

Article

# Entrepreneurship Education: An Experimental Study with Information and Communication Technology

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Received: 30 January 2018; Accepted: 2 March 2018; Published: 4 March 2018

**Abstract:** Entrepreneurship has been regarded as a new science in the promotion of economic development, which has led to rapid development in entrepreneurship education. The growing number of students enrolled in entrepreneurship programs creates unprecedented challenges on educators. Although multiple teaching and learning activities are adopted in entrepreneurship education, these are mainly carried out using traditional classroom lectures, case studies and group discussions. Nowadays, information & communication technology (ICT) is used to enhance the effectiveness of traditional teaching methods and competency training. PowToon is a web-based ICT tool that allows teachers and students to quickly and easily create animated presentations. Using quasi-experimental design and qualitative method, this study is to examine whether PowToon is an effective tool for business plan presentation. The study finds that the animated presentations attracted more investment than the groups that did not prepare animated videos. It reflects that developed videos which help entrepreneurial teams to better deliver their business ideas to investors in a well-thought-out way. In addition, the results of the study show that individuals who generate a business idea did not necessarily significantly influence their investment decisions. Our findings challenge the concept on self-biases evaluations of the economic potential of their own business ideas. Finally, the students were very willing to adopt new ways of delivering their business ideas.

**Keywords:** entrepreneurship education; information and communication technology; PowToon; animated video; investment

## 1. Introduction

Entrepreneurship is considered the best approach to achieving economic growth, which has led to rapid development in entrepreneurship education. The growing number of students enrolled in entrepreneurship programs stresses the capacity of lecture theatres and teachers [1]. Higher education institutions have been impelled to create courses and environments in the field of entrepreneurship education [2,3]. The teachers are also being challenged to design effective teaching strategies and plan meaningful activities for these students [4]. Entrepreneurship education has improved regarding teaching models, learning theories and learning environments [5–9]. However, the literature is controversial as to the impact of entrepreneurship education on students' entrepreneurial intentions [2,10]. The following research question was asked: "How can teachers enhance students' willingness and interest to learn entrepreneurship?"

Venkatesh, Shaw, Sykes, Wamba and Macharia [7] suggested that entrepreneurial activities and profits are influenced by the use of information and communication technology (ICT). Recently, it has gained popularity among government, enterprises and education institutions [11–17]. ICT can

create opportunities for governments to improve efficiency and strengthen their management and operations [18]. Many studies have confirmed that ICT increases procedural efficiency, customer service quality and reduces costs as well as positively influencing corporate performance, such as productivity, profit, market value and market share [12,19].

ICT also could benefit teachers, promote learning and improve learning outcomes, particular at the elementary and high school levels [13]. Although higher education is where new knowledge is supposed to be created and acquired, it rarely is successfully applied to teaching activities [20]. Furthermore, higher education classes are more likely than elementary or high school classes to be large, which suggests relatively lower quality teacher-student interaction and relatively more common teacher-centered learning.

The common course formats and key features of business courses include business plan (BP) development and pitch competitions [6]. BPs usually are employed to raise capital and plan for future developments. Recently, the idea of “crowdfunding” has rapidly spread around the world. The idea is to give individual investors opportunities to apply a relatively small amount of capital to fund new or expanding businesses [21]. If you were to ask investors whether the crowdfunding platform or the fundraising team was more important, many of them would tell you that the key is to display a video [22].

PowToon is a cloud-based ICT tool that allows teachers and students to visualize business idea and create animated presentations [23]. PowToon has been seen as an interesting and attractive tool for supporting teaching-learning activities [24]. The major difference between PowToon and PowerPoint was the presentation style (dynamic vs. static) used in rocket pitch rather than technologies themselves. It would promote students’ engagement during learning activities [25]. Wu, Pan and Yuan [16] also indicated that publishing and content creating tools would likely enable students to interactively participate in their education through new forms of technology dependent learning. People learn best by actively constructing their own understanding is a key tenet of constructivist model. In order to construct new knowledge and understanding from authentic experience, learners are presented with opportunities to build on prior knowledge and understanding [26].

Therefore, the purpose of this study was to investigate PowToon is an effective tool for business plan presentation. Although there are numerous video production techniques, this study focused on PowToon, which provides pre-designed templates to quickly create animated explainer videos. It could be widely used in learning as tools for such outcomes as the visualization of ideas, crowdfunding, advertisement and employee training [23,25]. Teachers also tend to use emerging technologies as new and/or improved tools to enhance the effectiveness of their teaching [27].

