

Crowdfunding, Entrepreneurship, and Design Education: Case Study of a Campaign by Design Students from China

Author

Zhou, Ding, Jiang, Jiabei

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Design Education for Fostering Creativity and Innovation in China

Kin Wai Michael Siu

The Hong Kong Polytechnic University, Hong Kong

Giovanni J. Contreras

The Hong Kong Polytechnic University, Hong Kong

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Chapter 6

Crowdfunding, Entrepreneurship, and Design Education: Case Study of a Campaign by Design Students from China

Zhou Ding

Nanjing University of the Arts, China

Jiang Jiabei

Nanjing University of the Arts, China

ABSTRACT

The purpose of this paper is to develop further insights into micro-entrepreneurship programs participated in by Chinese industrial designers. A model of creative thinking is employed to explain the campaign creation process. A case study research in sample design entrepreneurs was designed and conducted, and it was composed of three steps: preparing for data collection, collecting the evidences, and analyzing the evidences. It was found that five main defects in creative thinking work as obstacles to crowdfunding success. In order to overcome these drawbacks, it is suggested that designers involved in micro-entrepreneurship programs should acquire the abilities of building prototypes, following the design procedure, finding and solving problems, defining ideation and applying the evaluation methods. Current findings and future study can contribute to the curriculum development for China's industrial design education.

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INTRODUCTION

The Chinese government is making heavy investments to convert grass-roots innovation into business. In Shanghai, Communist Youth League supported the 2012 Shanghai Maker Carnival. The construction of more than 100 government-supported innovation houses is proposed by local officials. Some hackers' fabrication laboratories in China earn official supports which take the form of latest facilities or considerable allowances usually used as the rents (Parker, 2014). Around the globe, online crowdfunding currently becomes a significantly effective approach to realize a wide range of designers' micro-entrepreneurship dreams. A number of campaigns have been successfully launched on Kickstarter that one of the most popular international crowdfunding platforms. On the community of Kickstarter, a product design campaign for a smart watch named Pebble attracted more than \$10.3 million from 68,928 backers as of May 2012 (Newman, 2012).

In the field of design education, what can domestic educators in China learn from these changing external conditions? Few researchers in China have so far studied this emerging question. Focusing on university-level design education and industrial business, two scholars Rodber and Wormald (2007) in the UK pointed out that the process of creating wealth through new-product development has changed since the early 21st century. Similar to Chinese government, British government strongly supports science and innovation to create innovative goods and services for economic success. Design thinking, marketing-oriented new product development as well as the integration of design system and service are highlighted as the important drivers. Thus two researchers suggested orienting industrial design education (IDE) to the latest trends so as to alleviate the mismatch between IDE curricula and newly required skills and knowledge in industries. While this suggestion can serve as a reference for this paper, it is of limited helps for China's IDE and crowdfunding campaign creation.

Despite the rapid growth of online crowdfunding, there is comparatively little research on fund-raising campaigns. Focusing on the participants' psychology and behaviour, a study proposed enhancing the motivations of both the creators and the supporters via crowdfunding support tools (Hui, Greenberg & Gerber, 2013). Gerber and Hui (2013) suggested applying the principles of connecting participants by, for example, creating a reward system and inspiring social feedbacks (Sakamoto et al., 2013). Kuppuswamy and Bayus (2014) indicated that project creators should pay more attention to the first and last periods of fundraising campaigns, in which platform backers tend to contribute more than in middle weeks. However, these prior researches regarding campaign management may rarely benefit entrepreneurs in their campaign creation.

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In order to research online crowdfunding, a case study was conducted here targeting a group of industrial design students (hereafter referred to as the Students) at Nanjing University of the Arts, China. The Students created a smart ring for which the fundraising campaign was unsuccessful on Indiegogo, a large global crowdfunding and fundraising online site. Through figuring out how the Students carried out product design campaigns and why their creative thinking-based campaign creation failed to reach the funding goal, this research aims to develop further insights into the design micro-entrepreneurship based on China's IDE.

After presenting the key concepts and theoretical basis, this paper gives a systematic description of the research process, which is divided into three main sections. The first section details the process of preparing for data collection, including case selection and the formulation of the evidence-collecting procedure. The second section describes the collected evidences. Through analyzing the evidences, Section three concludes that the Students' crowdfunding failure was the result of their creative thinking shortcomings, including deficient knowledge about prototype construction, poorly designed procedure, poorly defined target problem and solution, ambiguous function definition, and disorderly evaluation process. The research findings herein can potentially benefit not only micro-entrepreneurs engaged in crowdfunding design but also local design educators in China, who significantly need to rethink about IDE and develop related curricula to satisfy the changing industry's needs.

