, 2024). The scale used was a five-point Likert scale, where respondents were asked to indicate their level of agreement with the given statements, with answer options from 'Strongly Disagree' (STS) to 'Strongly Agree' (SS).

The following table shows the division of questionnaire items into the six aspects of entrepreneurial attitude measured in this study.

Aspect	Item Number	Amount
Self-confidence	4, 6, 10, 26	4
Task and Result Oriented	7, 14, 20, 25	4
Risk Taking	1, 15, 16, 27, 28	5
Leadership	2, 3, 5, 13, 17, 18, 23, 24, 29, 30	10
Future-Oriented	9, 12, 19, 21, 22	5

Aspect	Item Number	Amount
Creativity	8, 11	2
Amount Overall		30

The questionnaires were given to participants during teaching and learning activities. Students and teachers were given sufficient time to complete the questionnaire based on their understanding. The data was then analyzed using descriptive statistical methods to describe the characteristics of students' entrepreneurial attitudes, as well as the role of teachers in shaping them.

Result and Discussion

On student respondents to explore business motivation and entrepreneurial attitudes, the results of the average percentage score on each indicator of entrepreneurial attitudes show the details of the indicator:

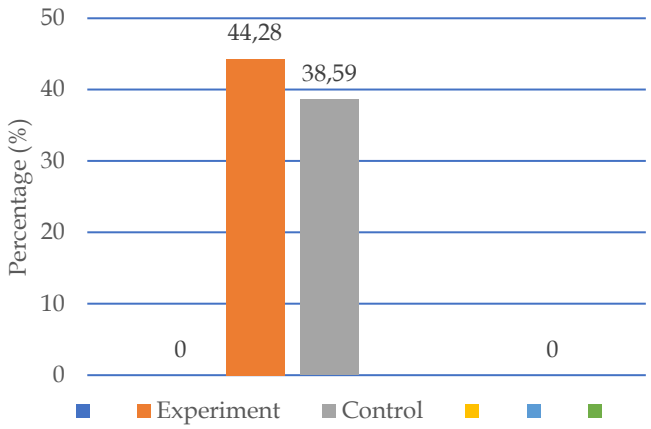

Figure 1. Percentage Results of Student Responses to Entrepreneurship Aspects

The role of teachers in forming entrepreneurial attitudes can be studied through the average percentage score for each indicator, as shown in Figure 2.

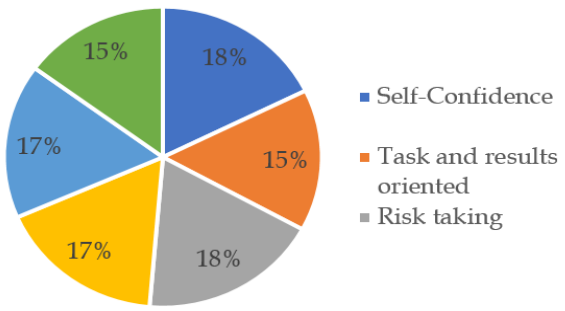

Figure 2. Percentage Results of Teacher Responses to Entrepreneurship Aspects

Figure 3. documentation from research

The data-based analysis of students' entrepreneurial attitudes and the role of teachers in shaping these attitudes is:

Self-confidence:

Self-confidence and self-efficacy play an important role in entrepreneurial success, as described by Bandura, (1997) who emphasized that high self-confidence is an important asset in entrepreneurship. Self-efficacy, or the belief in one's ability to achieve goals, is positively associated with success in entrepreneurship. Research by Zhao, Seibert, and Lumpkin (2010) also shows that practical experience increases self-efficacy and self-confidence, which in turn strengthens entrepreneurial attitudes and resilience in the face of challenges. In addition, research by Chen, Greene, and Crick (1998) emphasize the importance of hands-on experience in building stronger self-confidence. Although students and teachers showed good self-confidence scores (66.48% and 66.50%), these findings suggest that there is still room for improvement, especially through practical experiences that can further enhance their self-efficacy and confidence in entrepreneurship.

