

A Competence-Based Curriculum Design for Entrepreneurship Study Program

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ABSTRACT

Indonesia is affected by global crisis. Increasing the number of entrepreneurs is one of many solutions to increase the economic growth in Indonesia. The number of entrepreneurs in Indonesia to leverage the economic growth is still limited. Entrepreneurs can be prepared through an Entrepreneurship Study Program. Entrepreneurship Study Program attempts to create qualified entrepreneurs who have relevant competences. In order to create a qualified entrepreneurs, the Entrepreneurial Studies Program requires a competency-based curriculum that will support the educational process and provide all the necessary to become future entrepreneurs who can survive through a global challenge. This research aims to design a competence-based curriculum for entrepreneurial study and uses Quality Function Deployment (QFD) as the major tool to design the competence-based curriculum. From the QFD process, this research finds core and elective courses for the Entrepreneurship Study Program. The result shows the competences covered by the courses and sequence, credits, and teaching methods for each course. The competences prepared the potential entrepreneurs can be achieved through specific courses which can be acquired within 8 semesters.

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To improve the prosperity of a country, a country needs to improve its economic situation and economic power. There are many ways to achieve those things, for example improving the foreign exchange, improving export

activities, etc. However, the global economic situation becomes worsen and it affects entire countries. Most of the countries suffer bad economic situation and they need to get back to previous state.

When one country cannot fully depend to other countries anymore, it means that one should depend to itself in order to survive. If a country wants to survive by itself, it needs to strengthen its own capabilities or power. A country needs 2% of its citizens as entrepreneurs to maintain or even develop the economic power and situation of the country. It can be concluded that developing entrepreneurship inside the country is a form of strengthen country's capabilities or power and furthermore it can fix the economic situation and improve/develop it.

However, one country needs not just a big number of entrepreneurs. In fact, it needs entrepreneurs that can face national and even global challenges. In that way, those entrepreneurs can survive in national and global markets and furthermore they can give contributions to improve the economic situation or power of their country.

Indonesia is a country, which also affected by the crisis of global economic situation. Unfortunately, the number of entrepreneurs in Indonesia is still way below 2% and there is still lack of government involvement in encouraging entrepreneurship. Therefore, Indonesia is in a huge need to encourage the entrepreneurship development in its own country. Thus, business school in Indonesia starts to grow in order to create new entrepreneurs that qualify and can answer national and global market challenges and in the end they can give contributions to recover and develop the economic situation/power of Indonesia.

As the entrepreneurship academic program is created, it also requires a competence-based curriculum that will support in education process. This curriculum will provide all the requirements to become the next entrepreneurs in Indonesia that can survive in national market and hopefully global market.

This research uses Bandung Institute of Technology as the source of research study and attempts

to design a competence-based curriculum for Entrepreneurship Study Program in order to create new entrepreneurs with qualified competences. This curriculum is made based on the needs of Academic Program as the provider, entrepreneurs, and students as the customers/users. All the needs are collected through interviews with Academic Program, entrepreneurs, and students. Furthermore, this curriculum will be able to provide all the competences that are needed for an entrepreneur and finally it can help 'creating' entrepreneurs that can conquer national and global markets challenges.

In order to design an undergraduate academic program for entrepreneurship area, this paper uses the principle of Total Quality Management (TQM). The major tool that will be used for this research paper is Quality Function Deployment (QFD) as it is an effective tool to translate customer expectations into product or service features. QFD principles will be applied to develop the undergraduate education for Entrepreneurship Study Program.

Entrepreneurship Education

The word entrepreneur derives from the French word "entreprendre", means, "to undertake". Entrepreneur itself is a catalyst for economic change who uses purposeful searching, careful planning, and sound judgment when carrying out the entrepreneurial process (Kuratko, 2004). Meanwhile, entrepreneurship is a process of innovation and new-venture creation through four major dimensions (individual, organizational, environmental, process) that is aided by collaborative networks in government, education, and institutions (Kuratko, 2004). Along with outreach activities with entrepreneurs and entrepreneurial research, entrepreneurship education is one of three major areas that most of the university centers for entrepreneurship have been focused on.

There are some examples of research findings that show developments in entrepreneurship education and research in the past few years.

