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From Sustainability Problems to Venture Opportunities: Determinants of Sustainable Entrepreneurial Opportunity Recognition among College Students in Karnataka, India

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***Abstract* – Sustainable entrepreneurship education often measures intention, but intention does not show whether students can first identify a workable venture opportunity within a social or environmental problem. This study examines sustainable entrepreneurial opportunity recognition among college students in Karnataka, India. It tests sustainability problem awareness, future consequence orientation, sustainable entrepreneurial role-model exposure and university experiential learning support. The analysis covers 342 responses and uses descriptive statistics, reliability analysis, an independent-samples t-test, one-way analysis of variance, Pearson correlation and multiple regression. Sustainability problem awareness recorded the highest mean (M = 3.90), while role-model exposure recorded the lowest (M = 3.50). Students with prior entrepreneurship education reported stronger opportunity recognition than those without it, t(340) = 4.42, p < .001, d = .48. Opportunity recognition also differed across academic streams, F(3, 338) = 6.00, p < .001, eta squared = .051. The four predictors were positive and significant. The model explained 58.1 per cent of the variance. Future consequence orientation was the strongest predictor, followed by sustainability problem awareness, university experiential learning support and role-model exposure. The findings show that students recognise stronger opportunities when they understand sustainability problems, consider future effects, receive practical learning support and observe entrepreneurs who have turned similar problems into ventures. The study moves attention from general intention to the earlier task of finding and judging a sustainable venture opportunity.**

***Keywords* - sustainable entrepreneurship; opportunity recognition; future orientation; role models; experiential learning; college students.**

I. INTRODUCTION

Environmental and social problems often create needs that markets and public systems do not fully meet. Sustainable entrepreneurs can respond to these needs through products, services and business models that create economic, social and environmental value (Cohen & Winn, 2007). Their role is not limited to starting an environmentally friendly business. Sustainable entrepreneurship also concerns what should be protected and what kind of development should be created (Shepherd & Patzelt, 2011). It can therefore offer new responses when existing solutions are weak, costly or unavailable (Hall et al., 2010).

Higher education has an important role in preparing students to identify and respond to such problems. Entrepreneurship education can develop useful knowledge and skills, especially when learning is connected to tasks that students may later perform in real settings (Martin et al., 2013). Human capital is also more valuable when it includes current and task-related knowledge rather than qualifications alone (Unger et al., 2011). Students therefore need opportunities to observe sustainability problems, understand the needs of affected groups and assess whether a responsible business solution can be developed.

Much of the existing research on students focuses on entrepreneurial intention as the main outcome. Intention is important because it reflects a person's willingness to start a venture. However, intention does not explain what the student plans to create or which environmental or social problem the venture will address (Krueger et al., 2000). Studies show that sustainable entrepreneurial intention is influenced by education, attitudes, perceived support, personal values and concern for future consequences (Agu et al., 2021; Thelken & de Jong, 2020; Vuorio et al., 2018). The effect of education may also differ according to students' previous experience (Gamarra-Chávez et al., 2026). These findings are useful, but they leave an earlier stage of the entrepreneurial process less examined.

Before students can form a strong intention to start a sustainable venture, they must first recognise a suitable opportunity. Sustainable entrepreneurial opportunity recognition occurs when a student connects an environmental or social problem with a possible venture solution that can create value. Knowledge of natural and community conditions helps individuals notice unmet needs, while entrepreneurial knowledge helps them assess whether a possible response is practical and valuable (Patzelt & Shepherd, 2011). Market failures can also reveal opportunities because poor information, weak pricing systems and unaddressed environmental or social costs may create space for new solutions (Dean & McMullen, 2007).

Problem awareness alone may not be sufficient. Students may notice a problem but fail to consider its long-term effects. Future consequence orientation can help students assess how present decisions may affect society and the environment over time. Exposure to sustainable entrepreneurial role models may also make opportunity recognition easier by showing how others have converted sustainability problems into workable ventures. In the same way, university experiential learning support can give students practical opportunities to study local problems, work with communities, develop ideas and receive feedback.

