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Assessing the impact of startup bootcamps on entrepreneurial skills development: Insights from student participants

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Abstract

The study aimed at assessing the impact of bootcamps on self-reported entrepreneurial skills development among selected undergraduate students at Africa Nazarene university, Kenya. The students had participated in three different bootcamps facilitated by diverse teams from Handong Global university, Korea. The study adopted an action research approach, where a semi-structured survey was administered to 71 students, with 14 responses analysed using descriptive statistics and thematic analysis. Findings indicated a high satisfaction (92.9%), with students acquiring critical skills such as pitching, prototyping, and business planning (85%). However, challenges such as time constraints, technical difficulties, and lack of mentorship were noted as a hinderance to project continuity. The participants emphasized the need for financial support (35.7%), networking (28.6%), and mentorship (21.4%) as essential in sustaining their projects post-camp. Peer-led ESG camp was noted for its interactivity, while the professor-led camps were valued for structural support. The study contributes to theory building and decision-making process on the importance of innovation camps in fostering entrepreneurial mindsets. It informs future role of institutional mechanisms such as incubation hubs, extended mentorship, and funding; to enhance startups sustainability. Recommendations include integrating the camps program into the university curriculum and fostering partnerships to bolster the startup ecosystem. Limitations included a small sample size and unassessed entrepreneurial intentions amongst the students.

Keywords: *Entrepreneurial skills, Camps, Kenya-Korea collaboration, Students' insights*

1. Introduction

Entrepreneurial skills is one of the core competencies essential for lifelong learning for today's learners (Wang & and Horta, 2024). Learning and developing these skills is important to foster competencies that empower an individual (Rani, 2024). Government advocate for entrepreneurships education among students to expose them to career opportunities and help reduce unemployment (Abdul Rahim & Mukhtar, 2021). Accelerator and startup camps are some of the strategies and innovations that have been adopted to support the development of entrepreneurship skills in universities (Miliou & Ioannou, 2024; Schimperna et al., 2022). Such camps complement mainstream entrepreneurship programs by offering experiential-learning that is seen to influence students' entrepreneurial engagements (Ho et al., 2014). These camps engage students in real-world challenges and enhance their creativity in solving real problems (Konak et al., 2025). Entrepreneurship training help students establish startups that are profitable and hence promote national development. Camps are seen as catalyst for new business ideas and innovations (Jacobsen et al., 2018; Shenkoya et al., 2023).

2. Theoretical framework

The study was guided by Kolb's Experiential Learning Theory that offers a framework that emphasize the crucial role of learning though direct experience and experimentation (Jan, 2024). Kolb's four stages offer insights into the effectiveness of such camps and ability to offer recommendations for optimizing the camps experiences (Healey & Jenkins, 2000). The role of experiential learning in entrepreneurship education is important in the achieving lifelong learning goals (Awaysheh & Bonfiglio, 2017). The bootcamps offer students opportunities and initial concrete experience to explore knowledge and skills that are not well integrated with the conventional curriculum (Moses et al., 2016). Students have opportunities to reflect and appreciate their own experiences and the environment through surveys and storytelling (Wijnen-Meijer et al., 2022). During the camps the students are trained to construct meaning from their experiences and design abstract concepts about their experiences and identify patterns and insights (Fields, 2009). Through design thinking and problem-solving techniques acquired in the camps, students can integrate their creativity and knowledge to produce innovative ideas(Lassen & Nielsen, 2011). Students can comprehend practical application and transferability of the camp's learning (Kerins et al., 2021).

To gain more insights into the performance of the camps from the students' perspectives, the study also adopted the Input-Process-Output-Outcome (IPOO) (Humbeck et al., 2019). This conceptual model align with the different stages of Kolb's Experiential Learning theory in an attempt to understand how processes can transform given inputs to outputs and products (Iqbal, 2021). The structured activities and resources utilized in the camps together with the input from facilitators and students' prior experiences and motivations are key inputs (Salarnzadehl et al., 2011). During the training the students underwent several processes such as the hands-on activities, teamwork, reflections, collaboration with peer, building network with the peers, conceptualization, and experimenting with

problem-solving techniques. It was envisioned that the students will acquire certain skills such as enhancing their teamwork skills, increased self-efficacy, and acquiring other entrepreneurial skills. The long-term intent of the camps was to enhance the students' entrepreneurial intentions, empower the students, and preferably launch startups or innovation projects. The theory and the conceptual model guided the study and offered a holistic lens to assessing the camps' impact on the students' entrepreneurial skills development. Students' insights into innovation camps, are key outputs and are essential to inform the success of future camps and projects initiated. Failure of these projects or failure to attaining expected outcomes is sometimes due to lack of mechanisms to involve the youth in policy formulation or factoring their insights (Bosire & Muturi, 2020).