For example, Venture financing; including both venture capital and angel capital financing as well as other innovative financing techniques, emerged in the 1990s with unprecedented strength, fueling another decade of entrepreneurship (Amit et al., 1998). Other research explains that Intrapreneurship (that is, entrepreneurship within large organization) and the need for entrepreneurial cultures have gained much attention during the past few years (Kuratko, 1996). Entrepreneurial entry strategies have been identified that show some important common denominators, issues, and trade-offs (Ireland et al., 2001). The great variety among types of entrepreneurs and the methods they have used to achieve success have motivated research on the psychological aspects that can predict future success (Baron, 1998). The risks and trade-offs of an entrepreneurial career-particularly its demanding and stressful nature-have been a subject of keen research interest relevant to would-be and practicing entrepreneurs alike (McGrath et al., 1992). Women and minority entrepreneurs have emerged in unprecedented number. They appear to face obstacles and difficulties different

from those that other entrepreneurs face (Gundry et al., 2001). The entrepreneurial spirit is universal, judging by the enormous growth of interest in entrepreneurship around the world in the past few years (Zahra et al., 2001). The economic and social contributions of entrepreneurs, new companies, and family businesses have been shown to make immensely disproportionate contributions to job creation, innovation, and economic renewal, compared with the contributions that the 500 or so largest companies make (Reynolds, et al., 2001). Entrepreneurial education has become one of the hottest topics at U.S. business and engineering schools. The number of schools teaching a new-venture or similar course has grown from a few as two dozen 20 years ago to more than 500 at this time (Vesper et al., 1997).

The examples of those research findings show that entrepreneurship education is the current trend right now. Entrepreneurship education gives not only knowledge and soft skills regarding to entrepreneurship, but also builds the entrepreneurial spirit and mentality as an entrepreneur.

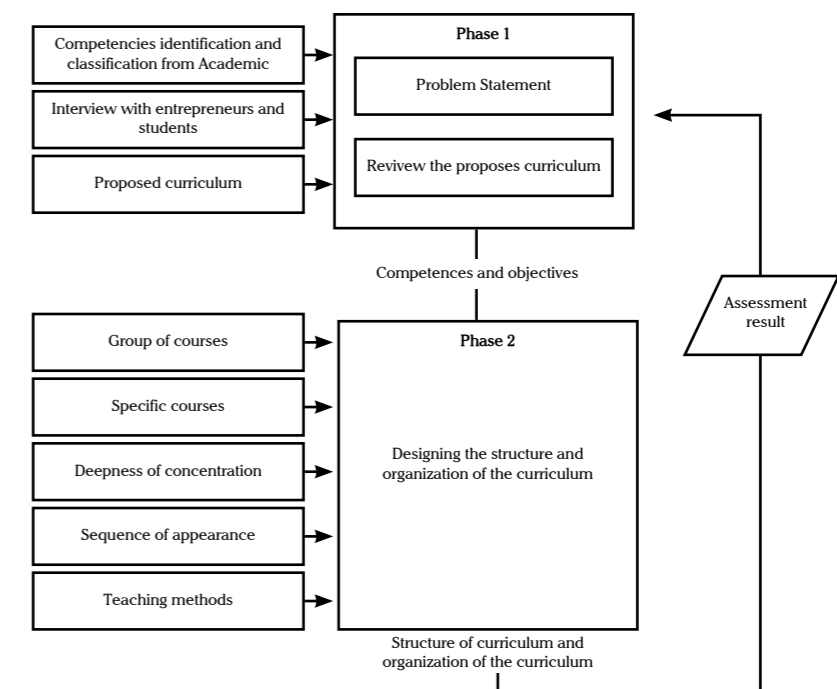


Figure 1. Curriculum Design Methodology

METHODS

Research Method

In order to design the competence-based curriculum, there are some steps that need to get through. It starts from designing the QFD model for competence-based curriculum. Based on the Grayson model of designing/developing a curriculum, basically there are three main phases in designing curriculum, which are problem statement; designing the structure and the organization of the curriculum; and lastly implementation and evaluation. However, from this model, there is no tool or method that can be used to review the curriculum.

Phase 1

In order to develop the curriculum, this research will use all the needs from Academic Program, entrepreneurs, and students that have been collected through interviews and QFD method. In this phase, the research defines the problem statement of the research itself and uses the proposed curriculum for Entrepreneurship Study Program to facilitate the data for QFD process. The inputs for this phase are interview results from students, entrepreneurs, and Entrepreneurship Study Program; and proposed curriculum. The interview was conducted to 10 students of Bandung Institute Technology, 3 entrepreneurs, and 2 persons from Entrepreneurship Study Program. The research limited to those numbers since the respondents gave a similar responds for the interview questions.