Task and Result Oriented

This indicator scored 60.16% for students and 57.25% for teachers. This difference may reflect the fact that students are more concerned with achieving immediate results, whereas teachers see the task from the point of view of the learning process. According to Locke and Latham (2002), results orientation is an important motivator in entrepreneurship. Supported by research conducted by Taing et al (2013) shows that students with a high outcome orientation tend to have greater motivation, but teachers can help balance this with a focus on the process. Apart from higher student grades, teachers play an important role in balancing task and outcome orientation through comprehensive education.

Risk Taking

The risk-taking aspect of students' entrepreneurial attitude in SMA Negeri 3 Ketapang showed the highest score, with 74.63% for students and 69.00% for teachers.

Entrepreneurs are known to be more optimistic in taking risks (Palich & Bagby, 1995), and this finding suggests that students have high potential to become innovative entrepreneurs. The role of teachers is crucial in encouraging and guiding students to take calculated risks, especially through case studies and business simulations that highlight risks and benefits. Research by Falah & Syafri (2023) showed that entrepreneurship education helps students understand and manage risk better, which is important in decision-making involving risk. In addition, Minarsih et al. (2022) emphasized that entrepreneurship education can equip students with the skills to face challenges and take measured risks, which are essential in the world of entrepreneurship. Thus, teachers act as facilitators who help students develop a healthy and informed entrepreneurial attitude..

Leadership

Leadership recorded a score of 64.99% for students and 64.20% for teachers, indicating a good awareness of the importance of leadership in entrepreneurship. According to Northouse (2018), leadership requires not only technical skills, but also interpersonal skills that enable leaders to motivate, communicate and cooperate with others effectively. This is particularly relevant in the context of entrepreneurship, where the ability to lead teams and manage relationships is key to success. Teachers can strengthen students' leadership skills by giving them a more active role in group projects and extracurricular activities that focus on leadership development, so that students can hone their interpersonal skills and prepare themselves to face future entrepreneurial challenges. Indarti and Rostiani's (2018) research highlights the importance of the teacher's role in developing student entrepreneurship, by guiding students in understanding the concept of entrepreneurship and applying it in everyday life. In addition, Falah and Syafri (2023) showed that entrepreneurship education can help students to understand and manage risk better, which is important in making decisions that involve risk, so the role of teachers in integrating entrepreneurship education and leadership skills development is very important to prepare students for future entrepreneurship challenges.

Future-oriented

The results of this indicator showed a result of 62.47% for students and 62.40% for teachers, reflecting an awareness of the importance of future orientation in entrepreneurship. Future orientation requires the ability to make long-term plans and anticipate challenges, which is part of strategic entrepreneurship (Lumpkin & Dess, 1996). While there is awareness of the importance of planning, more efforts are needed to develop this ability, such as through mentoring programs or strategic planning activities. Strategic planning is important to understand market dynamics, capitalize on opportunities, and anticipate challenges (Kummara, 2023), so it can help students prepare for entrepreneurial challenges.

Creativity

Creativity received the lowest score from both students (56,99%) and teachers (56,00%). Amabile (1996) emphasizes the importance of creativity in driving innovation. These low scores highlight the need for more innovative approaches in entrepreneurship education, such as project-based learning or training centered on developing new ideas (Musrizal & Azhar, 2024). Given the significance of creativity in confronting business challenges and competition, teachers can play an important role in fostering a learning environment that encourages exploration and innovation.

The development of students' entrepreneurial attitudes and the role of teachers is very important based on data showing several key aspects of entrepreneurship that still have low scores and require improvement (Supandi & Burhanudin, 2024). Here are the main reasons why such development is needed:

Addressing Gaps in Self-Confidence

With a score of 66.48% for students and 66.50% for teachers, self-confidence is still at a moderate level. Self-confidence is a fundamental element in entrepreneurship, influencing the ability to face challenges, make decisions and act proactively (Isrososiawan, 2013). If students' self-confidence is not further developed, they may lack confidence in taking business initiatives or capitalizing on entrepreneurial opportunities. Therefore, development is needed to boost students' self-confidence through activities that foster practical skills (Maisyaroh et al., 2023).