3. Literature Review

Developing entrepreneurship skills is one of the factors that initiate collaboration efforts especially the university-industry collaborations (Romero-Sánchez et al., 2024). Collaborations in facilitating training sessions is critical in empowering students' entrepreneurship skills. It is critical in fostering student entrepreneurship and entrepreneurial community. Both the national government and the private sector can play a great role in enhancing the performance of startups (Otieno & Muathe, 2023). This has been observed in Korea where the national government, region governments, and individuals support the development efforts of startups (Shenkoya et al., 2023). Inculcating the right entrepreneurial intentions in students is seen to hasten the startup behaviours and their success (Saoud et al., 2024; Schimperna et al., 2022; Shenkoya et al., 2023). Startups are seen as key components and contributes to sustainable development of nations' economies (Shenkoya et al., 2023) and as such seen as "initial steps toward transformation" (Saoud et al., 2024, p. 1). Startups are regarded as the engines of economic development (Shenkoya et al., 2023). Hence support for both entrepreneurial skills and startups at an early age of an individual is important for sustainable development of a country's economy (Shenkoya et al., 2023).

The start-up scene in Kenya, despite making major progress over time, faces many hurdles and majority of such are concentrated around the capital city, Nairobi (Muathe et al., 2022). Lack of entrepreneurship stages in startups faces other obstacles such lack of awareness, sensitization and poor network creation (International Trade Center, 2020). Other challenges include lack of funds, scarce resources, inadequate business experiences, and poor skills in balancing academic and startups engagements (Jurgelevičius & Raišienė, 2024). Good networks services, infrastructure, financial support and good business plan contributes positively to the growth of the startup ecosystem (Otieno & Muathe, 2023). Some studies point out that entrepreneurship ecosystem in some regions of Kenya are at their budding stage (International Trade Center, 2020). However, it is noted that in Kenya, opportunities for collaboration are ignored, with new start-ups duplicating existing ones, hence missing the synergy that would have been realised in partnering (Muathe et al., 2022). Leveraging on collaboration between business incubators, universities, and governments can create a synergy ideal for successful startups ecosystem in Kenya (Otieno & Muathe, 2023). Overcoming low key collaborations between institutions will be critical for the growth of startups

ecosystem (International Trade Center, 2020).

In Kenya various entities are involved in transforming the entrepreneurship scenario among the youth under the Kenya Vision 2030 on promotion of entrepreneurship culture (Kenya Vision 2030, 2020). The Kenya Industry and Entrepreneurship Project (KIEP) has partnered with government ministry and World Bank in supporting innovation and productivity in select private sector (KIEP, 2025). Despite such vision and initiatives, access to government funding, training, and other support systems for enhancing enterprises' growth is still out of reach for many youth (Bosire & Muturi, 2020). At higher education institutions (HEIs) the role that camps and innovation hubs play is critical to help alleviate such challenges and probably increase the success rates of startups (Jurgelevičius & Raišienė, 2024; Nyerere et al., 2022). In particular, the camps' environment are envisioned to offer students opportunities to enhance their innovative skills and be able to initiate startups (Bodnar et al., 2015). Despite noble intentions, it is noted that the failure rate of startups is still high at 90% (Jurgelevičius & Raišienė, 2024). To reduce this failure rate, studies suggest establishment of incubation centres that play a critical role in enhancing the success rate. The centres provide resources, mentorship, and generally support startups to enhance their survival rates (Nyerere et al., 2022; Ravichandran & Dixit, 2024).