From the interview, the research gets the needs from Entrepreneurship Study Program, entrepreneurs, and students. All the needs from Academic Program, entrepreneurs, and students act as the Voice of Customer (VOC). In order to get the critical needs, the needs are required to be validated. It means the critical needs are the needs that are important to have according to Academic Program, entrepreneurs, and students (high level of agreement). Through validation, there will be some eliminated needs. It means, those eliminated needs are needs that have high level of disagreement

regarding to the importance to have between Academic Program, entrepreneurs, and students.

Before doing the validation process, Voice of Customer (VOC) that has been aggregated before will be grouped into several group of needs. Needs with high level of relationship or there are similarities will be put into particular group that can cover those needs. For instance, the needs of “production planning and control” and “product distribution” were aggregated under “supply chain” knowledge.

To achieve the critical needs, the researcher will measure the agreement between students, entrepreneurs, and Academic Program. The representatives of students, entrepreneurs, and Academic Program will be asked to rate all those aggregated needs according to the importance level of each competence.

Kendall’s coefficient of concordance (W) will be used to measure agreement on the rating of capabilities. The coefficient of concordance (W) can measure the strength of association among the ranking of items. The coefficient of concordance (W) also allows for multiple judges (rather than just two). $W \geq 0.7$ shows strong consensus; $W = 0.5$ shows moderate consensus; $W < 0.3$ shows weak consensus.

For this research, if the Kendall’s coefficient of concordance (W) is already higher than 0.7, the researcher will use all the competences that have been rated by student, entrepreneur, and Academic Program. If the Kendall’s coefficient of concordance (W) is still below 0.7, the representatives of students, entrepreneurs, and Academic Program will be asked again to rank all the competences in the list of competences with some competences that have sum rank around the mean value being removed. When the sum rank of a competence has a value around the mean value, it means that there is a disagreement between the rankers in ranking the competence. This process will be done until the

Kendall’s coefficient of concordance (W) is higher than or at least 0.7.

The remaining competences after the process of validation becomes the critical needs or the “what”.

Phase 2

In phase 2, QFD will be used in order to design the structure of the curriculum. The HOQ involved assessing the critical needs and how the needs have been incorporated into the curriculum design. As the preferred courses have been found, mapping preferred courses with customer critical expectations by using rating scheme to develop the relationship matrix is needed. The Entrepreneurship Academic Program determines the relationship values between critical needs

and program requirements. It provides a listing of how the program requirements represent each critical need on a scale 1, 3, and 9. The rating scale 1 represents a slight or possible relationship, 3 represents a moderate relationship, and 9 stands for a strong relationship.

Importance weight will be also determined by making the average of the importance weight of Academic Program, entrepreneurs, and students (for matrix 1). As for matrix 2 and so on, the importance weight will be the absolute weight from previous matrix. The absolute weight is determined by multiplying the cell numbers (row) by corresponding importance values (last row) for each program requirements.