When the tools meet the teaching objectives, and, “if students feel that they must use these business tools to succeed in a competition,” they will use them [28]. Application of ICT in entrepreneurship education has just begun to receive scholarly attention [29,30]. The study selected entrepreneurship education to observe the following three considerations in detail. First, students might be helped because they can obtain free online resources for entrepreneurial activities. Second, teachers could develop learning activities to offer relatively more advanced skills to students through practice [24]. Third, to visualize the entrepreneurship idea, the learner need to know its main point and have full picture. Finally, previous studies have suggested that, from a policy perspective, entrepreneurship is essential for meeting economic and social goals [30].

## 2. Literature Review

### 2.1. ICT Tools

The application of ICT in teaching can be understood as four stages: (1) discovery, (2) learning the operations, (3) understanding how and when to use ICT and (4) specialization [31]. The ICT tool must be chosen to meet specific educational goals but selecting the correct ICT tool is not an easy task [32]. The ways that ICT tools are used matter when teachers made decisions [33]. The practicality and

effectiveness of ICT also are key assessment criteria. In a study of 421 students, Edmunds, et al. [34] found that ICT tools enhanced learning and job performance, mainly regarding increased efficiency and that ICT was more practical for work than for learning or leisure activities.

Teachers are key to learning programs, whether teaching occurs in face-to-face interaction or via distance learning [35]. Bartsch and Murphy [36] surveyed 52 college students in an experimental design and found that students that used a Classroom Response System (CRS) had relatively higher achievement scores at the end of the course, supporting CRS as a tool for student feedback and engagement. Wu, Wu and Li [30] proposed that CRS promotes interaction between students and course content, improves students' motivations to strengthen their entrepreneurial skills and increases students' engagement in knowledge acquisition.

## 2.2. PowToon and Videos Use in the Classroom

PowToon aims to effectively improve students' willingness to learn and their learning outcomes [24]. Released as beta in August of 2012, this free online software combines presentation with animation. PowToon provides free images and royalty-free music to its users. Users also could upload their images and dubbing. Its operation is similar to PowerPoint and Prezi with enhanced creativity and appeal. It is intuitive and user-friendly via text, images (including characters, props, shapes and background) and other content that easily can be added to templates. Video presenters can use blank project templates or ready-made animations to create a high quality animated videos. Videos cannot be downloaded free of cost but they can be shared through social media, content community and other platforms. After a learning period, anyone can create engaging animations that seem professional, allowing users to quickly convey attractive information to various audiences. As of December 2017, more than 45 million PowToon animations had been created.

Rioseco, Paukner and Ramírez [25] used PowToon as a learning tool in two courses and semi-open questionnaires to assess students' perceptions after using the software. The results indicated that students had positive attitudes about using PowToon to learn and that it helped them learn the content and develop skills. Makarius [24] instructed students to create training sessions based on edutainment techniques (PowToon and GoAnimate) and assessed how comparisons should be drawn with traditional training methods (on-the-job, simulation or team-building). These students tended to use the PowToon and GoAnimate tools and they were very interested. These methods are arguably useful for students who are not successful at role-playing in classroom settings and they enable teachers to adjust to meet their teaching needs. Aravopoulou et al. [37] argued that a variety of creative media, created by students or experts, appeals to students and leads to better and deeper learning.

Sergeant and MacDonald [38] have indicated that multimedia video presentations are an indispensable tool for business professionals. Their study of 324 business students found that students believed that they needed basic video production skills in order to succeed in the next 10 years. Edmiston [39] also found that students felt comfortable with new video technologies and had not encountered any difficulties while acquiring such technologies. Producing video presentations brings about positive peer learning experiences. During a course on new product development, Manzon [40] encouraged students who were developing new products to participate in Kickstarter projects. Students were required to use descriptive videos, photo advertisements and text to explain why potential sponsors should invest in their products. Compared to other business plans that were completed in the same semester, results showed that participants believed they learned more from this type of fundraising plan.

## 3. Methodology

This study used multiple methods to explore whether PowToon is an effective tool for business plan presentation at a leading public university in Taiwan. In Study 1, the article employed a quasi-experiment design in an EMBA class setting and examined the effect by manipulating groups of pitch presentation styles and peer and self-investments of entrepreneurial opportunities. In Study 2,

qualitative methodology was used to examine the tendencies of students to use PowToon in a MBA class setting in a follow-up semester.