Camps facilitated by external resource persons are seen to offer students some comfort zones that promote innovative thinking and offer opportunity for diversity feedback (Milner, 2019). Global partnerships that impact positively on training is essential since entrepreneurship education has been observed to have a significant positive effect on entrepreneurship intentions among students (Abdul Rahim & Mukhtar, 2021). Furthermore, one crucial role played by camps is to offer a platform for ideation that can propel the students to actualize their entrepreneurial intentions (Jacobsen et al., 2018).

The study addressed the gap of insufficient students' perspectives and insights from bootcamps to enhance their sustainability and transition of the bootcamps' outcomes into tangible products (Pearce et al., 2018). Hence, the objective of this study was to gain insights from the students to assess the impact of these camps. Exploring students' insights offer a better perspective of the camps outcomes that are a result of collaborating efforts between Africa Nazarene University and Handong Global University on entrepreneurial and innovative skills development. To achieve this the research aimed to answer the following five research questions:

RQ 1: How do participants rate their experience across camps?

RQ 2: What skills did you learn?

RQ 3: What challenges prevented some participants from continuing their startup projects?

RQ 4: What support mechanisms are most requested to sustain projects post-camp?

RQ 5: How do students perceive the effectiveness of startup camps?

4. Methodology

Research design and participants

The study was an action research that adopted a survey design, with the goal of gathering information that will inform change and improvement (Cohen et al., 2009). Action research is a powerful tool for change and improvement that can be applied within one school for improving evaluative procedures, teaching methods or learning strategies (Cohen et al., 2009). Action research is helpful when one has a specific educational problem to solve within a classroom setup or address a schoolwide phenomenon (Creswell & Guetterman, 2024). The research study targeted a group of seventy-one undergraduate students from Africa Nazarene University who participated in three different camps (As shown in Table 1 below). These camps were a collaboration between two universities. One from the Republic of Korea and the other from Kenya. Teams from Handong Global University facilitated camps at Africa Nazarene university of Kenya, on diverse dates over a period of six months. This is under the UNESCO university network that involving twinning a global north and global south universities. The three camps were Startup Ideation Camp, Entrepreneurship Camp, and ESG Design Sprint camp facilitated in a period of six months attracting 78 students. However, it was observed five students participated in more than one camp while two students had registered for the camps but never turned up. Fourteen students or about 20 % responded to the questionnaire. This is within the acceptable 20-30 % response rate of online surveys (Wu et al., 2022).

Research instrument

The researcher opted for semi-structured questionnaire since it was suited for exploring the participants' perceptions and opinions regarding their experiences in the boot camp (Ahlin, 2019; Louise Barriball & While, 1994). The questionnaire was shared with the students via google forms. The closed ended items involved both single ordinal items and multiselect items. The multi-select items provided self-reporting on skills acquired and camp experiences, and on the demographics of the participants. The study was action research with an objective of improving the outcomes of future boot camps. The researcher undertook a pilot study and engaged participants in the content of the questionnaire to enhance the validity of the items (Sharma & Patel, 2023). It ensured that the items were conveying the same meaning to participants. The research instruments gathered data from the participants who took part in the camps, and this provided high validity for the responses. The professors who were part of the boot camps provided expert opinion on the questionnaire items to enhance their reliability. There was convergent validity established by the observed high correlation between the responses in the closed ended questionnaire items and the themes identified.

Data analysis

Descriptive statistics were used to analyse the structured items while theme was used to analyse the open-ended responses. The open-ended responses were analysed and categorised per themes. The researcher through few-shot prompting techniques utilized both free source versions of ChatGPT-4o and DeepSeek-V3 to identify

themes from responses of open-ended items. ChatGPT has been used to assist in thematic analysis despite a need to develop a robust research protocol to guide such processes (Manuel et al., 2024). The tools with "clear instructions can help achieve desired output" in summarizing and analysing text (Shah et al., 2025, p. 4). Free source generative AI, DeepSeek is perceived highly by users and enhance analytical accuracy through free access and by its ability to facilitate complex inquiries with speed (Albuhairy & Algaraady, 2025).

Table 1

Bootcamps Attended

Bootcamp	Number of students*	Facilitators
Startup Ideation Camp	20	Professors
Entrepreneurship camp	36	Professors
ESG Design Sprint camp	20	Students

Note: Five students participated in more than one camp.*

5. Results and Discussions

The results were examined in line with the research questions. The following sections will outline and discuss the students' responses regarding the five research questions. Descriptive statistics have been used to analyse the responses while open-ended items were analysed for themes.