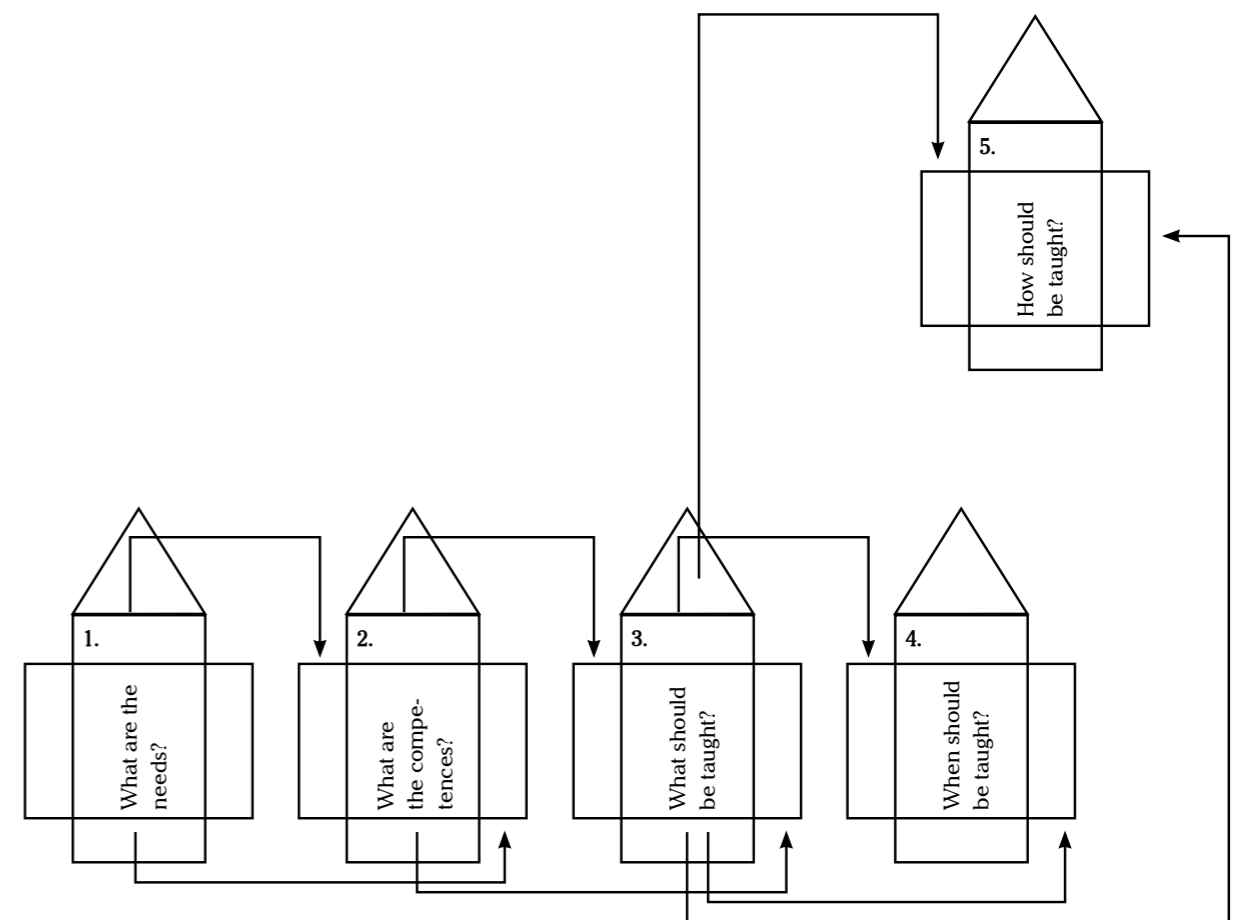


Figure 2. QFD Matrices

There are several steps of QFD to get through to define the curriculum for Entrepreneurship Study Program. The matrices of QFD that define the curriculum is based on Balderrama et al. (2007) with some modifications.

Matrix 1: correlates knowledge, skill, and personality (needs) with the competences needed.

Knowledge, skill, and personality are the competences that are needed as an entrepreneur. All the needs from entrepreneurs, students, and Academic Program are acting as Voice of Customer (VOC). After all the needs have been collected, the needs will be grouped based on the similarities of the needs. Later on, those groups of need will be through validation steps to eliminate needs that have high disagreement of importance. The validation steps are done by asking the rank of importance of the needs that have been stated before by the student, entrepreneur, and Academic Program. In this matrix, all the needs need to be transformed as the competences that are needed by the Academic Program to form the curriculum. All the needs will have slight relationship, moderate relationship, or even strong relationship with particular competences. As the result, all the needs will be transformed into competences that are useful for Academic Program to make the curriculum.

Matrix 2: correlates competences needed with groups of courses.

In this matrix, the competences will be correlated to the groups of courses. It is needed because the groups of courses are the part of competence-based curriculum. This matrix shows whether those competences can be achieved through particular groups of courses. Those groups of courses help on develop the competences.

Matrix 3: correlates the groups of courses with the studied contents (specific courses).

Each group of courses has several courses that can help on achieving the competences. Courses will be focused on specific competence to be achieved.

Basically, a curriculum for an Academic Program consists of these specific courses to be studied.

In this matrix, the relationship between specific courses and groups of courses also show the deepness of the studied content. If a course has a slight relationship with one group of courses, it means the course contributes 2 credits to the group of courses. If a course has a moderate relationship with one group of courses, it means the course contributes 3 credits to the group of courses. If a course has a strong relationship with one group of courses, it means that the course contributes 4 credits to the group of courses.

The courses come with different credits because each course has different materials to be studied and also different methods of learning or teaching. When a course covers a very important competence to be achieved, that course will have deeper materials in order to have the students get high level of understanding of the course and finally the students can achieve the competence. As the materials get deeper, the methods of teaching are getting more vary and the number of lecturing meeting is increase.

“2 (two) credits” shows that the number of materials to be learned is not many. The only teaching method that will be used is mastery learning. The course will be done only once a week and there will be no tutorial class.