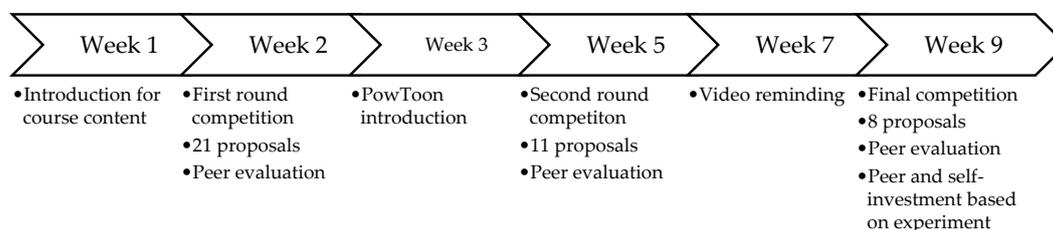
### 3.1. Study 1 in EMBA Setting

#### 3.1.1. Participants

The participants in the Study 1 were 21 EMBA students studying entrepreneurship management (12 males and 9 females) and employed by a variety of private and public institutions in Taiwan. These participants had at least seven years of fulltime work experience and were part-time students. The course was a two-credit, nine-week elective that met every other week for four class hours per week. The purpose of the course was to cultivate participants' entrepreneurial spirit and skills. The course was designed to provide practical guidance by covering a range of entrepreneurial knowledge, including: (1) initial mental preparation, (2) innovation and transformation and (3) business launching. These issues included self-awareness, identifying opportunities, creative thinking, developing business models, understanding entrepreneurship laws, writing BPs and securing external funding.

#### 3.1.2. Design and Procedures

Because all of the participants were in the same class and the animated film for final pitch competition was optional, it was not known whether they created animated explainer videos until the end of the semester. Therefore, it was not possible to randomly assign the participants into experimental and control groups. Instead, this study used a quasi-experimental design to determine whether using PowToon as a learning tool improved participant performance and attracted the attention of potential investors. The main learning activity was for the participants to develop BPs, which were subjected to three rounds of Rocket Pitch competition, supplemented by the introduction of PowToon. The research process and methodology are shown in Figure 1.



**Figure 1.** The flow of research process.

Related events for research design were explained as follows: During the first week of the course, the instructor introduced the course content and explained the three rounds BP competition for the semester. The participants were suggested to use animation to present their BP ideas of the week nine but it was optional. During the second week, each participant entrepreneur gave a quick and concise presentation of his or her business ideas and key differentiating elements. The presentation was limited to one minute and a maximum of three slides. The other participants ranked the presentations (online) and the 11 proposals with the highest rankings entered the second round of the competition. Participants whose presentations were not selected were integrated into the successful teams. During the third week, PowToon was introduced and an animation demonstration was given as an example. In the sixth week, each group developed a complete proof-of-concept study to illustrate that the entrepreneurial ideas were feasible. After five-minute presentations, the eight best proposals were selected via online ranking and they moved on to the final competition. The participants not selected were redistributed into the remaining groups. The list of groups participating in the final competition was confirmed during week seven. In weeks seven and eight, the participants were reminded that they could use supplementary videos if no significant burden was created.

Peers performed all of the assessments and grading, such that members of the class ranked and assessed each other. This is a widely used and established teaching approach to writing, oral or audio-visual reports and other professional activities [41]. This process is known to benefit learning. The peer assessment of this study was divided into two parts. The peer online assessment used the options of “average,” “not bad” and “awesome,” which is coded as Average = 1, not bad = 2 and awesome = 3. Voting was not required and a positive approach was taken. The first two rounds of the Rocket Pitch and the BP competition and video presentation at the end of the semester, used this scoring method.

People who develop entrepreneurial ideas might make biased assessments of their economic opportunities, which might distort investment decisions [42]. To reduce this bias in the final competition, two conditions were added to the experimental design. In the “OWN” condition, each participant included his or her proposal in his or her investment considerations. Under the “OTH” condition, the participants’ personal BPs were not available for investment and these participants could consider only other groups’ proposals for investment. The study was designed so that one member of each group was assigned one of these conditions. For example, Group 4 had three members, each of which was given a random number. The member with the highest number was assigned to “OWN” and the member with the second highest number was assigned to “OTH.” The number assigned to the member with the third-highest random number was compared to those of the other groups’ participants with the third-highest random number and the participant with a highest number among them was assigned to “OWN.” Based on the above-described grouping and the number of times each proposal was assessed, each participant’s investment assessment portfolio was set at “six.” Similarly, every proposal was assigned a random number (which, therefore, differed for every participant). The proposals of the participants in the “OWN” category were included in the portfolio first, regardless of the random number assigned to the proposal. The five proposals with the next highest random numbers were included in the portfolio next.