This study examines four factors that may support sustainable entrepreneurial opportunity recognition among college students. These factors are sustainability problem awareness, future consequence orientation, sustainable entrepreneurial role-model exposure and university experiential learning support. The study also examines whether students' opportunity recognition differs according to prior entrepreneurship education and academic stream. By focusing on opportunity recognition, the study examines an earlier and more practical stage than entrepreneurial intention. It also brings together personal, social and educational factors within one model.

Objectives of the Study

- To examine the influence of sustainability problem awareness, future consequence orientation, sustainable entrepreneurial role-model exposure and university experiential learning support on sustainable entrepreneurial opportunity recognition.
- To identify the relative contribution of each predictor in explaining sustainable entrepreneurial opportunity recognition.
- To test whether sustainable entrepreneurial opportunity recognition differs between students with and without prior entrepreneurship education.
- To examine whether sustainable entrepreneurial opportunity recognition differs across academic streams.

II. REVIEW OF LITERATURE AND HYPOTHESIS DEVELOPMENT

1. Sustainable Entrepreneurship and Opportunity Recognition

Sustainable entrepreneurship research first drew attention to market failure and the chance to create value by solving environmental problems. Cohen and Winn (2007) show that inefficient firms, external costs, weak prices and poor information can create venture opportunities. Dean and McMullen (2007) also explain entrepreneurial action as a way to reduce environmental harm by correcting such failures. Later work widened the idea to include the protection of nature, life support and community while creating both economic and non-economic gains (Shepherd & Patzelt, 2011). Reviews show rapid growth in the field, but definitions and teaching approaches remain varied (Rosário & Raimundo, 2024; Terán-Yépez et al., 2020).

Patzelt and Shepherd (2011) explain that people are more likely to notice opportunities for sustainable development when they understand natural and community environments, perceive threat and care about others. Entrepreneurial knowledge then helps them judge whether a solution can be organised, delivered and supported by users. Students may care about waste, water, energy or inequality but still be unable to frame a value proposition. In this study, sustainable entrepreneurial opportunity recognition means identifying a sustainability problem, connecting it with an unmet need and judging whether a venture response deserves further development.

2. Sustainability Problem Awareness

Sustainability problem awareness includes understanding causes, affected groups, links between systems and weaknesses in current solutions. Wiek et al. (2011) identify systems thinking as a key competence because complex problems cannot be understood through one cause or one discipline. Lans et al. (2014) connect sustainability competence with entrepreneurial competence, while Diepolder et al. (2021) show that leading competence frameworks all require learners to understand problems before acting. A student with deeper problem knowledge is more likely to see where value is lost and where a venture may fit.

H1: Sustainability problem awareness positively predicts sustainable entrepreneurial opportunity recognition.

3. Future Consequence Orientation

Sustainable ventures must consider effects that appear after the first sale or first year. Future consequence orientation is the tendency to consider long-term social, environmental and intergenerational outcomes when making present choices. Wiek et al. (2011) treat anticipatory thinking as a core competence. Thelken and de Jong (2020) show that future orientation supports favourable attitudes towards sustainable entrepreneurship. Future thinking may help students notice needs that will grow over time and reject ideas that merely shift costs to other groups or later generations.

H2: Future consequence orientation positively predicts sustainable entrepreneurial opportunity recognition.

4. Sustainable Entrepreneurial Role-Model Exposure

Role models make an unfamiliar task easier to understand. They can show how a founder moved from a problem to an idea, tested demand and handled tension between financial and sustainability goals. Diepolder et al. (2024) find that role models can support the generation of opportunities for sustainable development. Hörisch et al. (2026) also find evidence that contact with role models can strengthen competence, although their results show that the form of

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contact matters. A detailed case, visit or mentoring session should provide a stronger learning script than a short success speech.

H3: Sustainable entrepreneurial role-model exposure positively predicts sustainable entrepreneurial opportunity recognition.

