

ENTREPRENEURSHIP COMPETENCIES IN HIGH SCHOOL STUDENTS: EFFECTS OF AGE AND GENDER

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Abstract

Entrepreneurs are more than ever very important economic actors in all societies. In many countries such as Canada, governments are mobilizing school curricula to include activities aimed to develop entrepreneurship competencies in high school students. However, there is no clear data on the actual level of these competencies among high school students. This comparative study examines levels of entrepreneurship qualities in a sample of $n=5527$ high school students from the province of Québec and compares results with $n=5309$ adult subjects. Entrepreneurship is measured with the Entrepreneurship Qualities Questionnaire (EQQ, L'Heureux, 2000) which contains 59 items grouped in 6 continuous scales (Commitment, Motivation, Result-oriented, Creativity, Self-competition, Leadership). Results of univariate ANOVAs show a clear and strong linear relationship with age on all entrepreneurship scales. High school students have the lowest scores and older adults have the highest. There is some small effect of gender. These results suggest the importance of entrepreneurship contents in high school curricula in order to give opportunities for students to develop the fundamental competencies for becoming successful entrepreneurs.

Keywords: *Entrepreneurship, high school students, gender effect, age effect, quantitative measure.*

1. Context

Entrepreneurship competencies refer to the skills, knowledge, and abilities that individuals need to successfully start, manage, and develop a business venture. These competencies have been widely studied in the academic literature, and several frameworks have been proposed to categorize them. One commonly referenced framework, proposed by Audretsch and Lehmann (2005), identifies eight core entrepreneurship competencies: opportunity identification, innovation, proactiveness, autonomy, risk-taking, self-efficacy, networking, and learning. Another framework, proposed by Stevenson (1985), identifies four key competencies for entrepreneurs: conceptual, human, network, and financial. Additionally, a more recent study by Edelman, Watson and others (2015) defines the following 8 entrepreneurship competencies: 1) opportunity recognition, 2) business acumen, 3) creativity and innovation, 4) interpersonal and communication skills, 5) strategic thinking and planning, 6) resilience and persistence, 7) networking and relationship-building and 8) financial management. All these frameworks, however, underline that it is a combination of various abilities and traits that make an entrepreneur successful. These models have inspired some high schools to offer some basic training in entrepreneurship to students.

The Quebec Secondary School Training Program (MEES, 2019) contains various components related to entrepreneurship that overlap with the forementioned frameworks. These include the General Domain of Vocational and Entrepreneurship Training, which is used to contextualize the students' learning; cross-cutting skills such as Effective Work Methods, Cooperation, and Problem Solving; the Entrepreneurship Awareness Domain of Learning; and pedagogical approaches such as project-based learning. Other devices related to the school curriculum, such as the *OSEntreprendre* challenge (<https://www.osentreprendre.quebec/>), also allow students to learn about entrepreneurship and showcase their entrepreneurial initiatives. However, except for a few studies (Champy-Remoussenard and Starck, 2018; Fayolle, 2012; Lapointe et al., 2010; Pepin, 2011; Samson and Morin, 2013; Surlemont and Kearny, 2009), little research has been conducted to evaluate the entrepreneurial characteristics of students beforehand or afterwards. Such studies are of great importance in developing a sense of entrepreneurship among young people and, above all, in better preparing them to face the challenges of the job market and society. Question remains though regarding the role of age and gender on development of entrepreneurship competencies. This study aims to examine these relations.

2. Methods

The participants have answered voluntarily and anonymously to the online version of the ECQ between 2016 and 2023. The ECQ is available free online to the general population and is often suggested by teachers and guidance counselors. All scores are computed electronically. There has been no subject recruiting, so this is a convenience sample of 10,836 persons who answered the online questionnaire on entrepreneurship. 5527 were youth, 2284 are young adults (18-30 y/o) and 3025 persons are over 30 years old. There are 6464 women and 4372 men.

The Entrepreneurship Competencies Questionnaire (ECQ; L'Heureux, Dupont & Gingras, 2016) is a self-reported instrument including 59 items assessing a range of perceived behaviors and attitudes related to entrepreneurship. Respondents must determine the level of self-correspondence for each item on a 4-point scale from "not at all" to "totally" corresponding. The ECQ results in a total score and 6 specific scales scores: 1) Energy/commitment, 2) Motivation, 3) Results oriented, 4) Initiative/creativity, 5) Self-competition and 6) Leadership. The higher the score on a scale, the more competency on that dimension is being perceived by the subject. The ECQ total score has a very good homogeneity ($\alpha=.95$) as the 6 dimensions scores with Cronbach's alpha between .75 and .86.