Before the final competition began, every participant was given a prepared investment evaluation form and \$1000 in imitation cash (four \$100 bills, six \$50 bills and twenty \$20 bills) and the purpose of this step was explained to them (Figure 2). Each group was given one minute to present its BP and the other participants ranked them. Next, the groups that had prepared videos presented them and the other participants assessed them. Then, each participant took the role of an investor and assessed the proposals listed on the prepared investment evaluation form. Each form contained six BPs. The participants were free to invest in as many BPs as they wanted to (up to six) by writing their investment amounts on the form until they had exhausted their \$1000. Finally, each participant investor paid these amounts to the participants who submitted the proposals (Figure 2) using their cash. The actual amount of cash invested in each case might have differed from the amount listed on the investment evaluation forms. Every proposal was assessed 14 to 18 times.

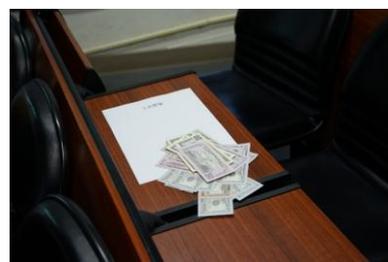
Investment portfolio

Student ID: 104590173

Group	1	3	4	5	7	8
Investment						

Criteria for investment:

.....



**Figure 2.** Investment portfolio example.

### 3.1.3. Measures

The dependent variable, independent variables and control variables were summarized as following (Table 1):

*Dependent variable.* Peer and self-investments was determined by the extent of the participants' willingness to invest in business ideas and the size of their investments. This was a key dependent variable of the study, which ranged from \$0 to \$1000.

**Table 1.** Variables and measures.

Variables	Measures
<i>Dependent variable</i>	
Peer and self-investments	\$0 to \$1000
<i>Independent variables</i>	
PowToon	Non-PowToon = 0, PowToon = 1
Investment portfolio	OTH = 0, OWN = 1
<i>Control variables</i>	
Gender	Female = 0, Male = 1
Portfolio ratio	The ratio 0 to 100% was used to identify the number of ideas in which each participant invested

*Independent variables.* The use of PowToon to visualize the business idea (PowToon) versus not using it (No-PowToon) was a key independent variable. The participants might have had strong tendencies to invest in their personal proposals during their assessments. To avoid this bias, the study followed Hooshangi and Loewenstein [42] investment portfolio research design and classified the participant investors as "OWN" (their personal proposals were included in their investment considerations) or "OTH" (they could not invest in their personal proposals). As described above, the participants under the "OTH" condition could invest only in other participants' business ideas.

*Control variables.* To explain certain relevant factors in our context, the analysis included some control variables that might have been relevant to investing in entrepreneurial activities. "Gender" was included because female investors tend to be more proactive than male investors regarding investing behaviors [43]. "Portfolio" was included because, among the conditions of the investment portfolio, peer investments were limited to six business ideas. The ratio was used to identify the number of ideas in which each participant invested. For example, the portfolio value of a participant who invested in two of the six ideas was 0.33 and the remaining four ideas had a portfolio value of zero.

### 3.2. Study 2 in MBA Setting

The second study reported in this article used a qualitative methodology to explore the tendencies enabled by PowToon. The participants were 24 full-time MBA students studying entrepreneurship management. This eighteen-week, three-credit graduate level course was taught by the same instructor. The procedure was the same as in Study 1, except that the entrepreneurial teams seek funding for their business ventures was by delivering one from oral, filmed or animated video presentation (or a combination of these).

After two rounds of rocket pitches, seven entrepreneurial proposals were selected to enter the final competition. Two weeks before the final competition, the instructors reminded groups that they could deliver their ideas either orally or through videos or animations. The students were also suggested to provide individual reflective learning report at the end of the semester. The main open-ended questions are: 1. What did you enjoy most about the course? 2. What did you like least about the course?