5. University experiential learning support

Entrepreneurship is learned more effectively when students work on real tasks. Martin et al. (2013) find that entrepreneurship education is related to human capital and entrepreneurial outcomes, but the size of the effect depends on the form and quality of learning. Indian business schools often use sustainable entrepreneurship training to encourage ventures that address social problems, although later venture development may receive less attention (Kummitha & Kummitha, 2021). Field observation, local problem briefs, mentoring and idea tests can connect early ideas with evidence.

Technology-supported tools can help students build sustainable business models (Cocu et al., 2025), while university-business partnerships can place learning around real local problems (Okuogume & Toledano, 2024). Competence research also supports learning that joins knowledge, skills and action (Ploum et al., 2018). These forms of support should make opportunity recognition clearer and more realistic.

H4: University experiential learning support positively predicts sustainable entrepreneurial opportunity recognition.

6. Research gap and model

Research explains sustainable entrepreneurship, competence and intention well, but gives less attention to the stage before intention when a student identifies a specific opportunity. Intention studies show that education and support matter (Agu et al., 2021; Vuorio et al., 2018). Business experience can change the effect of sustainability orientation (Kuckertz & Wagner, 2010), and prior experience can change how students respond to education (Gamarra-Chávez et al., 2026). Few studies bring problem awareness, future thinking, role models and experiential support together to explain opportunity recognition among Indian college students.

H5: Sustainability problem awareness, future consequence orientation, sustainable entrepreneurial role-model exposure and university experiential learning support jointly explain significant variance in sustainable entrepreneurial opportunity recognition.

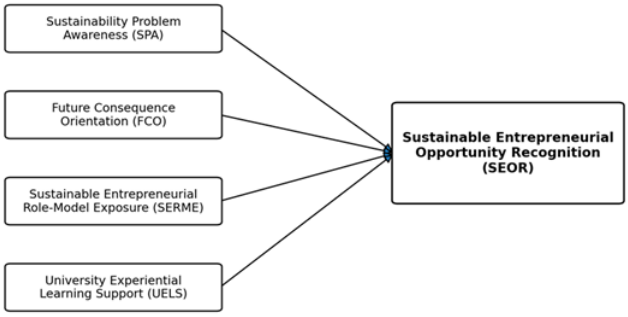

Figure 1: Proposed research model

III. METHOD

The study used a quantitative, cross-sectional design. The unit of analysis was the individual student. The analytic file contained 342 undergraduate and postgraduate students from colleges and universities in Karnataka, India. Commerce and Management, Science and Engineering, Arts and Social Sciences and other streams were included so that opportunity recognition could be compared across different learning backgrounds.

All constructs were measured on a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree. Sustainability problem awareness used four items based on Patzelt and Shepherd (2011), Wiek et al. (2011) and Diepolder et al. (2021). Future consequence orientation used four items based on Thelken and de Jong (2020). Role-model exposure used four items based on Diepolder et al. (2024) and Hörisch et al. (2026). Experiential learning support used five items based on Cocu et al. (2025) and Okuogume and Toledano (2024). Opportunity recognition used five items based on Cohen and Winn (2007) and Patzelt and Shepherd (2011).

The analysis began with frequency distributions, means, standard deviations and Cronbach's alpha. Corrected item-total correlations and alpha if item deleted were also examined. An independent-samples t-test compared students with and without prior entrepreneurship education. Levene's test checked equality of variance, and Cohen's d measured the size of the difference. One-way analysis of variance compared four academic streams. Levene's test, eta squared, omega squared and Tukey's honestly significant difference test were reported. Pearson correlation examined bivariate relationships. Multiple regression tested the combined predictors. Residual normality, homoscedasticity, independence, influential cases, tolerance and variance inflation factors were checked before interpretation. Statistical significance was judged at $p < .05$.