KEY CONCEPTS AND THEORETICAL BASIS

Crowdfunding and AON Model

Crowdfunding, defined as the integrated practice of raising funds from a large number of people particularly over the Internet (Drake, 2014), has gained rapid development since the beginning of this century. Following ArtistShare, the first online crowdfunding platform set up in 2003, related sites have mushroomed around the globe since 2005. More than one million individual campaigns were carried out globally in 2012, and the industry size would expectedly grow to US\$5.1 billion in 2013 (Barnett, 2013).

Indiegogo, the research setting of this study, is one of the largest crowdfunding platforms worldwide. Its funding model is referred to as All-or-Nothing (AON), the most widespread and effective crowdfunding type (Weisul 2014). Based on it, project founders follow three main steps to realize their entrepreneurship projects. The initial stage is to start a complete campaign for a designed product. Then the product is released on Indiegogo platform. Meanwhile, crowdfunding work, includ-

ing campaign material preparation, project marketing and project goal following (Hui et al., 2013), is implemented to raise funds. Following the above two steps, if the total funds meet the expected minimum before the expiration date, the project founders will definitely gain all the funds and rewards for future project implementation; otherwise, the project has to be sadly terminated by Indiegogo, and all the invested capital will be directly returned to investors. This AON model is typical and even imitated by numbers of crowdfunding platforms in China, like Demohour and Zhongchou. Therefore, case of the Students on Indiegogo has general significance in Chinese micro-entrepreneurship and industrial design context.

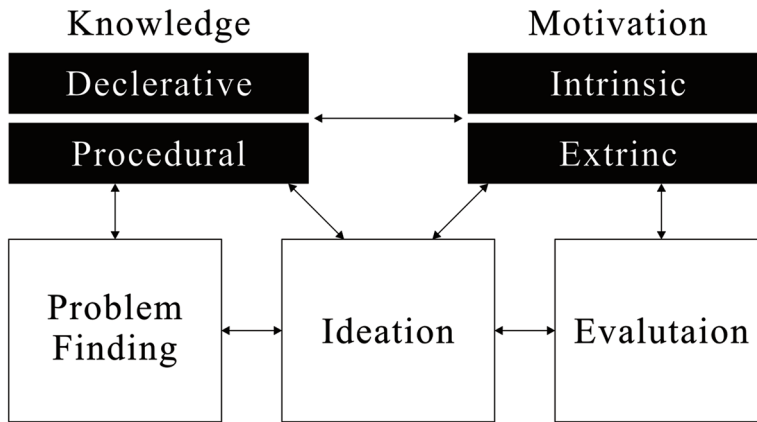
Creative Thinking

This research was carried out in the context of new product development, a complete process of bringing a new product to market. Authors tended to evaluate the effective transformation of market opportunities into products available (Krishnan & Ulrich, 2001) for sale as ‘creative’. And the science behind the phenomenon is the designed products satisfy customer needs and wants. Runco and Chand (1995) defined creative thinking as a mental process of activity leading to original and adaptive ideas, solutions, or insights. Product design, as a kind of creative behaviour, is typically defined in terms of originality and adaptiveness that together follow the integrated processes generating the above results. In addition, two scholars presented a two-tier model of creative thinking in detail.

As shown in Figure 1, knowledge and motivation are two basic elements of the first tier. In general, knowledge is declarative or procedural. Declarative knowledge represents fact-based information, while procedural knowledge indicates specialized knowledge which usually requires explicit instructions and strategies. Motivations are classified into two types including intrinsic motivation and extrinsic motivation. Furthermore, the second tier of creative thinking consists of problem discovery, ideation and evaluation, wherein problem discovery implies identification and definition of problems; ideation refers to the ideational process which is described as divergent thinking or associative thinking, while ideational flexibility, namely the variety of ideas, is one of the most important factors for divergent thinking; evaluation indicates various evaluative processes which could influence creative thinking. The model below was employed as a theoretical basis in this paper because it could bring a systematic framework for the following evidence collection. This framework demonstrates an understanding of creativity theories and concepts related to the topic of designers’ micro-entrepreneurship and the broader areas of

Figure 1. The model of creative thinking includes two components on the first tier while three ones on the second

Source: Runco and Chand, 1995



knowledge considered. Selection of the two-tier model of creative thinking depends on its appropriateness, explanatory power, and convenience in application.