RQ 1: How do participants rate their experience across camps?

There were more boys (85.7%) than girls (14.3) who responded to the questionnaire. Overwhelmingly majority, 92.9% rated the camp as excellent with the rest 7.1% rating it as good. However, for specific camps, it was noted that both the student led Environment and Social Governance (ESG) Sprint Design camp and professor led entrepreneurship camp were rated at 100% while the professor led Startup Ideation camp was rated at 80%. The positive responses is good indicator on how the camp were facilitated and how the students value experiential learning. It demonstrates the desire of the learners to be exposed to global practices in education and entrepreneurship development. The rating may be a pointer to gratitude bias. Students may rate highly out of appreciation for free and accessible camps. However this positivity is consistent with other studies that showed participants reporting positively about the benefits of such programs (Miliou & Ioannou, 2024). Such programs are seen as gateway to opportunities for self-employment and probably higher earnings (Kurdyś-Kujawska & Wojtkowska, 2023). Camps have also been noted to change the mindset of students towards entrepreneurship (Hasleberg & Hagen, 2016). They empower such students to act entrepreneurially (Neergård et al., 2022).

RQ 2: What skills did you learn?

The study revealed six categories of self-reported skills learnt by students (As shown in Table 2 below). The skills for pitching & presentation, and prototyping were nearly universal at 92.9%, while the skills for financial management and legal compliance were rated lowly. Other skills that were rated considerably above average were skills in business planning, leadership and team-management, networking, problem-solving, and user-centred design. Teamwork among other skills that are sharpened in innovation camps empower youth and enhance their entrepreneurial mindsets (Hasleberg & Hagen, 2016). The skill for market research & analysis was rated slightly above average. While skills in team collaboration, data analysis, and design thinking were rated below average. Business knowledge and skills are critical in the success of startups (Kurdyś-Kujawska & Wojtkowska, 2023).

Hence the camp experiences are good incentives and can ignite the initial entrepreneurial ventures and increases students' confidence to run their own small businesses (Kurdyś-Kujawska & Wojtkowska, 2023; Tumati & Daşkın, 2024). Camps create environments that are essential in empowering the students to learn and acquire critical skills such a human tolerance, handling time pressure, and creativity (Hasleberg & Hagen, 2016).

Table 2

Skills Learnt

Category	Specific Skills	Percentage (n = 14)
Business & entrepreneurship	Business planning & strategy	85.7
	Pitching & Presentation	92.9
	Market research & analysis	57.1
	Financial management	7.1
Product development	Prototyping	92.9
	User-centred design	64.3
Leadership & teamwork	Leadership & team management	71.4
	Networking & relationship building	71.4
	Collaboration	14.3
Problem-solving	Problem-solving	78.6
	Design thinking	7.1
Technical & compliance	Legal and compliance	7.1
Data analysis	Data analysis	14.3

RQ 3: What challenges prevented some participants from continuing their startup projects?

Data analysis identified eight common themes for the challenges that led to the projects' discontinuation (As shown in Table 3 below). The challenges identified were not unique and have been reported in different studies (Kurdyś-Kujawska & Wojtkowska, 2023). Time management was rated high as the main reason why students discontinued their projects. Despite receiving high ratings, the camps' projects completion enthusiasm fizzled out. These challenges of time and lack of resources are consistent with similar studies (Jurgelevičius & Raišienė, 2024). These challenges correlate with the type of support that the students desired to take their projects to the next levels as seen in Table 4 below. A student sought "financial and stakeholders support" to help their team actualize the dream their conceived during the camp. Need for financial support was the most popular at 35.7% followed by networking and mentorship. This is consistent with other studies that noted lack of financial resources as a challenge (Kurdyś-Kujawska & Wojtkowska, 2023). Research fund and financial support has a positive effect on the profitability of such projects (Shenkoya et al., 2023). 35.7% of the students pointed lack of resources especially financial resources as a challenge. The student perceived that lack of connection with investors and marketing support were obstacles to their project move to the next level. The students mentioned a need for mentorship from experts and guidance on how to pitch their protype to the market (see Table 4 below). This correlate with the student who responded that there is a need for "follow-up steps to ensure my business is successful". Sustained mentorship is critical in the success attainment of bootcamp's outcomes (Azizan et al., 2025).