IV. RESULTS

1. Profile of Respondents

Table 1 presents the respondent profile. Female students formed 53.8 per cent of the sample. Most respondents

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were aged 18 to 23 years and were studying at undergraduate level. Commerce and Management was the largest academic group. Prior entrepreneurship education was reported by 57.3 per cent, while 38.6 per cent reported earlier interaction with an entrepreneur or role model.

Table 1. Profile of respondents (n = 342)

Variable	Category	n	%
Gender	Female	184	53.8
	Male	158	46.2
Age	18-20 years	148	43.3
	21-23 years	146	42.7
	24 years and above	48	14.0
Level of study	Undergraduate	267	78.1
	Postgraduate	75	21.9
Academic stream	Commerce and Management	116	33.9
	Science and Engineering	96	28.1
	Arts and Social Sciences	82	24.0
	Other	48	14.0
Prior entrepreneurship education	Yes	196	57.3
	No	146	42.7
Prior role-model interaction	Yes	132	38.6
	No	210	61.4

2. Descriptive Statistics and Reliability

Table 2 shows that sustainability problem awareness recorded the highest mean (M = 3.90, SD = 0.67). Opportunity recognition also recorded a high mean (M = 3.85, SD = 0.64). Role-model exposure recorded the lowest mean (M = 3.50, SD = 0.68), which shows that direct or case-based exposure was less common than awareness and future thinking.

Cronbach's alpha ranged from .838 to .892. Corrected item-total correlations were above .65, and alpha did not improve when any item was removed. The measures therefore had satisfactory internal consistency.

Table 2. Descriptive statistics and reliability

Construct	Items	M	SD	alpha	Mean r	Corrected item-total r	Alpha if deleted
Sustainability problem awareness	4	3.90	0.67	.839	.567	0.655-0.701	0.784-0.804
Future consequence orientation	4	3.79	0.69	.857	.600	0.670-0.715	0.811-0.831
Sustainable entrepreneurial role-model exposure	4	3.50	0.68	.838	.564	0.658-0.687	0.787-0.800
University experiential learning support	5	3.62	0.70	.880	.595	0.686-0.744	0.847-0.861
Sustainable entrepreneurial opportunity recognition	5	3.85	0.64	.892	.623	0.724-0.751	0.865-0.871

3. Difference by prior entrepreneurship education

Levene's test was not significant, F = 0.248, p = .619, so the equal-variance result was used. Students with prior entrepreneurship education reported higher opportunity recognition (M = 3.97, SD = 0.62) than students without it (M = 3.67, SD = 0.63). The difference was significant, t(340) = 4.42, p < .001. The mean difference was 0.301, 95% CI [0.167, 0.435], and Cohen's d = 0.483. The size of the difference was close to moderate.

Table 3. Independent-samples t-test by prior entrepreneurship education

Prior education	n			M	SD	Levene F	Levene p	t	df	p	Mean difference	SE difference	95% CI	d
No	146			3.673	0.627									
Yes	196			3.973	0.621	0.248	.619	4.415	340	< .001	0.301	0.068	[0.167, 0.435]	0.483

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4. Difference Across Academic Streams

The homogeneity test was not significant, Levene F(3, 338) = 1.654, p = .177. Opportunity recognition differed across academic streams, F(3, 338) = 6.00, p < .001, eta squared = 0.051, omega squared = 0.042. Commerce and Management students recorded the highest mean, followed by Science and Engineering students. Tukey comparisons showed that Commerce and Management students scored higher than Arts and Social Sciences students and students in the Other group. The remaining pairwise differences were not significant. The overall effect was small.

