

Strategic Networking for Venture Creation in University-Based Entrepreneurship Education

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ABSTRACT: This study explores how entrepreneurship education (EE) fosters effective networking for venture creation among pre-career students. Prior research has focused primarily on professional entrepreneurs and MBA students, leaving a gap in understanding how students with limited initial networks can build essential entrepreneurial connections. Grounded in the "network success hypothesis," which posits that access to key resources impacts venture creation more than network size or diversity, this study tracks the networking patterns and venture outcomes of students from a Japanese university's pre-career EE program. Using network analysis and multinomial logistic regression on survey data from 135 alumni, we examined the roles of network structure and strategic networking in students' venture progress. Network analysis results indicate that broad acquaintance networks did not correlate with venture advancement; targeted connections to influential individuals significantly contributed to venture creation. Regression analysis further highlights continuous engagement with individuals who serve as connectors to key resources and opportunities proved critical for advancing students' business. These results underscore the value of incorporating well-connected mentors in EE, suggesting a design in EE towards strategic mentorship and resource-accessible networks for students. In addition, we contribute to EE evaluation by providing insights into the longitudinal development of pre-career students' entrepreneurial networks.

Keywords: Entrepreneurship Education, Network Analysis, Higher Education

1 INTRODUCTION

Entrepreneurship plays a vital role in driving industrial competitiveness and fostering innovation [1], leading to a growing emphasis on entrepreneurship education (EE) at universities. However, much research has focused narrowly on pre-post measures of entrepreneurial intention [2, 3]. While longitudinal studies on entrepreneurs underscore the importance of evolving networks, such research is scarce in EE, despite increasing recognition of its relevance [4]. As a result, understanding how initial networking efforts contribute to venture progress over time remains limited [5].

Networking is crucial for entrepreneurial success. The "network success hypothesis" suggests that access to valuable resources—more than network size or diversity—influences venture creation [6]. Existing studies have primarily examined working adults [7] or MBA students [8] who already possess professional networks. Despite validations across various contexts, how pre-career students establish and leverage networks remains insufficiently studied. This lack of research leaves uncertain whether existing insights apply to this group, hindering the effective design and evaluation of EE programs tailored to their needs.

These gaps highlight the growing need to study how students without established networks develop connections and how these networks influence their entrepreneurial behaviors, thereby informing the design of more effective, action-oriented EE programs. To address this, we examine how EE influences students' network development and identify the strategies that effectively support venture creation by tracking the progress of alumni from venture-focused EE programs. Furthermore, by analyzing the networking practices of students demonstrating measurable progress in their projects, we investigate what types of networking are effective for company creation.

2 METHODS

2.1 Sample

This study surveyed 166 alumni who had completed a Japanese university's pre-career EE program within the past six months to three years; 135 persons replied, and the response rate was 81.3%. The program

includes a 4-month for-credit course offering lectures and business plan development, followed by ongoing support through feedback and networking within and beyond the alumni community. Distinctive features of the program include (1) an action-oriented approach that engages experienced entrepreneurs and mentors to support venture creation; (2) a curriculum focused on science-based startups, integrated with university education for practical insights; and (3) extensive networking facilitated by a 1:3 mentor-student ratio, supported by corporate partnerships and alumni Bridging Tutors (BTs) who assist in networking and foster community engagement.

2.2 Measure

A structured questionnaire was administered with questions about alumni connections, venture progress, networking, number of entrepreneurs around, activities before entering university, and aspects of the EE program that they found helpful. The network was constructed based on alumni connections, and the index of network centrality was used in the analysis. We examined three centrality metrics: eigenvector centrality, capturing influence through connections to highly connected nodes; betweenness centrality, indicating the node's role in connecting disparate parts of the network; and degree centrality, measuring the node's direct connectivity. In addition, clustering was performed using the Louvain method to see connections at the sub-community level. We also conducted multinomial logistic regression analysis of 135 alumni. The dependent variable is "venture progress" categorized into three stages—"not yet (n=84)", "planning (n=16)" and "creation (n=35)"—following the phase in the establishment process used in [9]. "Planning" is a situation in which they have participated in business model competition but have not actually taken action, while "creation" is in which they have already started a business, developing based on grants, or starting a business and taking on projects on consignment. The independent variables are the following six: "degree centrality" adopted as the abundance of connections because of multicollinearity among the centrality indices; "communication" with pivotal introducers—In this analysis, defined as a person with a betweenness centrality of 0.05 or greater in another network created by the response items of networking that participants reported whom they referred or asked for referral and communicating about once a week; The number of "friends" and "relatives" within two degrees of kinship to explore the influence of surrounding entrepreneurs on entrepreneurial behavior; "awards" before university entrance, such as science Olympiads; "BTs" experience. Additionally, participants identified "which aspects of the course and alumni activities contributed to their venture progress" through multiple-choice questions.