## 4. Results

### 4.1. EMBA Setting

The results of the final competition are shown in Table 2. The top three ranked in the oral presentation in average score were Group 6 (2.33), Group 7 (2.25) and Group 4 (2.14). In video presentation, Group 7 (2.31), Group 6 (2.28) and Group 1 (2.07) were ranked in the top 3. The top three ranked in the sizes of peer and self-investments for both rounds were Group 2, Group 6 and Group

7. Although Group 2's oral presentation and video presentation ranked fourth, the investments it received were the highest. The main reason for this outcome was that Group 2 had two members in the "OWN" condition and they heavily invested (on average 75% of their capital) in their personal business ideas. Group 2 also received all of the capital belonging to an investor (from another group) under the "OTH" condition. The actual investment amounts might have differed from the amounts stated on the investment evaluation forms. The main reason for that was that some of the participant investors changed their investment decisions when they spontaneously changed their minds or were influenced by other people or environmental factors between the first and final rounds. Therefore, in those cases, the investment amounts differed between the first and final rounds, which changed the rankings of Groups 4, 5 and 8 in terms of final investments.

**Table 2.** Results of final competition.

Group	Number of Participants	Oral Presentation		Animation Presentation		First round Investment		Cash Received	
		Average	Rank	Average	Rank	Fund	Rank	Fund	Rank
1	2	2.00	4	2.07	3	2880	4	2800	4
2	3	2.00	4	1.88	4	4530	1	3980	1
3	2	1.92	6			2110	5	2010	5
4	3	2.14	3			2110	5	2030	6
5	2	1.85	7			560	8	560	8
6	3	2.33	1	2.28	2	3830	2	3750	2
7	3	2.25	2	2.31	1	3500	3	3240	3
8	3	1.07	8			1480	7	1400	7
Total	21					21,000		19,770	

The sizes of the investments on first round were used to identify the extent of the attractiveness of the animations. In this quasi-experimental design, a stepwise linear regression model was used to estimate the effect of the experimental treatment on investment size. The results are reported in Table 3. Model 1–3 show the relationships between experimental manipulation and investment. In first step, this study inserted portfolio and gender as the control variables (Model 1). In Model 2, the main effect of OWN were included in the second step. Its main effect did not significantly explain any of the variance in investment decisions ( $\Delta R^2 = 0.000$ ,  $p > 0.10$ ) and no direct relationship was found between "OWN" and "Investment" ( $\beta_{OWN} = 0.000$ ,  $t = -0.000$ ,  $p > 0.10$ ). This result suggests that including the participants' personal proposals in their investment portfolios did not significantly influence their investment decisions.

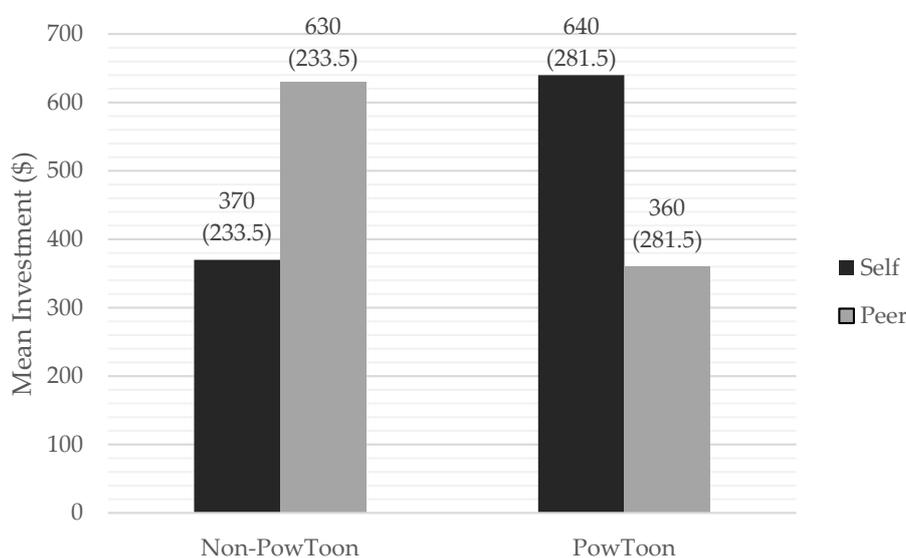
In the third step, the main effect of PowToon was placed in Model 3. The main effect significantly explained the variance in investment decisions ( $\Delta R^2 = 0.011$ ,  $p < 0.05$ ). PowToon positively related to Investment ( $\beta_{PowToon} = 0.110$ ,  $t = 2.016$ ,  $p < 0.05$ ). Videos made using PowToon and displayed in entrepreneurial proposals positively influenced the participant investors.

