

Technopreneur Education and Incubation: Designing IT Technopreneurship Graduate Program

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ABSTRACT

This paper describes the design of a post-graduate program in Information Technology (IT) Technopreneurship that blends practice with theory with the primary objective of producing successful graduate IT technopreneurs. The program is designed based on close partnership between the university, the industry, and the government to ensure young and intelligent IT enthusiasts to obtain the necessary entrepreneurship knowledge and skills as well as to provide initial seed capital and adequate funding for start-offs. With the close industry linkage, business opportunities will be made available for the young technopreneurs to gain experience and exposure in the real-life environment as well as fulfilling part of the industry's social obligation and support. The duration of the program is four semesters or two years leading to the Masters of Science in IT Technopreneurship. The program consists of four components i.e.; Self Development and Competencies through specialised technopreneurship development training, University-Industrial Linkage and intensive incubation phase to develop and commercialise IT products, Knowledge and Skill on IT and Business through Teaching Factory and Mentoring and/or solutions using the concept of Continuous Supportive System. Candidates will be selected among those who graduated with at least a 3.0 cumulative grade point average. They will have to go through a screening process in the form of an interview and aptitude test in order to get the right participants with the right attitude, having entrepreneurship characteristics, and those who possess high motivation, perseverance and interest. Major part of the curriculum are Core IT, Core Entrepreneurship, Experiential Learning and Development. One of the criteria for graduation is students will have to secure a total sales of not less than RM100,000.

INTRODUCTION

Thousand of students in different kinds of field and specialization graduated every year. Many countries have now recognized that entrepreneurship as a possible solution to rising unemployment rates and as a recipe for economic growth. There is much discussion about the possibility of developing entrepreneurs. The debate on whether entrepreneurs can be taught still rears its head from time to time. Some biographies of successful entrepreneurs often read as such people entered the world with an extraordinary genetic endowment. But there are almost as many counter stories of those who hit on the entrepreneurial jackpot without the benefits of genetics. It is clear that these traits and genetics do not fall into any sensible pattern for start-up successes. Many factors are unrelated to genetics and support the counter paradigm that "entrepreneurs are often made, not born" (Garavan et. al., 1994).

However, while many of the aspects of entrepreneurship can be taught, it also requires a certain flair or attitude towards taking risks. There are some idiosyncratic competences that cannot easily be taught in classrooms (Erikson, 2002). According to Lee, Miller et. al. (2000), incubators can play four different venture habitat replication roles: a) transaction cost reduction, b) filling missing gaps, c) replicating the venture habitat on a micro-level, and/or d) accumulating organizational learning. Therefore, the most effective way for individuals to develop a strong sense of distinctive competence is through mastery experience. For that reason, realistic hands-on training through incubation internships should contribute to shape their entrepreneurial competence (Wood and Bandura, 1989).

In Malaysia, many educated entrepreneurs are starting up high tech small business. Based on a survey conducted by Hassan et. al. (2002) on 86 high tech businesses in Malaysia, it was found that more than 80 percent of the owner-managers have at least first degrees and most have achieved an average annual turnover growth of more than 26 percent over a three year period. Conversely, in the global competitions, without sufficient business, precise development training, experiential learning, industrial internship, and management exposure would these technical entrepreneurs can grow larger and/or perform well? With the believe that technopreneurs are not born but can be taught and made, the Universiti Utara Malaysia (UUM), Malaysian government, and industries perform close partnership in order to develop the IT Technopreneurship Graduate Program Model.