Low Task and Result Orientation

The scores of 60.16% for students and 57.25% for teachers indicate that the orientation to tasks and results is still weak. This orientation is very important in achieving business goals (Prayitno et al., 2023). If students and teachers do not develop enough focus on the results to be achieved, the entrepreneurship learning process will be less effective in motivating students to achieve real goals. This development is needed to encourage teachers and students to prioritize results without putting aside the quality learning process.

The Need for Improved Risk Taking

Although the risk-taking aspect recorded a fairly good score (74.63% for students and 69.00% for teachers), prudent risk-taking is an important

characteristic of successful entrepreneurs. The data shows that there is still room to improve students' ability to take more measured and strategic risks. Without further development, students may struggle to make innovative yet calculated business decisions.

Lack of Leadership Development

With a score of around 64% for both students and teachers, leadership skills are still at a moderate level. In fact, leadership is needed in managing a business, leading a team, and making strategic decisions. If not developed, students may find it difficult to lead their own projects or businesses. Student and teacher leadership development is urgently needed to create a more dynamic and collaborative environment where students can practice the role of leaders.

Low Future Orientation

A score of around 62% indicates that students and teachers have not fully adopted a long-term entrepreneurial mindset. Future planning is essential in business for students to prepare themselves for future changes and challenges. Without further development, students may be less prepared in planning sustainable and adaptive business strategies to market changes. Therefore, development in this aspect will help students to focus more on long-term planning and strategy.

Low Level of Creativity

Creativity recorded the lowest score (56.99% for students and 56.00% for teachers). Creativity is a key element in creating innovation, which is indispensable in entrepreneurship to differentiate oneself from competitors and create unique solutions (Prayitno et al., 2023). These scores indicate that the educational approach used has not sufficiently stimulated the creativity of students and teachers. Without further development, students may find it difficult to create innovations that can add value in the business world. Development is needed to integrate more creative and innovation-based learning methods.

To improve aspects of entrepreneurship that are not yet optimal:

1. Self-Confidence: Enhance through practical experiences such as business simulations to encourage students to face real challenges.
2. Task and Result Orientation: Focus on projects that result in real solutions, balancing learning and goal achievement.
3. Risk-Taking Ability: Use case studies and simulations to teach students to take measured risks and strategic decisions.
4. Leadership: Engage students in collaborative projects and extracurricular training to develop leadership skills.
5. Future Orientation: Encourage long-term planning through mentoring programs and business strategy simulations.
6. Creativity: Apply project-based learning and interdisciplinary approaches to spur innovation and creative ideas.

Analyzing entrepreneurial attitudes through the Project Based Learning (PjBL) Model integrated with Ketapang natural resources on macromolecular materials helps improve students' creative thinking skills and entrepreneurial attitudes through practical experience, risk-taking, results orientation, leadership, and long-term planning relevant to the local context.

Conclusion

The study revealed that students at SMA Negeri 3 Ketapang showed strong tendencies in the aspects of risk-taking and leadership, with scores of 74,63% and 64,99% respectively. Teachers also showed similar views, with a risk-taking score of 69,00% and leadership of 64,20%. These two aspects are very important in shaping a resilient and proactive entrepreneurial attitude. However, the creativity aspect recorded the lowest score among both students (56,99%) and teachers (56,00%), indicating a need to improve the integration of creativity in the learning process. Chemistry practicums have been shown to be effective in strengthening entrepreneurial attitudes, particularly risk-taking and leadership, by allowing students to apply chemical knowledge in an entrepreneurial context while also improving critical thinking and problem-solving skills. More innovative learning strategies are needed to enhance students' creativity in the context of entrepreneurship. Combining practicum activities with creative projects can help improve creativity, which is currently low among students and teachers. The curriculum at SMA Negeri 3 Ketapang and other schools are advised to integrate more entrepreneurship-based practicum activities, with a special focus on developing students' creativity so that they are better prepared to face global challenges. This study provides valuable insights for the development of a more applicable and relevant learning model, which can be used as a benchmark to improve the quality of entrepreneurship education, particularly in areas with economic potential that has not been optimized.