Table 4. Descriptive statistics by academic stream

Academic stream	n	M	SD	95% CI lower	95% CI upper
Commerce and Management	116	3.990	0.644	3.871	4.108
Science and Engineering	96	3.910	0.560	3.797	4.024
Arts and Social Sciences	82	3.693	0.633	3.554	3.832
Other	48	3.625	0.696	3.423	3.827

Table 5. One-way analysis of variance

Source	SS	df	MS	F	p	eta squared	omega squared
Between groups	7.064	3	2.355	6.002	< .001	0.051	0.042
Within groups	132.603	338	0.392				
Total	139.667	341					

Table 6. Tukey's honestly significant difference comparisons

Group 1	Group 2	Mean difference	Adjusted p	95% CI lower	95% CI upper	Significant
Arts and Social Sciences	Commerce and Management	0.2970	.0061	0.0637	0.5303	Yes
Arts and Social Sciences	Other	-0.0677	.9337	-0.3616	0.2262	No
Arts and Social Sciences	Science and Engineering	0.2177	.0974	-0.0254	0.4609	No
Commerce and Management	Other	-0.3647	.0043	-0.6422	-0.0871	Yes
Commerce and Management	Science and Engineering	-0.0792	.7959	-0.3024	0.1439	No
Other	Science and Engineering	0.2854	.0505	-0.0005	0.5713	No

5. Correlation results

All four predictors had positive correlations with opportunity recognition. Future consequence orientation showed the strongest bivariate relationship (r = .603), followed by experiential learning support (r = .589), sustainability problem awareness (r = .566) and role-model exposure (r = .461). Every correlation in Table 7 was significant at p < .001. Correlations among the predictors ranged from .287 to .447, so the variables were related without being so highly related that they represented the same construct.

Table 7. Pearson correlation matrix

Construct	1	2	3	4	5
1. Sustainability problem awareness	1.000				
2. Future consequence orientation	0.434	1.000			
3. Role-model exposure	0.287	0.296	1.000		
4. Experiential learning support	0.392	0.442	0.447	1.000	
5. Opportunity recognition	0.566	0.603	0.461	0.589	1.000

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6. Multiple Regression

The assumptions supported interpretation of the regression. Residuals did not depart significantly from normality, Shapiro-Wilk W = 0.992, p = .083, and the Jarque-Bera test was also not significant, JB = 2.339, p = .310. The Breusch-Pagan test did not show unequal residual variance, chi-square(4) = 1.360, p = .851. Durbin-Watson was 2.141. Standardised residuals ranged from -2.883 to 2.439; none exceeded an absolute value of 3. The largest Cook's distance was 0.032. Tolerance ranged from 0.668 to 0.780, and VIF ranged from 1.283 to 1.497. These values did not indicate a serious assumption problem.

The model was significant, F(4, 337) = 116.86, p < .001. The multiple correlation was R = 0.762. The model explained 58.1 per cent of the variance in opportunity recognition, R squared = 0.581, adjusted R squared = 0.576. Future consequence orientation was the strongest predictor (beta = 0.316), followed by sustainability problem awareness (beta = 0.276), experiential learning support (beta = 0.265) and role-model exposure (beta = 0.169). All four predictors were positive and significant. H1 to H5 were supported.

Table 8. Regression model summary

R	R squared	Adjusted R squared	SE of estimate	F change	df1	df2	p	Durbin-Watson
0.762	0.581	0.576	0.417	116.856	4	337	< .001	2.141

Table 9. Regression analysis of variance

Source	SS	df	MS	F	p
Regression	81.156	4	20.289	116.856	< .001
Residual	58.511	337	0.174		
Total	139.667	341			

Table 10. Regression coefficients

Predictor	B	SE	beta	t	p	95% CI lower	95% CI upper
Constant	0.268	0.170		1.580	.115	-0.066	0.602
Sustainability problem awareness	0.266	0.039	0.276	6.804	< .001	0.189	0.343
Future consequence orientation	0.293	0.039	0.316	7.592	< .001	0.217	0.369
Role-model exposure	0.159	0.037	0.169	4.240	< .001	0.085	0.232
Experiential learning support	0.241	0.039	0.265	6.155	< .001	0.164	0.319