In general, the theoretical basis of creative thinking strengthens current researches in four crucial ways (Anonymous, 2016). Firstly, an explicit statement of theoretical assumptions of creative thinking enables readers to critically evaluate the evidence collection of selected case. Secondly, this theoretical basis associates researchers of this study with existing knowledge, especially with regard to practical creation. Guided by the two-tier model of creative thinking, authors are provided with basic selection of research methods. Thirdly, articulation of the theoretical assumptions of current researches requires researchers to solve the problems about how product design campaigns are carried out by designers and why their crowd funding campaigns end up with success or failure. It enables researchers to complete intellectual transition from general description of an observed phenomenon to generalization of various aspects of the phenomenon. Last but not least, application of theories helps authors of this study identify the limitation to the generalization. A theoretical framework specifies essential reasons which influence a phenomenon and highlights demand for examining diversification of those reasons and conditions for the diversification. Therefore, by its application, the two-tier model of creative thinking is valuable because it fulfills the primary purpose of current researches, so that authors of this research may apply that knowledge and understanding to perform more effectively.

RESEARCH DESIGN

A research design is the document of the study, which is created to seek answers for the researched questions. The design of this study effectively defined the aim, objective, scope, method, and data collection approach of the research. Based on critical evaluation of China's IDE in the current context of micro-entrepreneurship, the research aims to develop further insights into the design micro-entrepreneurship based on China's IDE. The research aims to work out two questions, namely, how the product design campaigns are carried out by designers and why their crowd funding campaigns end up with success or failure. Scope of the research is narrowed to designers' campaign creation on a crowd funding platform in view that crowd funding has become a new opportunity for designers' entrepreneurships in China and even the whole world.

As a type of micro-entrepreneurships of emerging designers, the number of crowd funding campaigns launched by Chinese designers is still highly insufficient. Therefore, an inductive approach based on qualitative case research was adopted (Eisenhardt, 1989; Yin, 2013). Bell (1999) also pointed out that "a case study approach is particularly applicable to individual researchers because it realizes certain research of one aspect of a problem within a limited time scale". In order to explore the solutions for research questions which possibly benefit design entrepreneurs and educators in China, the evidences shall be collected through interviews and observations, rather than experiments. As a result, case study became the most suitable method for this kind of researches (Yin, 2013).

Furthermore, the single-case holistic design is deemed as one of the most effective types of case study design, as this research aims to realize objective understanding of the environments and conditions, wherein crowd funding campaigns are created. The conclusion of current researches towards a typical object should be helpful for deepening the comprehension of similar cases. The technological issues of the holistic single-case study mainly focus on design of an effective investigation and interview for data collection, so it is divided into three parts: preparation for data collection, evidence collection, and evidence analysis. The first part consists of case selection and formulation of the evidence collection procedure; based on the model of creative thinking, an investigation framework is formulated and applied in this part. In the second part, the collected evidences are presented systematically. In the third part, the answers to the research questions will be proposed based on the evidence analysis.

PREPARING FOR DATA COLLECTION

Case Selection

When selecting a subject for a case study, researchers used information-oriented sampling here, which is opposed to random sampling. A representative and typical sample meets selection standards of a holistic single-case study, wherein qualitative evidence indicates the knowledge of a current research question. Therefore, a case of Chinese designers' micro-entrepreneurship became an ideal research object.

Authors of this research selected a product campaign on Indiegogo crowdfunding platform, which was launched by Chinese designers from domestic IDE system. The story of an entrepreneurial team, which was a group of industrial design students in China led by Youlin Chen, Zhengpeng Wu and Shuwen Xiao, was selected as the study case. This selection was made based on the following facts. First and foremost, the three group-mates were senior students at the School of Industrial Design, Nanjing University of the Arts (NUA) in China. NUA also is known as the Nanjing Arts Institute, is a university offering undergraduate and graduate degrees in fine arts, design, and related subjects. The institutional history begins in 1912, with the foundation of the Shanghai Chinese Art College. The name was changed to the Shanghai Academy of Fine Arts of in 1930. The amalgamation of several universities in 1952 produced East China Arts College, situated in Wuxi. In 1958, the East China Arts College relocated to Nanjing, and in 1959 it acquired its present name (Anonymous, 2014). So far, the Ministry of Education and China Industrial Design Association still have a crucial influence on whole China's IDE system, in which most schools share the similar curricula and standards in design education. Therefore, the Students at NUA were rather typical representatives. Second, the entrepreneurial team had converted creative thinking into entrepreneurial practice by launching a crowdfunding campaign on Indiegogo, thus it was positively feasible to closely observe their campaign creation for collecting targeted evidences. Their campaign project, Rilove Smart Ring, is a gesture-based wearable device being able to control music, camera, phone calls and even home appliances. Supported by 68 investors investing a total of US\$1,935 as of the expiration date, this campaign finally failed to reach its US\$20,000 goal and was therefore terminated. Last but not least, the authors of this research taught at NUA, the Students' university, and had obtained the Students' consents to the investigation and interview.