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Author Contributions

Conceptualization, Titin Nurhayatin and Bambang Susilo; methodology, Titin Nurhayatin; software, Suyanta; validation, Titin Nurhayatin, Bambang Susilo, and Suyanta; formal analysis, Bambang Susilo; investigation, Suyanta; resources, Bambang Susilo; data curation, Titin Nurhayatin; writing—original draft preparation, Titin Nurhayatin; writing—review and editing, Bambang Susilo; visualization, Suyanta; supervision, Suyanta; project administration, Bambang Susilo; Funding funding, Suyanta. All authors have read and approved the published version of the manuscript.

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Conflicts of Interest

The funders had no role in study design; in the collection, analysis, or interpretation of data; in script writing; or in the decision to publish the results.

References

Al-Jubari, I., Hassan, A., & Liñán, F. (2019). Entrepreneurial intention among university students in Malaysia: Integrating self-determination theory and the theory of planned behavior. *International Entrepreneurship and Management Journal,* 15(4), 1323-1342. https://doi.org/10.1007/s11365-018-0529-0

Bandura, A. (1997). *The Exercise of contro*l.Worthh Publishers.

Boldureanu, G., Ionescu, A. M., Bercu, A.-M., Bedrule-Grigorută, M. V., & Boldureanu, D. (2020). Entrepreneurship education through successful entrepreneurial models in higher education institutions. *Sustainability,* 12(3), 1267. https://doi.org/10.3390/su12031267.

Darma, F. E., Mesah, W., & Bello, Y. (2024). Cara Berpikir Seorang Wirausahawan Sukses untuk Menciptakan Peluang Bisnis. *Maeswara : Jurnal Riset Ilmu Manajemen Dan Kewirausahaan,* 2(6), Article 6. https://doi.org/10.61132/maeswara.v2i6.1366.

Falah, N., & Syafri, M. (2023). The role of entrepreneurship education in developing students' risk-taking abilities. *Journal of Business and Entrepreneurship Education*, 15(2), 112-125.

Indarti, N., & Rostiani, R. (2018). The role of teachers in fostering student entrepreneurship: A case study in Indonesia. *International Journal of Entrepreneurship Education,* 6(1), 78-95.

Isrososiawan, S. (2013). Peran Kewirausahaan Dalam Pendidikan. *Society,* 4(1), Article 1. https://doi.org/10.20414/society.v4i1.329

Ketapang Education Office. (2023). *Education report on student entrepreneurial attitudes in Ketapang*. Ketapang Government Press.

Kummara. (2023). Understanding the importance of strategic planning in business. *Journal of Strategic Business Development,* 12(3), 45-56.

Lu, G., Song, Y., & Pan, B. (2021). How university entrepreneurship support affects college students' entrepreneurial intentions: An empirical analysis from China. *Sustainability,* 13(6), 3224. https://doi.org/10.3390/su13063224.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. Academy of Management Review, 21(1), 135-172.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, 57(9), 705–717.

Mahmudin, T. (2023). The Importance of Entrepreneurship Education in Preparing the Young Generation to Face Global Economic Challenges. *Journal of Contemporary Administration and Management (ADMAN)*, 1(3), Article 3. https://doi.org/10.61100/adman.v1i3.78

Maisyaroh, F. Z., Miterianifa, Fatisa, Y., & Hasanudin. (2023). Pendidikan Karakter Siswa Dalam Pembelajaran IPA Abad 21. *Journal of Natural Sciences Learning*, 2(2), Article 2.

Minarsih, M. M., Susilo, D., & Wijayanti, R. (2022). Enhancing entrepreneurial skills through education: A study on risk-taking behavior. I*nternational Journal of Entrepreneurship and Innovation Studies,* 10(1), 45-60.