Figure 3 shows the mean investments made by participants in OWN condition. In the "Non-PowToon" group, participants made relatively higher investments to others than themselves. On average, peer obtained 70.3% more than themselves (\$630 versus \$370). It reflects the participants in "Non-PowToon" group were able to compare the merits of their business idea to the others before deciding how much to invest. Interestingly, under the "PowToon" group, participants invested themselves 77.8% more than others (\$640 versus \$360).

**Table 3.** Results of multiple regression analysis of investments <sup>a</sup>.

Variables	Investment		
	Model 1	Model 2	Model 3
Control variables			
Portfolio	0.809 (65.61) **	0.809 (65.87) **	0.779 (67.59) **
Gender	0.000 (25.15)	0.000 (25.49)	0.001 (25.18)
Mean effects			
OWN		0.000 (25.26)	0.002 (24.95)
PowToon			0.110 (25.68) *
$\Delta R^2$	-	0.000	0.011*
R <sup>2</sup>	0.654	0.654	0.665
Adjusted R <sup>2</sup>	0.648	0.645	0.654
F-value	116.173	76.819	60.077
df for F-value	125	125	125

<sup>a</sup>  $n = 21$ , Standard errors are in parentheses. \*  $p < 0.05$ , \*\*  $p < 0.01$ .

**Figure 3.** Investment levels in OWN condition. Note: Standard errors are in parentheses.

#### 4.2. MBA Setting

The results showed that five groups used an animation to display their business plans, one used a video and one delivered a verbal presentation. This result reflected the fact that students were very willing to adopt new ways of expression. At the moment, the delivery of oral presentations is an essential component of business education [44]. Although oral presentations are important to entrepreneurs, knowing that they are important does not help shy students or those with inadequate speaking skills. Developing oral presentation skills is also regarded as a time-consuming activity [45]. This course focused on the entrepreneurship idea itself and how its core concepts could be delivered in the most suitable way. With the development of communities and information technology, fundraising channels have become more and more diversified. The majority of students are willing to spend extra time to learn how to produce animations and use them to clearly explain their cases, including facts and evidence from expert witnesses, to persuade investors. The value of a video presentation is that entrepreneurs can preview and edit it before it is actually delivered in order to improve the presentation quality [38].

The reflection reports submitted by the students are summarized as: (1) ICT tools: Six students mentioned that they enjoyed the ICT tool introduction session in class. During which the instructor introduced nearly 20 ICT tools, two of the participants clearly expressed in their feedback that PowToon

was helpful for them. In the final competition, five groups applied animations designed with PowToon to deliver entrepreneurial concepts. (2) Design thinking: Four students believed design thinking was important; it plays an important role in the development of new products. This concept can be applied to animation design through the adoption of a people-oriented and innovative approach to convey valuable products or services to investors. This should be a fundamental feature of any creative field. (3) Adopting an implementation approach: Four learners mentioned the concept of implementation. The viability of any entrepreneurial concept must be demonstrated through the proof of concept. If there would be a lack of supporting evidence, marketing the idea widely would rely merely on chance. (4) The role of an investor: Each participant was a proposer and an investor at the same time. They needed to listen and learn to make investment choices and decisions. The four issues above were strongly related to the topic of this study.

## 5. Conclusions

BP development plays an important role in the entrepreneurial activities and education. It can be used to fundraise. Bruton, Khavul, Siegel and Wright [21] indicated that the use of videos to present entrepreneurial ideas will increase the likelihood of successful fundraising. PowToon is an ICT tool for animated video that is easy to learn and to use in an environment that is key to learning and decisions. This study incorporated PowToon into a course and created an environment for participants by explaining to them how to use the software. Active entrepreneurial participants were more willing to invest their time into learning how to use the optional animation software and they tried to visually externalize their entrepreneurial ideas. They created environments in which they could raise relatively greater capital.

The first contribution of this paper is to challenge the concept on self-biases evaluations of the economic potential of their own business ideas. After three rounds of rocket pitches, it can provide the participants with a better understanding of advantages and disadvantages of their business plans. The second contribution is that higher education emphasizes the use of oral presentations and this study provides a new option as a reference for teachers. The results of this study are as follows.