3 RESULTS

T-tests and U-tests revealed no statistically significant differences in eigenvector, betweenness, and degree centrality in the acquaintance network across three groups of phases. This indicates that there are no significant correlations between these metrics and venture progress. Figure 1 presents a visualization of the network, where node size represents eigenvector centrality and node color intensity (logarithmic scale) represents betweenness centrality. Additionally, nodes belonging to the "creation" group and the "planning" group are highlighted in yellow and lime green, respectively.

Clustering analysis using the Louvain method revealed a concentration of "creation" group members within two of the four clusters. In Figure 2, these clusters are represented by red and blue nodes, with nodes from the "creation" group highlighted in yellow, consistent with the marking in Figure 1. In addition, regression analysis (Table1) shows that frequent and focused "communication" significantly increased "creation" likelihood while higher "degree centrality" reduced the odds of it. However, it is worth noting that although

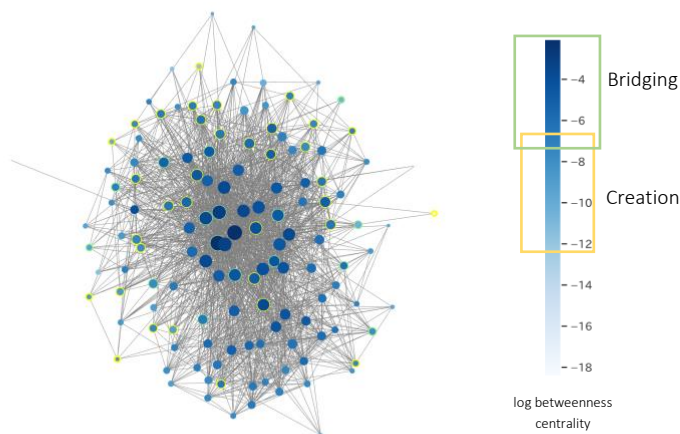


Figure 1: Visualization of the acquaintance network with eigenvector centrality and betweenness centrality

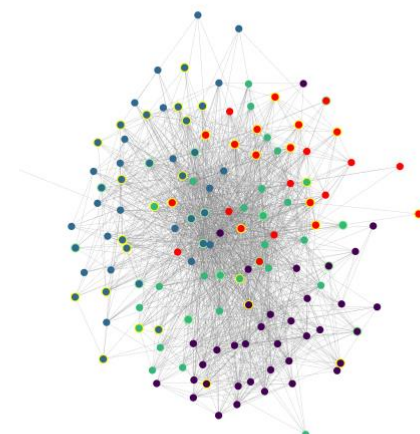


Figure 2: Visualization of the acquaintance network with clusters

these factors are statistically significant at the 5% significance, their p-values are close to the threshold, and the model demonstrates relatively low explanatory power, as indicated by a modest coefficient of determination. Other factors, including the presence of entrepreneurial "relatives", the number of entrepreneurial "friends", high school "Awards", and "BTs" experience indicated no significant associations with either "planning" or "creation".

In the "aspects of the EE program that they found helpful" question, participants in the "creation" group demonstrated distinct tendencies in their reported benefits from the course and alumni community. This group indicated that "networking" was the most valuable component, whereas the other two groups primarily cited "inspiration from others" as the most influential factor.

Table 1: Multinomial logistic regression analysis ($R^2=0.1030$)

Independent var.	Regression Coefficient (creation)	Standard Error (creation)	Regression Coefficient (planning)	Standard Error (planning)
Degree Centrality	-7.3835 (p=0.049)	3.746	5.5582 (p=0.175)	4.100
Communication	0.1404 (p=0.048)	0.071	-0.0869 (p=0.327)	0.089
Relatives	0.5845 (p=0.216)	0.473	0.8571 (p=0.209)	0.682
Friends	0.0343 (p=0.785)	0.126	-0.1141 (p=0.538)	0.186
Awards	0.5080 (p=0.356)	0.508	-0.1408 (p=0.850)	0.743
Bridging Tutors (BTs)	0.7296 (p=0.224)	0.600	1.4129 (p=0.050)	0.720

4 DISCUSSION AND CONCLUSION

The regression analysis reveals that strategic networking, rather than a broad network of connections, is key to entrepreneurial progress, while centrality is less important in determining influence within the network. Additionally, cluster analysis suggests that the components of the creation "group" are relatively close to each other and form a community. Our findings indicate that general acquaintance networks do not correlate with venture progress, consistent with previous studies on social networks and entrepreneurship. However, continuous engagement with individuals who serve as connectors to key resources and opportunities proved critical for advancing students' business. This suggests that even when starting with limited personal networks, strategically building connections with individuals who can introduce a diverse range of contacts within and beyond the community is more impactful than broad networking efforts solely within the community. It also underscores the importance of "bridging" connections and supports the effectiveness of incorporating BTs into entrepreneurship courses.

This study makes several contributions to the field of EE evaluation. First, it provides a new direction for longitudinal tracking in EE assessment, addressing a previously underexplored area. Second, it elucidates the relationship between venture progress and network characteristics among students, highlighting the potential of designing programs that involve individuals who possess established networks rather than solely focusing on developing students' networking skills. This insight suggests that inviting well-connected individuals into EE programs could enhance program effectiveness, rather than offering prizes or featuring guest speakers.

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