Table 11. Predictor contribution and collinearity statistics

Predictor	Zero-order r	Partial r	Part r	Tolerance	VIF
Sustainability problem awareness	0.566	0.348	0.240	0.754	1.326
Future consequence orientation	0.603	0.382	0.268	0.719	1.391
Role-model exposure	0.461	0.225	0.149	0.780	1.283
Experiential learning support	0.589	0.318	0.217	0.668	1.497

V. DISCUSSION

The study examined sustainable entrepreneurial opportunity recognition, an early stage that comes before intention and venture action. The model explained 58.1 per cent of the variance, which shows that problem knowledge, future thinking, practical support and social examples work together. This result supports the view that sustainable opportunities do not arise from concern alone. A person must connect a problem with users, value and a workable response, as suggested by Cohen and Winn (2007) and Patzelt and Shepherd (2011).

Future consequence orientation was the strongest predictor. Thelken and de Jong (2020) link future orientation with sustainable entrepreneurial attitudes and intention. The present result places future thinking earlier, during opportunity recognition. Students who consider later effects may notice needs that will become important and may reject ideas that move costs to communities or future users. This finding also agrees with the anticipatory competence described by Wiek et al. (2011). Opportunity recognition is therefore not only creative. It also requires judgement about whether an idea remains useful and responsible over time.

Sustainability problem awareness was the second strongest predictor. Patzelt and Shepherd (2011) argue that knowledge of natural and community environments directs attention towards sustainable opportunities. Competence frameworks also place systems thinking and problem analysis before action (Diepolder et al., 2021; Lans et al.,

2014). The finding questions courses that begin immediately with idea pitching. Stronger ideas may begin with careful study of causes, affected people, current responses and missing value.

Experiential learning support made a contribution almost as large as problem awareness. This result fits human capital research showing that education is useful when it creates task-related knowledge and skills (Martin et al., 2013; Unger et al., 2011). It also agrees with studies of practical tools and co-created learning (Cocu et al., 2025; Okuogume & Toledano, 2024). Field projects and mentor feedback help students test whether a problem matters, whether users will change and whether a solution can be delivered. The higher mean among students with prior entrepreneurship education is consistent with this explanation.

Role-model exposure was significant but had the smallest regression coefficient and the lowest mean. This finding supports Diepolder et al. (2024) and the broader evidence reported by Hörisch et al. (2026), but it also shows that exposure alone has limits. A short speech may create interest without teaching the opportunity process. Role models are likely to be more useful when they explain how they found a problem, tested demand, changed the idea and handled failure. The quality and closeness of contact may therefore matter more than the number of role-model events.

The academic-stream result was significant but small. Commerce and Management students scored higher than Arts and Social Sciences students and the Other group, while the remaining differences were not significant. The result should not be used to rank disciplines. Business students may meet market and customer language more often, science students may contribute technical knowledge, and social science students may understand communities and institutions. Sustainable opportunities often require these forms of knowledge together. The result therefore supports interdisciplinary project teams.

The findings also add to intention research. Sustainable entrepreneurial intention is shaped by attitudes, support, values and education (Agu et al., 2021; Vuorio et al., 2018), but intention becomes more meaningful when a student can name a problem and explain a response. Krueger et al. (2000) link intention with perceived feasibility and desirability. A clear opportunity gives students something specific to assess and may connect general sustainability concern with later intention, readiness and action.

The results do not prove causation. The design is cross-sectional, the measures are self-reported and the outcome concerns perceived ability rather than the quality of an independently assessed venture idea. Students who already like entrepreneurship may also be more likely to take entrepreneurship courses. These limits require careful interpretation, but they do not remove the value of examining opportunity recognition as a separate educational outcome.

Implications

The main theoretical contribution is the use of sustainable entrepreneurial opportunity recognition as the outcome. This separates finding an opportunity from deciding to pursue it. The model also brings together four explanations that are often studied separately and applies human capital reasoning to a specific task rather than to education in general. It gives a clearer unit of analysis within a field that still uses varied definitions and outcomes (Rosário & Raimundo, 2024; Terán-Yépez et al., 2020).