Table 3

Challenges Experienced

Theme	Percentage (n = 14)
Time management	35%
Technical difficulties *(e.g. lack of software, lack technical guidance)*	25%
Team collaboration issues *(e.g. Members dropping out, poor communication within groups)*	20%
Lack of mentorship and support *(e.g. no guidance from mentors, unclear expectations from supervisors)*	15%
Personal circumstances *(e.g. health issues, family responsibilities)*	5%
Project scope issues *(e.g. Project was to ambitious, unclear or shifting objectives)*	5%
Lack of resources *(e.g. Tools and finances)*	5%
Motivation and Engagement *(e.g. lost interest, lack clear goals, no milestones)*	5%

Studies conducted in Kenya offer some perspective on how to overcome this through government interventions such as enacting an act of parliament to offer tax incentives that favour startups (Otieno & Muathe, 2023). Students cited lack of mentorship and support as a reason why their projects collapsed. These challenges were not unique to these camps, mentorship and the role of quality faculty has a positive impact on enhancing the performance of such startups projects (Shenkoya et al., 2023). Lack of entrepreneurship soft skills, mentorship and support throughout the startup stages are gaps identified as plaguing the startup ecosystem in some parts of Kenya (International Trade Center, 2020). The role of university in sustaining these projects in critical.

Motivation by the university plays a role in the success of these camps and startups (Saoud et al., 2024). Motivating students to start their own business and offering sufficient education on innovation and entrepreneurship that can be enhanced by such camps is essential for the success of startups (Wan et al., 2024). The students lacked motivation and had no clear goals or milestones, hence teams disintegrating.

Table 4

Verbatim Students' Responses

Category	Verbatim student responses	Frequency (%)
Financial support	*"Financial and stakeholders support" "My team requires KES 97880 to actualize our dream"*	35.7%
Networking	*"Marketing support" "connect with investors"*	28.6%
Mentorship	*"Being guided on how to pitch our prototype to the market" "expertise support...mentorship from experts"*	21.4%
Training	*Follow-up steps to ensure my business is successful"*	14.3%

RQ 4: How do students perceive the effectiveness of startup camps?

While all camps excelled, the ESG Camp facilitated by a team of students stood out for its peer-led interactivity, while the professor-led camps emphasized structural support such as training, funding and curriculum integration. The students in the ESG Camp noted that future camps can leverage students' trainers for scalability and a need to open camps to the public. For the professor-led camps students believed such camps need to be incorporated in existing programs in the university curriculum. They further noted a need for more funding and investor access opportunities (As shown in Table 5 below).

The student suggested some way forwards regarding future camps and their sustainability. They demanded for longer camps and an increase in the number of camps offered in a year. Students desired more training, with 14.3% response. This positively correlate with the high positive perceptions of the camp by the students. An interesting request by the student was for the need to open the camps to students outside ANU. Innovative ideas such as student-led training was noted. Students called for integrating the camp program in the main university curriculum which is consistent with other studies (Nyerere et al., 2022). Similar studies have pointed out the need to adapt teaching programs that meets the entrepreneurial spirit of students (Kurdyś-Kujawska & Wojtkowska, 2023).

Another unique request was establishing forum or incubation centre for turning ideas into reality. Such endeavours has successfully being implemented in old established universities and institutions in Kenya such as Kenyatta University's Chandaria Incubation centre, University of Nairobi's incubator-cum-accelerator lab, and the iLabAfrica Research centre (Nyerere et al., 2022). There is a positive correlation between incubation programs and success rate of entrepreneurship startups (Ravichandran & Dixit, 2024). Similarly, organizing Enterprise week and pitch festival where young entrepreneurs are invited, can complement institutional efforts of enhancing

entrepreneurship intentions of students (Tumati & Daşkın, 2024). Institutions can leverage on these suggestions to help achieve the potential impact of entrepreneurship education (Miliou & Ioannou, 2024). Lack of strategic focus and positioning of the ecosystem players especially in collaborations in seeking for funding, is a major gap that needs overcoming, for startups to be successful (International Trade Center, 2020). Furthermore, university environments are seen as antecedents of entrepreneurial intentions (Yegon et al., 2014). Hence, organizing bootcamps and Enterprise week can empower students on different stages of entrepreneurship from ideation to product development and marketing (Tumati & Daşkın, 2024).