All analysis is made with SPSS25 and consist of classic descriptive statistics with table means having the gender and age variables as factors. Effects of gender and age are examined with individual models of ANOVA factorial design (2 x 3) including both simple effects of factors and the interaction of these factors (gender x age). Six models are produced for each of the ECQ scales and one model is produced for the total score.

3. Results

Table 1 presents means of each ECQ scale for the entire sample and for subgroups of age and gender category. Visual appreciation of descriptive results shows that ECQ scores do not vary much due to gender but it seems scale scores are higher for adults comparing to younger subjects. Variation coefficients for all distributions oscillate around 15%.

Table 1. Descriptive statistics of ECQ scales by age group and gender (n=10,836).

Scales	Age group			Gender		Total
	High School	Young adults	Adults	M	F	
1. Energy/Dedication	27.7 (4.9)	28.0 (4.9)	29.5 (4.7)	28.3 (4.9)	28.2 (4.9)	28.3 (4.9)
2. Motivation	40.5 (6.1)	41.5 (6.1)	43.1 (5.9)	41.4 (6.4)	41.5 (6.1)	41.4 (6.2)
3. Results oriented	39.9 (6.2)	40.7 (6.1)	41.9 (6.1)	40.6 (6.4)	40.6 (6.1)	40.6 (6.2)
4. Initiative/Creativity	31.4 (5.7)	32.5 (5.7)	34.4 (5.5)	32.6 (5.8)	32.4 (5.8)	32.5 (5.8)
5. Self-competitiveness	21.4 (3.9)	22.0 (3.7)	22.5 (3.6)	21.8 (3.9)	21.9 (3.7)	21.8 (3.8)
6. Leadership	18.4 (3.7)	18.6 (3.6)	19.2 (3.4)	18.5 (3.7)	18.8 (3.5)	18.6 (3.6)
7. Total score	179.3 (26.3)	183.3 (26.0)	190.6 (25.7)	183.3 (27.4)	183.3 (26.0)	183.3 (26.5)

Table 2 reports summary results of the set of factorial ANOVA done on the 6 ECQ scales and total score. All models are statistically significant ($p<.001$). Results show an overall highly significant effect of age on every perceived competency, some effect of gender and only one significant interaction effect. For all scales, post hoc analysis reveal that the age effect reflects significantly higher scores for the older adults regarding the high school youth and young adult groups. The two younger groups have similar lower mean scores. Partial eta-square suggest small to medium sized effects. The effect of gender on scores is significant but trivial (eta-squares around 0.001) due to the high statistical power inherent to such large sample. The only significant interaction implies that men are slightly more creative than women in the two youngest groups but this difference disappears in the oldest group. The effect size of this interaction is trivial (eta-square = 0.001).

Table 2. Summary of factorial ANOVAs on ECQ scales and total score (n=10,836).

Scales	Source of variation (F values)			
	AGE	GENDER	AGE x GENDER	Model
1. Energy/Commitment	127.94***	14.96***	1.01	63.32***
2. Motivation	164.06***	13.91***	1.85	77.56***
3. Results oriented	83.61***	6.46**	1.09	40.44***
4. Initiative/Creativity	230.28***	30.32***	6.02**	118.96***
5. Self-competitiveness	80.63***	1.29	1.20	38.51***
6. Leadership	440.24***	58.15	1.67	21.88***
7. Total score	157.84***	10.41***	2.19	77.48***

Note: * p<0.05 ** p<0.01 *** p<0.001

4. Conclusion

There is a clear effect of age on perceived levels of all entrepreneurship competency scales. Even if the effect size is relatively modest due to the enormous statistical power of the study design, it appears that maturation and experience are related to stronger entrepreneurship competencies. The very small effect of gender suggests that entrepreneurship competencies are developed largely in a similar fashion and level by both men and women through all age categories. This study supports the relevance of implementing high school programs with academic contents and projects related to developing entrepreneurship competencies. Higher perceived competencies at a younger age would probably equate with more entrepreneurial activity in young adults.

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