Formulation of the Evidence-Collecting Procedure

In order to collect systematic evidences, this task was performed in six steps based on the model of creative thinking: declarative knowledge, procedural knowledge, motivation, problem finding, ideation and evaluation. As shown in Table 1, a framework, in which the aim of investigation and the interview questions for each step are defined, is developed:

- **Step for Declarative Knowledge:** At the first step, declarative knowledge including valued and neglected knowledge gained or missed by Students in

Table 1. The case interview framework

	Aim of Investigation	Interview Questions
Declarative Knowledge	Describe valued and neglected knowledge in China's IDE system.	<ul style="list-style-type: none"> • Did you learn any kind of design knowledge at the university which contributed to the campaign creation? If yes, please describe it/them. • Did you learn any kind of design knowledge outside the university which contributed to the campaign creation? If yes, please describe it/them. • Was there any kind of design knowledge which you intended to apply but failed to, or about which you had to consult others? If yes, please describe it/them.
Procedural Knowledge	Describe the Students' procedural knowledge.	<ul style="list-style-type: none"> • Was there an explicit instruction that guided your campaign creation process? If yes, please describe it/them. • Please describe your campaign creation process. In other words, how did you create your campaign? • Was there any strategy applied in your campaign creation process? If yes, please describe it/them.
Motivation	Describe the intrinsic motivation and/or extrinsic motivation of the Students.	Please describe your motivation for the campaign creation.
Problem Finding	Describe the Students' problem-finding process.	<ul style="list-style-type: none"> • What was the starting point of your campaign creation? • How did you identify and define a problem?
Ideation	Describe the Students' divergent ideational process and/or associative ideation process.	<ul style="list-style-type: none"> • Please describe the ideational process of your campaign creation. • How many ideas were generated in your divergent ideation process—if you experienced such a process?
Evaluation	Describe the Students' evaluation process.	<ul style="list-style-type: none"> • Was there any evaluation process for your campaign creation? If yes, please describe it/them and answer the following question. • Was there any modification after the evaluation? If yes, please describe it/them.

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current China's IDE system was surveyed. The valued knowledge stands for elements of fact-based information such as 3D modelling software, product engineering, and material applications, which could effectively promote the campaign creation. The neglected knowledge presents a series of elements in design process, wherein the Students intended to apply them but failed; or they had to consult others for these elements.

- **Step for Procedural Knowledge:** At the second step, procedural knowledge of the Students was investigated mainly based on their specialized experience. Procedural knowledge instructs them to organize campaign creation and apply creativity strategies during design.
- **Step for Motivation:** In order to interview the Students' possible intrinsic motivation and extrinsic motivation, the third step was organized in this framework.
- **Step for Problem Finding:** At the fourth step, the possible problem-finding process of the Students was surveyed. Does problem discovery only exist when a problem works as a starting point of campaign creation? To some extent, the quality of problem discovery depends on how a creator identifies and defines a problem.
- **Step for Ideation:** The fifth step aims to describe the Students' ideational process of campaign creation, which may be divergent or associative. In a possible divergent ideational process, the quantity of generated ideas is taken as one of the most important influential factors.
- **Step for Evaluation:** Step six aims to investigate a possible evaluation process of the Students, wherein the modification might be set up to improve the campaign creation.

COLLECTING THE EVIDENCES

Through summarizing the results of the interview with the Students, the detailed case evidences are listed in Table 2:

- **Evidences of Declarative Knowledge:** In terms of declarative knowledge supporting campaign creation, the Students declared that they learned digital modelling skill, products styles definitions, and ergonomics principle at school, and referring to online examples for product style and building visual communication outside school. However, current China's IDE provides deficient information with regard to engineering structures, prototypes building, interactive hardware or software.