Musrizal, M., & Azhar, A. (2024). Inovasi Guru Dalam Meningkatkan Kreatifitas Berpikir Anak Di Era 4.0. *Al-Rabwah,* 18(01), Article 01. https://doi.org/10.55799/jalr.v18i01.274

Northouse, P. G. (2018). *Leadership: Theory and practice (8th ed.)*. SAGE Publications.

Nugroho, A., & Wahyuni, S. (2020). The impact of entrepreneurship-based practicum on students'

proactive and innovative attitudes. *Journal of Science Education and Entrepreneurship*, 8(2), 112-125.

OECD. (2021). *Entrepreneurship policies through a global lens: Achievinginclusive and sustainable economic development*. OECD Publishing.

OECD. (2024). *PISA 2024 Assessment and Analytical Framework: Entrepreneurship Indicators*. OECD Publishing.

Palich, L. E., & Bagby, D. R. (1995). Using cognitive theory to explain entrepreneurial risk-taking: Challenging conventional wisdom. J*ournal of Business Venturing,* 10(6), 425-438.

Prayitno, M. A., Haryani, S., Wardani, S., Wijayati, N., & Solihah, M. (2023). Efektivitas Pembelajaran Kimia Berbasis Proyek Greenpreneurship Terhadap Keterampilan Berpikir Kreatif Mahasiswa. *Prosiding Seminar Nasional Pascasarjana,* 6(1), Article 1.

Rahayu, D., & Suryadi, A. (2022). The role of a responsive curriculum in preparing students for the workforce. *Educational Policy and Development Journal*, 14(1), 67-80.

Sari, A. I. C., Karlina, E., & Rasam, F. (2021). Peran pendidikan kewirausahaan dan motivasi berwirausaha dalam menumbuhkan sikap mental kewirausahaan peserta didik. *Research and Development Journal of Education*, 7(2), 403-412. https://doi.org/10.30998/rdje.v7i2.10287.

Sari, P., & Kurniawati, L. (2022). Practicum-based learning and its effect on students' critical thinking and creativity. *International Journal of Chemistry Education Research*, 10(3), 178-190.

Sinaga, G. M., Rendi, R., & Belo, Y. (2024). Membangun Mindset Entrepreneur: Kunci Sukses di Era Digital. *Journal of Student Research,* 2(6), Article 6. https://doi.org/10.55606/jsr.v2i6.3438

Supandi, A., & Burhanudin, B. (2024). Peran Pendidikan Kewirausahaan Dalam Meningkatkan Motivasi Dan Inovasi Berwirausaha Pada Siswa Smk. *Jurnal Review Pendidikan Dan Pengajaran (JRPP),* 7(1), 89–92. https://doi.org/10.31004/jrpp.v7i1.24008

Supandi, T., & Burhanudin, A. (2024). Enhancing entrepreneurial attitudes through science education: A case study in Indonesia. *Journal of Entrepreneurship and Science Education*, 15(1), 34-50.

Taing, M. U., Smith, T., Singla, N., Johnson, R. E., & Chang, C.-H. (2013). The relationship between learning goal orientation, goal setting, and performance: A longitudinal study. *Journal of Applied Social Psychology,* 43(8), 1668–1675. https://doi.org/10.1111/jasp.12119

Vamvaka, V., Stoforos, C., Palaskas, T., & Botsaris, C. (2020). Attitude toward entrepreneurship, perceived behavioral control, and entrepreneurial intention: Dimensionality, structural relationships, and gender differences. *Journal of Innovation and Entrepreneurship,* 9(5). https://doi.org/10.1186/s13731-020-0112-0.

Wibowo, R. (2021). The role of hands-on experience in science learning for entrepreneurship education. *Journal of Applied Science and Business*, 7(4), 89-102

Zhao, H., Seibert, S. E., & Lumpkin, G. T. (2010). The relationship of personality to entrepreneurial intentions and performance: A meta-analytic review. *Journal of Management,* 36(2), 381-404