METHODOLOGY

The Master of Science Technopreneurship (MOST) Program Model is the third edition of the Technopreneurship Graduate Program in Malaysia. There are several methods used by the researchers in order to design the model, includes;

1. Personal involvement in the restructuring process of the SKIT program (*the second edition of the IT Technopreneurship Program*). This was done to gain the real experiences and to determine the specific needs for technopreneur development through technopreneur education and incubation program.
2. A representative case study and 36 months observation was used to illustrate the effectiveness of entrepreneurship training and development.
3. Informal interviews were held with ex-graduates programs to understand the specific problems faced.
4. Personal involvement in every meeting and discussion sessions involving government entity, such as Council of Trust for Indigenous People (MARA) and Malaysian Development Corporation (MDC), Industries and the university in the process of restructuring the technopreneurs development program.
5. An extensive study of available literature on entrepreneurship and related subject fields. Based on this literature study, an attempt is made to construct a conceptual framework to be used in designing the technopreneur education and incubation program.

The first edition of Technopreneur Education and Incubation Program started on November 1998. It was conducted in an incubator located at Universiti Teknologi Malaysia (UTM). This program was performed on close partnership with UTM and MARA. There are three main components in this program i.e.; Core Software Engineering, Core Entrepreneurship and Development Training. The emphasis of this program is to develop Software Engineering Entrepreneurs. However, only three out of fifteen of the program's graduates actually became technopreneur.

In order to overcome the failure of turning majority of the graduates into technopreneurs, by December 2000, the second edition of this program has been initiated. The focus of the program is not only on Software Engineering but also to generate technopreneurs on IT services. Yet, without industrial collaboration and continuous supportive system for the first start-up, the results remain the same. Only one out of fifteen of the graduates actually became technopreneur, another two involved in family business, while the rest became academicians.

Unable to determine the cause of the letdown, since end of 2002 several series of discussions were held between UUM, MARA and MDC in order to come out with solution to mitigate this problem. Meanwhile, to understand the specific problems faced by ex-graduates programs, informal interview was conducted with seven graduates of first edition program and nine graduates of the second edition program. The feedbacks come out with three main answers i.e.; lack of industrial exposure, inability to assimilate theories with real practice, and lack of potential commercial ideas to be commercializes. In order to overcome these problems, 18 IT related industries were identified and appointed as a steering committee for this program. Based on close partnership and industrial linkage, the new model of the Technopreneurship (IT) was designed.

FINDINGS

With close and smart partnership, government and industries agree to give full support on this program. Government entity such as MARA has signed MOA with the UUM to support the program by providing sponsorship and education facilities such as incubator development, personal laptop and living allowance to all selected candidates. Another government entity i.e., MDC and Industries have agree to support this program through industrial internship and mentoring methods. The aim of the program is to generate IT Technopreneurs in Software Engineering, IT Services & Consultancies and Multimedia Development. With the mission to gain the knowledge and profit through advancement in technology, this program has two main objectives i.e.:

1. To generate skilfulness, energetic and spirited graduates technopreneurs to involve in the world class IT business, and
2. To originate bright, creative, innovative and outstanding technopreneurs in IT business management.

Through thorough investigation and experiences in restructuring the process of IT Technopreneurship program, the researchers have identified the most important components and the implementation process in designing the MOST program model in order to achieve above mission and objectives.

The Components

Incubation program hope to make greater contributions to the success of start-up firms, and can make more information accessible than other forms of small business assistance. However, to ensure young and intelligent IT enthusiasts to obtain necessary entrepreneurship knowledge, skills, motivation and competencies, the incubation

program component have to encompass four main aspects i.e.; Self Development and Competencies, Industrial Linkage, Teaching Factory and Mentoring, and Continuous Supportive System.

a) Self Development and Competencies

This component will be implemented through three phases of experiential learning called Technopreneur Development Training (TDT), which will be conducted by selected consultants at particular training centre. It is compulsory for every candidate to attend the workshop and the development training sessions. The first TDT focuses on "Technopreneur Development and Competencies". The second TDT focuses on "IT Business Managements System", the third TDT focuses on "IT Business Strategic Planning and Managements" whereas the fourth focuses on with writing a viable potential Business Plan (BP). The relationship between the first component and its emphasis is shown in figure 1.

