Operationalizing Entrepreneurial Behavior for Effective Assessment of Engineering Entrepreneurship Programs

**Prateek Shekhar¹, Aileen Huang-Saad¹, and Julie Libarkin²**

1. Transforming Engineering Education Co-Laboratory¹, Geocognition Research Lab²

**BACKGROUND**

Entrepreneurship Education Programs

Lack of Quality Assessment Measures

A recent review of current assessment methods in engineering entrepreneurship education identified 29 articles that utilized 52 assessment instruments (Purzer et al., 2016). Of those 52 assessment instruments, only 10 reported evidence of instrument reliability and validity.

**METHODOLOGY**

Study Design

- **Phase 1**: Identification of Relevant Constructs
- **Phase 2**: Generation of Open-Ended Items
- **Phase 3**: Generation of Closed-Ended Items

Reliability and Validity Measures

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<th>Description</th>
<th>Measures Undertaken</th>
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**FINDINGS**

**Phase 1: Identification of Constructs (Literature Review and Expert Feedback)**

- **Opportunity**: Recognizing a need to develop new products, services or processes; 3) Improve existing operations, and/or develop new marketing approaches; 2) Discover opportunities that enhance efficiency or quality; 3) Evaluate opportunities that involve balancing inadequate commitment of resources and the potential for return.
- **Innovativeness**: Developing new and/or new ways of improving existing 1) products, 2) services or 3) processes that meet customer/market needs.
- **Networking**: Purposefully establishing informal and formal relationships with other people with the intent of recruiting physical and monetary resources, and exchanging information, experiences and advice: 1) Internal (within an organization) and External (outside an organization).
- **Risk Management**: Take actions that reduce the probability of risk occurring or reduce the potential impact if the risk were to occur pertaining to 1) Finance; 2) Resources; and 3) Time.
- **Adaptability**: Altering oneself or the environment to the changed circumstances to one’s advantage: 1) Proactive approach - involves seeking knowledge about the environment and taking necessary actions; and 2) Reactive approach - involving responding to changes rather than exploiting and initiating change.
- **Perseverance**: Ability to sustain goal-directed action and energy when confronting difficulties and obstacles that impede goal achievement.

**Phase 2: Generation of Open-Ended Items**

- 2 items per construct
- Asking response to hypothetical scenarios
- 25 Students and Experts
- 5 experts and 5 students responding to each item

**Phase 3: Generation of Closed-Ended Items**

- Individual codes combined into categories
- Literature used whenever viable
- 6 items for each construct (Total-30)
- 2 response options per item (4 response)

**Response Collection**

- Open-Ended Items

**Response Analysis**

- Categorization of Codes

**Conclusion**

- Our study provides an example for the engineering entrepreneurship education community on how researchers can use prior literature, expert and student feedback, and qualitative open-ended items to create measures that do not have a consistent definition/terminology in past work due to disparate efforts and real-time program evolution.
- We identify underlying constructs constituting entrepreneurial behaviour and present a 30-item survey instrument for assessing five entrepreneurial behaviour sub-constructs - opportunities, networking, risk management, adaptability and perseverance.

**Future Work**

- Having performed the necessary steps to ensure high degree of validity in instrument development, our survey still needs to undergo scale analysis to ensure the generated survey items are representative of the underlying constructs.
- Pilot testing the instrument with a sample of undergraduate students and validate the survey for the sample.

**Select References**


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