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Table 2. Case interview evidences

	Detailed Items	Evidences
Declarative Knowledge	Design knowledge learned at school	<ul style="list-style-type: none"> • CAD skills, especially in digital modelling. • Definitions of product styles. • Ergonomics.
	Design knowledge learned outside school	<ul style="list-style-type: none"> • Designing a stylish product through referring to online examples. • Visualizing a campaign for communication through referring to online examples.
	Design knowledge that is deficient	<ul style="list-style-type: none"> • Designing product engineering structures. • Building product models or prototypes. • Developing hardware or software related to interactive design.
Procedural Knowledge	Explicit instruction	N/A
	Campaign creation process	<ul style="list-style-type: none"> • Designing product function, form and business model. • Evaluating design through investigation. • Modifying design. • Building prototype.
	Applied strategy in the process	<ul style="list-style-type: none"> • Brain storming. • Online investigation template.
Motivation	Intrinsic motivation	<ul style="list-style-type: none"> • Satisfying personal interests. • Pursuing a sense of accomplishment. • Exploring future career opportunity.
	Extrinsic motivation	<ul style="list-style-type: none"> • Investment from partner. • Possible economic benefits.
Problem Finding	Starting point of campaign creation	<ul style="list-style-type: none"> • Defining a ring combining technology and fashion.
	Definition of problems	N/A.
Ideation	Ideational process	<ul style="list-style-type: none"> • Generating product form. • Altering product function until confirmation.
	Divergent ideation process	Generating eight divergent ideations for product style.
Evaluation	Evaluation process	<ul style="list-style-type: none"> • Self-evaluation. • evaluating product form and function by conducting tests on a small number of users.
	Modification process	Modifying product form and function through self-evaluation and testing.

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- **Evidences of Procedural Knowledge:** According to the Students' description, explicit instruction was not included in their procedural knowledge. In order to create a product campaign, the Students scheduled and practised a flexible creation process: designing multiple elements of product, evaluating product design according to investigation, modifying final outcome, building full function prototype. Also, the Students applied strategy in the process, including brain storming and template-based online investigation.
- **Evidences of Motivation:** Basically, interview information showed that the Students worked with clear intrinsic motivation, such as satisfying personal interests, pursuing a sense of accomplishment, and exploring future career opportunity. Because of investment from partner and possible economic benefits, the Students' campaign creation also was driven by extrinsic motivation.
- **Evidences of Problem Finding:** The Students started the campaign creation from defining a ring combining technology and fashion, but not a problem that needs to be solved. Namely, in the process of creativity, the Students ignored problem finding that an essential component of creative thinking system.
- **Evidences of Ideation:** In order to create a high quality campaign, the Students carried out an ideational process in which product form was generated and its function was altered until confirmation. This ideational process producing eight diverse ideas for product style is typically divergent.
- **Evidences of Evaluation:** The Students applied a series of evaluation process, first of all, self-evaluation. In addition, conducting tests on a small number of users, the Students evaluated product form and function. According to self-evaluation and testing, the Students furthermore modified product form and function.

ANALYZING THE EVIDENCES

In order to evaluate the Students' creative thinking, the above evidences were analyzed in the following six sections:

1. **Declarative Knowledge Analysis:** The Students' declarative knowledge was concentrated in the field of design aesthetics. And online resources also provided access to its development. However, a lack of practical knowledge resulted in the Students' failure to build a truly applicable prototype.

2. **Procedural Knowledge Analysis:** Basically, the Students received no explicit instructions. Despite the application of some strategies, a poorly designed procedure still complicated their campaign creation.
3. **Motivation Analysis:** The Students owned clear intrinsic and extrinsic motivations.
4. **Problem Finding Analysis:** The Students didn't build the campaign based on problem finding. Consequently, this campaign lacked adequate attraction to the target participants, because specific problems were not solved.
5. **Ideation Analysis:** The Students struggled to generate a complete ideation because of ambiguous function definition. Divergent thinking rather than associative thinking was applied in their ideational process.
6. **Evaluation Analysis:** The Students consciously evaluated the campaign, but disorderly evaluation process might obscure the guideline for modification.