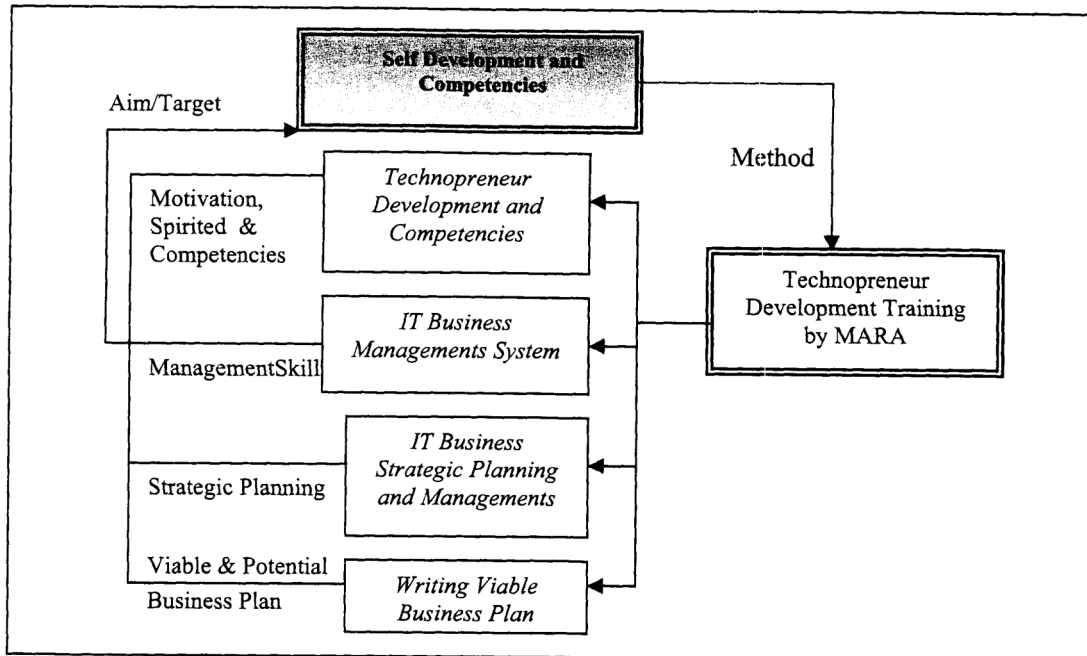


Figure 1: Self Development & Competencies component and the emphasis.

b) University-Industrial Linkage

Based on nurturing concept and industrial internship method, this component focuses more on IT project development, business management and commercialization skill, and business networking. Even though, the incubation process was applied since the first semester, in this component, the incubation processes will be more intensified. In addition, in this practical learning method participants will be exposed to the industries direct and indirectly by the internal and external industrial internship techniques. Figure 2 shows the relationship between the Industrial Linkage Component and its focus.

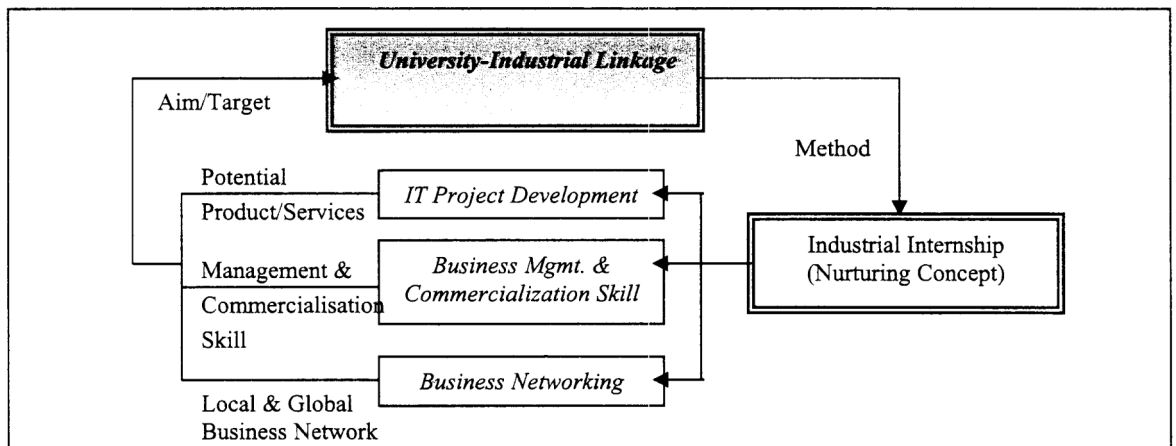


Figure 2: University-Industry Linkage and the emphasis.