For practice, colleges should begin with local problem discovery. Students can study waste, water, mobility, farming, energy, health, inclusion or livelihood problems before writing a business plan. Each idea should be checked for affected users, present alternatives, long-term effects and the value it creates. Role-model sessions should explain the full opportunity process rather than offer only success stories. Interdisciplinary teams, field contact and repeated feedback can make the learning useful to students from every stream.

These results also show why one entrepreneurship course may not be enough. Students need linked activities in which they observe a local problem, speak with affected users, compare present solutions, estimate long-term effects and revise the venture idea after feedback. Repeated work of this kind can help students combine social concern with market judgement and can make opportunity recognition visible to teachers as a measurable course outcome.

Limitations and Future Research

The study has four main limits. Cross-sectional data cannot show change over time. Self-report measures may overstate ability. The sample may not represent all college students in Karnataka. The model also does not test whether opportunity recognition later produces intention or action. Future research should use pretest-posttest designs, compare different forms of role-model contact and ask independent judges to rate student ideas for novelty, feasibility and sustainability value. Longitudinal work can test whether opportunity recognition leads to competence, intention, venture readiness and actual experimentation.

VI. CONCLUSION

Sustainable entrepreneurial opportunity recognition is a useful educational outcome. Students recognised stronger opportunities when they understood sustainability problems, considered future effects, received practical learning support and encountered role models. Future consequence orientation made the strongest contribution, while role-model exposure made the smallest significant contribution. Prior entrepreneurship education and

academic stream also mattered. Colleges should therefore move beyond general awareness and intention. Students need repeated chances to study real problems, frame value for users, test solutions and consider long-term consequences. This approach can help turn sustainability concern into credible venture opportunities.

Declarations

- Conflict of interest: The authors declare no conflict of interest.
- Funding: The authors received no specific funding for this study.