In summary, the above analysis illustrates how the Students carried out product design campaigns. Another research question, why the Students failed to carry out a successful campaign, also is effectively explained. There are five main defects in the Students' current creative thinking: deficient knowledge about prototype construction, poorly designed procedure, poorly defined target problem and solution, ambiguous ideational definition and disorderly evaluation process, all of which acted as the obstacles to their crowdfunding success. Associative thinking was additionally evaluated to assist with the ideational process. Overcoming these drawbacks requires reasonably developing creative thinking.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The first limitation lies in the research scope: this research only targets crowdfunding, and other types of designers' micro-entrepreneurships in China are not involved. The second limitation is that the research design in this paper is made for single sample. Yin (2013) defined this type of design as single-case holistic design and also presented the other three more complex types of case study design: single-case embedded design, multi-case holistic design and multi-case embedded design.

In terms of future research, crowdfunding will still be the focus of our research, considering that this type of micro-entrepreneurship is highly accessible to Chinese designers. In addition, an integrated research will be designed to gain a deeper comprehension of the relationship between crowdfunding success and creative thinking

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elements. Multiple cases, particularly successful product-design campaigns, will be included in future research. Last but not least, both current and future findings will be employed to develop university-level curricula for China's IDE. Experimental courses, which aim to enhance the creative thinking of designers, will expectedly be carried out and evaluated at NUA.

CONCLUSION

In the context of China's advocate of designers' micro-entrepreneurship, especially AON crowdfunding, domestic IDE and prior research can hardly produce ideal solutions to the emerging problems. How to effectively carry out a product design campaign? Which factors determine the success or failure of a fund-raising campaign? In order to answer these questions, a case study on a Chinese students' design team, which launched a crowdfunding campaign, was designed and conducted herein. In this study, evidences of the campaign creation process were collected based on the model of creative thinking. Analysis of the evidences revealed that the failure in the Students' fund-raising campaign could be attributed to creative thinking obstacles: deficient knowledge about prototype construction, poorly designed procedure, poorly defined target problem and solution, ambiguous ideational definition and disorderly evaluation process. This result objectively reflects the main defects of current China's IDE. Therefore it is required that related curricula and courses, which aim at improving the design entrepreneurs' creative thinking, should be positively developed. To be more specific, designers involved in micro-entrepreneurship should possess the strong abilities of building prototypes, following the design procedure, finding and solving problems, defining ideation and applying the evaluation methods. In future research, further insights into the relationship between the crowdfunding result and the elements of creative thinking will be developed, and possible research findings might be transformed into university-level curricula for China's IDE.

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KEY TERMS AND DEFINITIONS

AON Crowdfunding Model: A type of crowdfunding model in which project founders can gain all money if total funds meet expected minimum on expiration date, otherwise their campaigns must be terminated and all invested capital will be returned to investors. It is believed that AON fundraising campaigns involve substantially larger capital goals, and are much more likely to be successful at achieving their goals, because AON projects typically provide more detailed information on the campaign.

Campaign Creation: A process of creating a project for raising funds. A campaign is any series of actions or events that are meant to achieve a particular result, like an advertising campaign of television commercials and Internet ads that tries to convince kids to buy bubble gum-flavored toothpaste.

Commercial Wealth: Abundance of valuable resources or valuable material possessions in commerce.

Creative Thinking: A mental process of activity leading to original and adaptive ideas, solutions, or insights. Creativity is a phenomenon whereby something new and somehow valuable is formed. The created item may be intangible or a physical object. Creative thinking is a way of looking at problems or situations from a fresh

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perspective that suggests unorthodox solutions. Creative thinking can be stimulated both by an unstructured process such as brainstorming, and by a structured process such as lateral thinking.

Crowdfunding: A form of alternative finance, which has emerged outside of the traditional financial system. The practice of funding a project or venture by raising monetary contributions from a large number of people, today often performed via internet-mediated registries, but the concept can also be executed through mail-order subscriptions, benefit events, and other methods.

Industrial Design Education: A process of design applied to products being manufactured through multiple techniques. Industrial design is a process of design applied to products that are to be manufactured through techniques of mass production.

Micro-Enterprise: A small business generally employing 10 people or less, and have a capital asset of less than PhP 3,000,000. Internationally, most microenterprises are family businesses employing one or two persons.

Micro-Entrepreneurship: A process of starting a small scale business or other organization. The basis of micro-enterprise in the U.S. is micro-entrepreneurship, recognizing a fundamental right of people to apply their individual talents, creativity and hard work to better their lives.