C) Knowledge and Skill on Information Technology and Business

In this component, the implementation is based on *Teaching Factory and Mentoring* method. Teaching Factory mean that learning process will be performed in formal classes and lab to gain knowledge and skill in specific fields, and also through experiential learning (*learnt by practice*) to enhance knowledge and business cultures by involving in enterprise operations, seminars, workshops and other related activities. Meanwhile, under the mentoring method, every candidate will be placed under supervision of three mentors. The first mentor is an expertise from IT Faculty who will guide and monitor the participants from IT perspectives. The second mentor is an expertise from Business Faculty with a mission to guide and monitor the participants from business and entrepreneurial perspectives. On the other hand, the third mentor will be a specialist from related industries or venture capital organizations who will participate to help participants in the process of acquiring a real business experiences and commercialization skill. The relation between the component and its focuses is shown in figure 3.

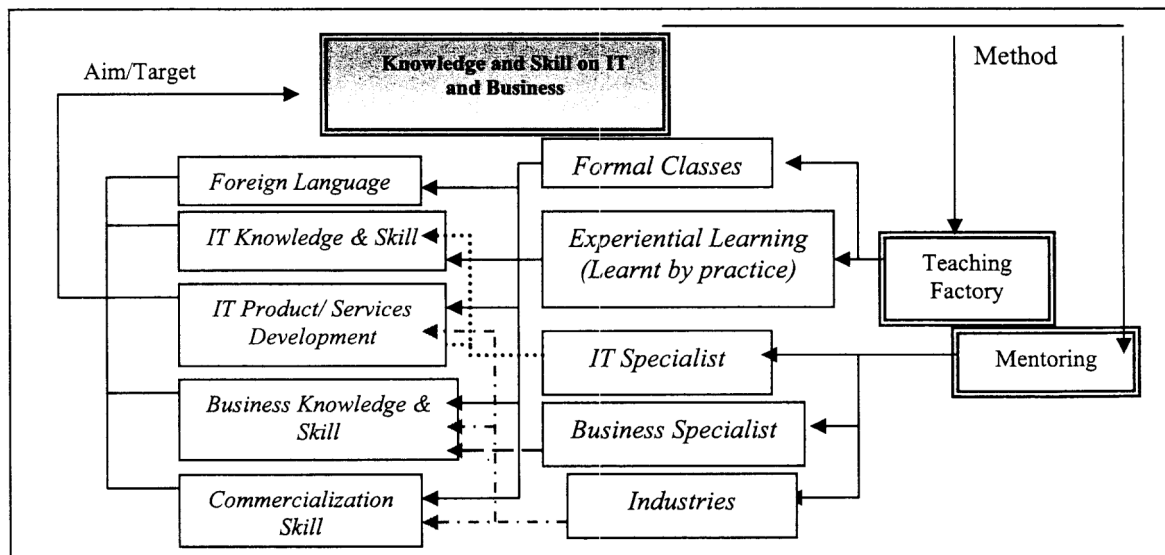


Figure 3: The relation between Knowledge and Skill component and the focuses

D) Continuous Supportive System

This component focused on supportive action after the graduation and incubation process. Although the participants have finished their incubation phases and graduated from this program, to ensure they are survived in the real business, all young technopreneurs are still in university and industries supervision for five years after they have launched their business. For monitoring and supporting purpose, a comprehensive technopreneur database will be developed. The relationship between the component and its purpose shown in figure 4.