REFERENCES

1. Agu, A. G., Kalu, O. O., Esi-Ubani, C. O., & Agu, P. C. (2021). Drivers of sustainable entrepreneurial intentions among university students: An integrated model from a developing world context. International Journal of Sustainability in Higher Education, 22(3), 659-680. https://doi.org/10.1108/IJSHE-07-2020-0277
2. Cocu, A., Pecheanu, E., Susnea, I., Dingli, S., Istrate, A., & Tudorie, C. (2025). Technology-enabled learning for green and sustainable entrepreneurship education. Administrative Sciences, 15(2), 45. https://doi.org/10.3390/admsci15020045
3. Cohen, B., & Winn, M. I. (2007). Market imperfections, opportunity and sustainable entrepreneurship. Journal of Business Venturing, 22(1), 29-49. https://doi.org/10.1016/j.jbusvent.2004.12.001
4. Dean, T. J., & McMullen, J. S. (2007). Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action. Journal of Business Venturing, 22(1), 50-76. https://doi.org/10.1016/j.jbusvent.2005.09.003
5. Diepolder, C. S., Weitzel, H., & Huwer, J. (2021). Competence frameworks of sustainable entrepreneurship: A systematic review. Sustainability, 13(24), 13734. https://doi.org/10.3390/su132413734
6. Diepolder, C. S., Weitzel, H., & Huwer, J. (2024). Exploring the impact of sustainable entrepreneurial role models on students' opportunity recognition for sustainable development in sustainable entrepreneurship education. Sustainability, 16(4), 1484. https://doi.org/10.3390/su16041484
7. Gamarra-Chávez, C. A., Fernández-Pérez, V., & Fernández-Pascual, R. (2026). Is sustainable entrepreneurship education effective in encouraging sustainable entrepreneurial intentions? The role of university students' prior experience. The International Journal of Management Education, 24, 101419. https://doi.org/10.1016/j.ijme.2026.101419
8. Hall, J. K., Daneke, G. A., & Lenox, M. J. (2010). Sustainable development and entrepreneurship: Past contributions and future directions. Journal of Business Venturing, 25(5), 439-448. https://doi.org/10.1016/j.jbusvent.2010.01.002
9. Hörisch, J., Fokuhl, M., Buhr, M., & Dickel, P. (2026). From environmentalist to ecopreneur? Target groups and role models as key elements in sustainable entrepreneurship education. Sustainable Development, 34, 1129-1140. https://doi.org/10.1002/sd.70307
10. Krueger, N. F., Jr., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. Journal of Business Venturing, 15(5-6), 411-432. https://doi.org/10.1016/S0883-9026(98)00033-0
11. Kuckertz, A., & Wagner, M. (2010). The influence of sustainability orientation on entrepreneurial intentions: Investigating the role of business experience. Journal of Business Venturing, 25(5), 524-539. https://doi.org/10.1016/j.jbusvent.2009.09.001
12. Kummitha, H. R., & Kummitha, R. K. R. (2021). Sustainable entrepreneurship training: A study of motivational factors. The International Journal of Management Education, 19, 100449. https://doi.org/10.1016/j.ijme.2020.100449
13. Lans, T., Blok, V., & Wesselink, R. (2014). Learning apart and together: Towards an integrated competence framework for sustainable entrepreneurship in higher education. Journal of Cleaner Production, 62, 37-47. https://doi.org/10.1016/j.jclepro.2013.03.036
14. Martin, B. C., McNally, J. J., & Kay, M. J. (2013). Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. Journal of Business Venturing, 28(2), 211-224. https://doi.org/10.1016/j.jbusvent.2012.03.002
15. Okuogume, A., & Toledano, N. (2024). Co-creation in sustainable entrepreneurship education: Lessons from business-university educational partnerships. Sustainability, 16(6), 2272. https://doi.org/10.3390/su16062272
16. Patzelt, H., & Shepherd, D. A. (2011). Recognizing opportunities for sustainable development. Entrepreneurship Theory and Practice, 35(4), 631-652. https://doi.org/10.1111/j.1540-6520.2010.00386.x
17. Ploum, L., Blok, V., Lans, T., & Omta, O. (2018). Toward a validated competence framework for sustainable entrepreneurship. Organization & Environment, 31(2), 113-132. https://doi.org/10.1177/1086026617697039
18. Rosário, A. T., & Raimundo, R. (2024). Sustainable entrepreneurship education: A systematic bibliometric literature review. Sustainability, 16(2), 784. https://doi.org/10.3390/su16020784
19. Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. Business Strategy and the Environment, 20(4), 222-237. https://doi.org/10.1002/bse.682
20. Shepherd, D. A., & Patzelt, H. (2011). The new field of sustainable entrepreneurship: Studying entrepreneurial action linking what is to be sustained with what is to be developed. Entrepreneurship

Theory and Practice, 35(1), 137-163. https://doi.org/10.1111/j.1540-6520.2010.00426.x

21. Terán-Yépez, E., Marín-Carrillo, G. M., Casado-Belmonte, M. P., & Capobianco-Uriarte, M. M. (2020). Sustainable entrepreneurship: Review of its evolution and new trends. Journal of Cleaner Production, 252, 119742. https://doi.org/10.1016/j.jclepro.2019.119742
22. Thelken, H. N., & de Jong, G. (2020). The impact of values and future orientation on intention formation within sustainable entrepreneurship. Journal of Cleaner Production, 266, 122052. https://doi.org/10.1016/j.jclepro.2020.122052
23. Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. Journal of Business Venturing, 26(3), 341-358. https://doi.org/10.1016/j.jbusvent.2009.09.004
24. Vuorio, A. M., Puumalainen, K., & Fellnhofer, K. (2018). Drivers of entrepreneurial intentions in sustainable entrepreneurship. International Journal of Entrepreneurial Behavior & Research, 24(2), 359-381. https://doi.org/10.1108/IJEBR-03-2016-0097
25. Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competencies in sustainability: A reference framework for academic program development. Sustainability Science, 6, 203-218. https://doi.org/10.1007/s11625-011-0132-6