First, a participant's assessments of the business ideas were not significantly influenced by the presence of his or her personal proposal in an investment portfolio. This result is inconsistent with Hooshangi and Loewenstein [42], who argued that people invest more in their own than in others' proposals. The major reasons for this inconsistency are: (1) participants had relatively deep understandings of these business concepts because the proposals had been through a three-round competition and (2) face-to-face communication influences decisions through body language, facial expressions and voice projection as well as words. An entrepreneur's preparedness and passion displayed in his or her BP presentation helped to convince participants to invest [46].

Second, video presentations positively influenced investments and attracted the participant investors' attention. The groups that prepared animated videos attracted more investment than the groups that did not prepare animated videos. Mollick [22] pointed out the power of video in crowdfunding and its contribution to successful fundraising. Shi and Guan [47] also suggested that goals and sponsorships are positively associated with promising outcomes, whereas images and updates are ineffective, although incorporating a video is helpful for obtaining investments. Developed videos which helps entrepreneurial team to better explain their business ideas to investors in a well-thought out way [48]. Entrepreneurs also ensure accurate venture success are certainly appealing to investors. Investor need to feel more confident about the business idea in which they make financial commitments.

Third, the participants of the PowToon group generally invested more money in their personal than in others' business ideas. After this classification, the results were consistent only with Hooshangi and Loewenstein [42], who argued that people predict that others' ideas are inferior to their personal ideas because people were taking pains and, therefore, tend to overestimate their relative value.

Entrepreneurs who provide investors with accurate projections of venture success are certainly appealing to investors.

Fourth, displaying animation in the final competition evolved from being an extra work into an option in Study 2. Surprisingly, participants were very willing to use animations to demonstrate their ideas. This observation was consistent with the results of Sergeant and MacDonald [38] and Makarius [24]. Video presentations can integrate facts, backgrounds and entertainment to effectively deliver business ideas and persuade investors [38]. Corbett, et al. [49] suggested that the benefit of producing videos in marketing courses is that it offers a creative way to strengthen students' understanding of and ability to apply sales processes.

### *5.1. Instructional Implications*

The findings may have some impact on teachers of different levels, as they are eager to have students communicate ideas and concepts in innovative ways. First, students demonstrated an ability to use PowToon to visualize ideas as well as describe the products and express content more concisely and vividly. PowToon's emphasis on innovation may inspire participants to transform their carefully written scripts into animations to give investors a different experience. By producing compelling animations, students are able to recount more attractive stories of new products as compared to traditional presentations [39]. Second, applying ICT tools to help students build their own learning approach and encourage collaboration with others enables students to discover multiple perspectives on a particular issue [25]. Finally, the acceptance of high-level learning activities positively affects the students' willingness to use ICT tools [30]. Some participants also stated in their reflection reports that tools that can be implemented would be helpful for their future.

### *5.2. Research Implications*

This study adopted a quasi-experimental design combining teaching and research. During the process, we did not let participants know that research data was being collected, in order to avoid the Hawthorne effect. In Study 1, the researchers encouraged students on several occasions to develop animations in addition to their presentations. A rigorous experimental design was adopted to avoid the bias of self-investment. In Study 2, we allowed participants to freely choose tools for their presentations. The results of the experiment showed that students were very willing to use animated presentations and the groups that produced animations achieved better grades. These two designs provide researchers with different perspectives.

### *5.3. Limitations and Future Study*

One of the limitations of this study is its small sample size of 21 participants. The number of entrepreneurial proposals could not be expanded because only the best ones were selected in the competitive process. There also was the limitation of the class size and the available human resources, which meant that an experimental control group was impossible. To manipulate the treatment, we were limited to encouraging the participants to learn the animation software. Overall, this study offers a snapshot of the value of using ICT tools in entrepreneurship education. Future examination and analysis should be conducted by dividing participants into two classes.

**Acknowledgments:** The authors would like to thank the Ministry of Science & Technology, Taiwan, for financially supporting this research under grant no. MOST 106-2511-S-003-029-MY3 and MOST 106-2811-S-003-004.

**Author Contributions:** Yenchun Jim Wu took charge in developing the concept, executing the experimental tasks, collecting data and wrote this manuscript. Chih-Hung Yuan designed the experiments, performed data analysis and wrote this manuscript. Chai-I Pan contributed the Study 2 in MBA setting.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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