Figure 5 represent a combination of MOST components. This figure shown that the program is designed based on close partnership between the university, the industry, and the government. With the close partnership linkage, young and intelligent IT will be able to obtain the necessary entrepreneurship knowledge, skills and business opportunities. At the same time, these opportunities will be made available for them to gain experience and exposure in the real-life environment as well as fulfilling part of the industry's social obligation and support.

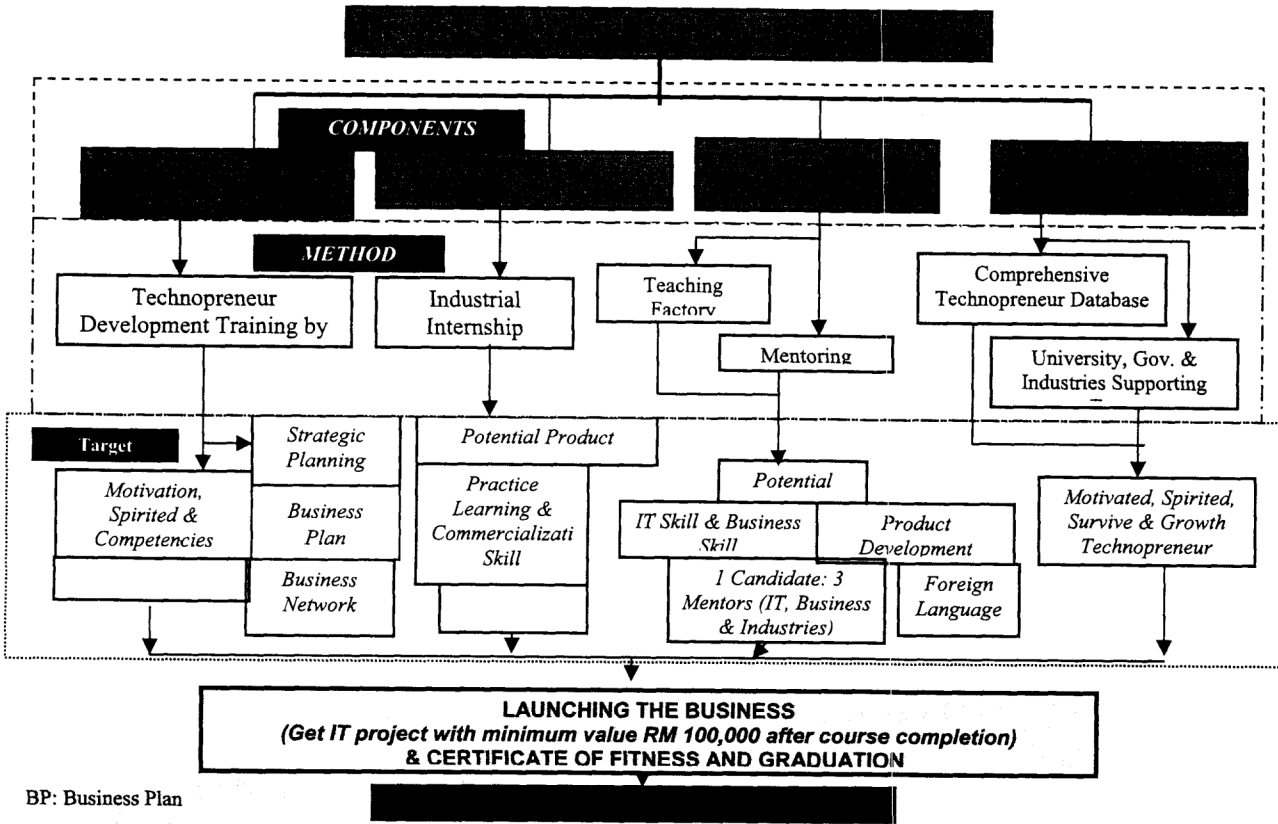


Figure 5: Masters of Science Technopreneurship (IT) Model

The duration of the program is four semesters or two years leading to the Masters of Science in IT Technopreneurship with 37 total credits. Major part of the curriculum is Core IT, Elective IT, Core Entrepreneurship, Experiential Learning, and IT Project Development and Commercialisation. In addition, participants also need to take two papers of one foreign language other than English. Three elective subjects will be focussed on three specializations in IT field, i.e.: Software Engineering, Multimedia, and IT Services and Consultancy. Participants can choose either one of this subjects based on their interest. Participants from none IT or Computer Science basis are required to take four IT prerequisite subjects before registering the core and elective subjects.