Table 5

Students' Feedback on the Future of Camps

Category	Verbatim student response	Frequency (%)
Increase camp frequency	"Do this more times" "makes these camps thrice a year"	42.9%
Expand access and cultural exchange	"Make camps open to public" "Partner with other schools" "enhance international exchange"	28.5%
Enhance training	"Train students to be trainers" "hold online trainings"	14.3%
Curriculum integration	"Incorporate such programs in university education"	14.3%
Improve logistics	"Set up a forum to turn ideas into reality" "set up incubation centres"	14.3%

The study revealed some key strengths that student took away. These were interactive learning, acquiring important skills in entrepreneurship development, networking, and turning real-world problems into ideas that can be solved (As shown in Table 2 above). They appreciated the hands-on approach to learning and the value of teamwork and networking. Collaboration opportunities were noted to be a motivating factors in startup camps (Rani, 2024). Students' perceptions are critical in the success of entrepreneurial education especially in determining how they engagement with entrepreneurship (Yegon et al., 2014). The camps' experiences provided opportunities for students to share and hear stories of success and challenges, that had a global perspective and form a basis for their storytelling regarding entrepreneurship. Storytelling is regarded to be a good strategy for pursuing entrepreneurial endeavours (Tumati & Daşkın, 2024).

6. Limitations and future research

The sample for this study was small and limits the generalization of the findings of this paper. Hence, the results of this study cannot be generalized beyond this specially selected sample (Ahlin, 2019). Again, the response rate was low about 20% and hence a limitation of response bias (Creswell & Guetterman, 2024).The study did not investigate the students' entrepreneurial intentions which are key to the effectiveness of entrepreneurial offerings as it hasten start-up behaviour (Lyu et al., 2023). Again, a qualitative study exploring further the self-reported skills is important to give more insights on the level of competencies. The selection of the students to participate in the camps did not consider students' entrepreneurial intentions or readiness, a factor that is considered to be essential for the success of startups (Saoud et al., 2024; Shenkoya et al., 2023). There is a need to probe further why students discontinued with their projects preferably by adopting a qualitative study. Equally important is to probe the status of these projects that were abandoned. Evaluating such projects is important in offering more insights (Milner, 2019). Finally, the camps are generally platforms for idea generation and hence a need for a longitudinal study to determine how such camps ultimately contribute to actual commercialization of ideas (Jacobsen et al., 2018).

7. Conclusion and Recommendations

In response to the research question on how students rate their experiences in the bootcamps, there was a near-universal satisfaction. It was evident for a need to establish structures and mechanisms to support the continuation of such projects beyond the bootcamps. Conducting future design challenges and accelerator programs may be a good option to enhance the ecosystem. The gap of finance and structured mentorship was identified and noted to be a determinant for the sustainability of such camps. There is urgency to explore funding opportunities such as startup grants or incubation programs since they play a critical role in the startup's ecosystem. Developing a flexible follow-up training program preferably with financial aid or assistance may prove valuable. The students perceived the camps to be effective in meeting their entrepreneurial and innovative skills development, suggesting way forward about future camps and their sustainability. Ranging from longer camps, diverse facilitators, integrating with the conventional curriculum and bringing on board other cooperating entities. The students were able to identify perceived critical entrepreneurial and innovative skills acquired such business planning, user-centred design, teamwork, problem-solving, and design thinking.

Bringing on board government agencies and private entrepreneurs to support such projects is critical and need to be factored moving forward. Governments and the private sector play an essential role in promoting startups. The success of government interventions in startups has been observed in areas where success has been witnessed such as in the republic of Korea (Shenkoya et al., 2023).

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Notes on contributor: Paul N. Kahenya is a faculty at Africa Nazarene university and director of online learning. His research interests revolve around mathematics, innovations, artificial intelligence, reflective practice, educational leadership, teaching, and learning in institutions of higher education. He is also keen in empowering youth gain entrepreneurial skills by coordinating collaborations efforts towards this goal.

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