Specifically, the TDT will be conducted during the semester-break. In additions, although the incubation processes and industrial internship instigates since semester I, these activities will be intensified beginning semester III. Beginning from semester III, participants will focus on writing Business Plan, Project Proposal and Project Development, which intensively engage internal and external industrial Internship. A detail of the curriculum is shown in Table 1 and the percentage of learning process is provided in Table 2.

Curriculum Category	Number of Subject	Total Credit
Prerequisite Subjects (For None IT Candidates)	4	Audit
Elective Foreign Language	2	Audit
Core IT	4	12
Elective IT	1	3
Core Entrepreneurship	3(Plus TDT 1, TDT2, TDT3 &TDT4)	6
Product/ Services Development & IT Business (Internal Industrial Internship & External Industrial Internship)	Project Proposal, External Industrial Internship & Final Project	16
Total Credit		37

Table 1: Masters of Science Technopreneurship (IT) Curriculum

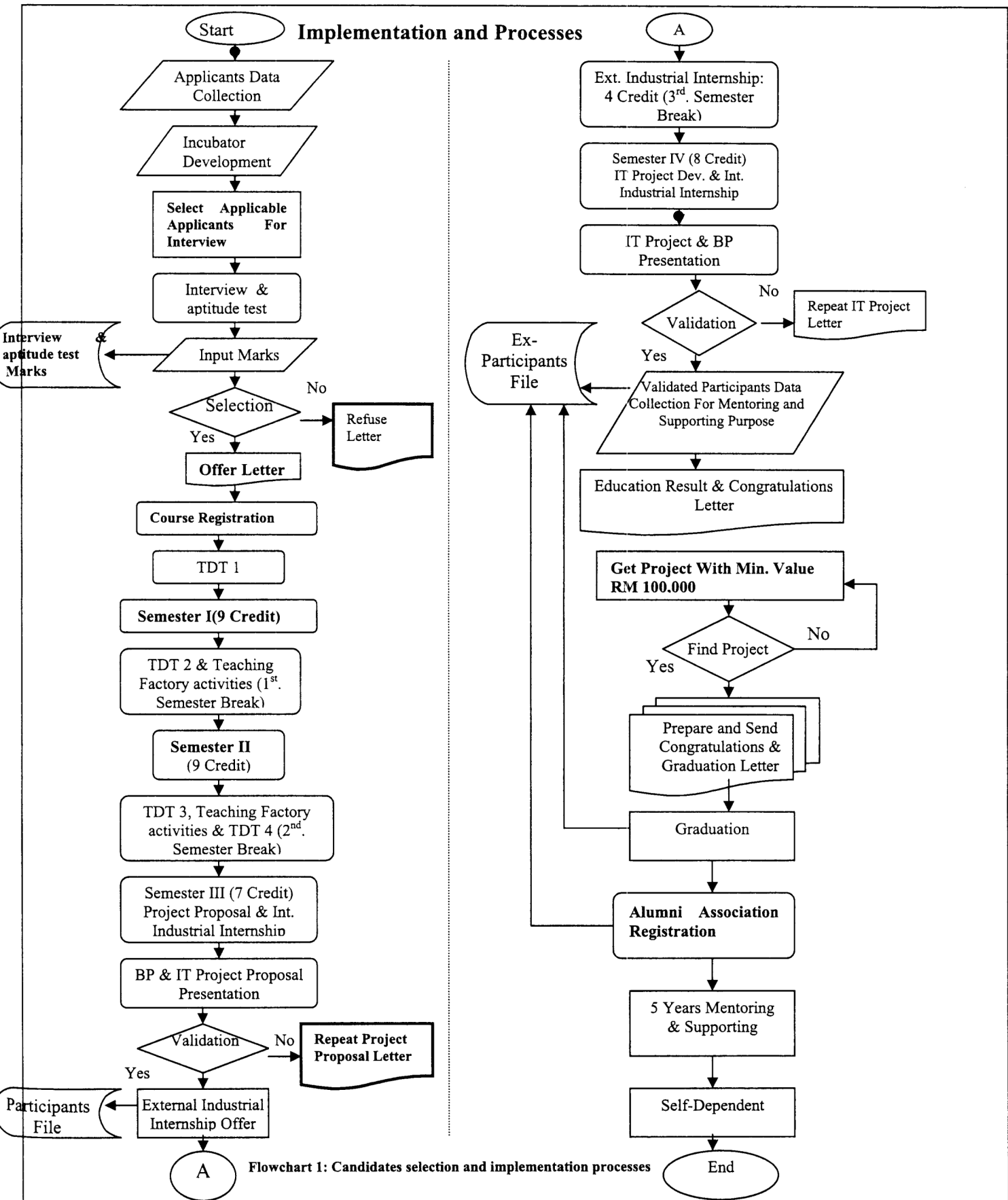
NO.	SUBJECT AREA	CALCULATIONS	TOTAL HOURS	PERCENT AGE
1.	Formal Teaching Factory: Lecturing (All subject not inclusive External Industrial Internship & Final Project)	21 credit hours x 14 weeks (1 semester: 14 weeks)	294	19%
2.	Formal Teaching Factory: Mentoring	45 hour x 4 semester	180	12%
3.	Technopreneur Development Training	38 days x 10 day hours	380	25%
4.	Industrial Internship & Project Supervision <ul style="list-style-type: none"> • Internal Industrial Internship (TZ6014 & TZ6038) • External Industrial Internship (TZ6024) 	12 credit hours x 14 weeks 51 working days (9 weeks) x 8 day hours	168 408	37%
5.	Informal Teaching Factory (Added activities during semester break) <ul style="list-style-type: none"> • Industrial Visit • Technopreneur Seminar 	3 days x 8 day hours x 4 semester 3 days x 8 day hours x 4 semester	96 96	7%
Total Hours			1532	100%

Table 2: Percentage of learning process

The Implementation and Process

Candidates will be selected among those who graduated with at least a 3.0 cumulative grade point average. They will have to go through a screening process in the form of an interview and aptitude test, in order to get the right participants with the right attitude, having entrepreneurship characteristics, and those who possess high motivation, perseverance and interest. One of the criteria for graduation is students will have to secure a total sales of not less than RM100, 000. Flowchart1 show steps of candidates' selection and the implementation processes of the program.

Implementation and Processes



Flowchart 1: Candidates selection and implementation processes

DISCUSSION AND CONCLUSION

Experience and knowledge gained in the first and second program of technopreneurship have been fully utilized in order to come out with this third edition. Through smart partnership between UUM, the government entities and related industries, series of discussion have been conducted to ensure all weakness and flaws are taken into consideration to ensure the success of the program. Meanwhile, to ensure the participants could exploit every possible entrepreneurship experience and skills, they will be placed under supervision of experts in IT, business management and industries. For that purpose, 18 companies with good prospect were chosen and have agreed to become the steering committee and act as mentors to the participants. To ensure that all the participants will become a successful technopreneur, their graduation are subjected to their success to secure a project with minimum value of RM100,000. The mission and objective of this program are not only to produce successful businessmen but also to ensure that they became a world-class technopreneurs. Even though this is the third edition of such program in Malaysia and have been extensively revised to cope with limitations of the first and second edition, it will still undergo re-engineering process from time to time to ensure greater success in developing world class technopreneurs.

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