“3 (three) credits” shows that the number of materials to be covered is quite many. The teaching methods that will be used are more than one, according to the materials of the courses. The course will be done at least once a week. If there is a tutorial class, the class can be done once a week. In the other hand, if there is no tutorial class, the class can be done twice a week.

“4 (four) credits” shows that the number of materials to be covered is many and need high level of concentration. The teaching methods that will be

used are more than one. A tutorial class is essential, besides the lecturing from the lecturer. The courses will be done at least twice a week.

Matrix 4: correlates the specific courses with the sequence of appearance of the studied contents (specific courses).

The curriculum is designed to prepare a qualified entrepreneur. To achieve that, the length of study has been designed with the programs. Based on the Academic Program, in the first and second year, the contents are focused on giving all preparations that are as the next entrepreneur. In the third and fourth, the contents are focused on training the students to become entrepreneur (incubation).

Therefore, specific courses need to be assigned to proper semester, according to the learning phase. Other than that, each course has been assigned with its own credit. It is important to correlates the courses (with credits) with the sequence of appearance of the specific contents because each semester has credits limit. The curriculum cannot put courses with the sum of credits exceed the limit of one semester total credits. Moreover, there are several courses that need to be studied as the requirement (basis) of other courses. It means there are several courses that needed to be taught in the first or second year, and the others in the third or fourth year.

Matrix 5: correlates the specific contents with the way they should be taught.

The curriculum is designed to prepare a qualified entrepreneur. To achieve that, the length of study has been designed with the programs. Based on the Academic Program, in the first and second year, the contents are focused on giving all preparations that are as the next entrepreneur. In the third and fourth, the contents are focused on training the students to become entrepreneur (incubation). Therefore, the teaching methods will different according to the learning phase. For example, in first and second year, the teaching method will be focusing mainly in mastery learning or perhaps study case. As in

the third and fourth, the teaching method will be focusing mainly in business simulation, firsthand experience, projects, etc. these teaching methods will also relates to the deepness of each specific course.

RESULTS AND DISCUSSION

Critical Needs

Through interview with 10 students, 3 entrepreneurs, and 2 persons from Entrepreneurship Academic Program, the needs can be gathered. Before validating all the needs, the needs (knowledge, skill, and personality) need to group based on the similarities of the needs. Table 1 shows the result of aggregated needs.

To validate all the needs that have been classified from the interviews with Academic Program, students, and entrepreneurs, the researcher will use Kendall's coefficient of concordance (W). In this step, there will be a representative from each Academic Program, students, and entrepreneurs. Those representatives will act as rankers and they will rank the competences that have been classified according to level of importance to them.

Kendall's coefficient of concordance (W) will help on measuring the agreement between rankers in assessing the level of importance of each need. The processes of ranking the competences will be done several times until the researcher get the W value more or at least 0.7.

The representatives have been asked to rank all needs that have been aggregated before. The representatives give higher rank to needs that they think are more important. If there are 13 needs to be assessed, the representative will give rank 13 to the most important need and rank 1 to the least important need.

The ranking process will be divided into three parts, which are knowledge ranking, skill ranking, and personality ranking.

Table 1. Result of Aggregated Needs

	Needs	Aggregated Needs
KNOWLEDGE	Market searching	Business market analysis
	Customer behavior	
	Market analysis	
	Making trend	
	Forecasting	Supply chain
	Distribution process	
	Product distribution	
	Production planning and control	
	Price decision	Financial analysis
	Cost analysis	
	Making income statement	Financial management
	Investment	
	Risk analysis	Business risk analysis
	Quality control	Product quality control
	Economics	Economics
	Idea realization	Business strategy
	Idea development	
	Innovation for product/service	
	Strategic planning	
	Business law	Legal law knowledge
	Making job description	Human management
	Organization development	
	Branding	Marketing communication
Advertising		
Production process	Operation management	
Choosing material		
Statistic	Statistic	
SKILL	Communication skill/ability	Interpersonal skill
	Inquiry skill	
	Inquisitive skill	
	Motivation skill	
	Human relation skill	
	Critical and integrative thinking	Research skill
	Strategy making	
	Making the process	
	Learning skill	
	Knowledge application	
	Analytical thinking	
	Quantitative thinking	
	Negotiation	Negotiation skill
	Generating idea	Making business plan
	Reading opportunities	
	Opportunity evaluation	
	Presentation skill	
	Global and multicultural perspective	Global and multicultural perspective thinking
	Network building	Network building
	Creative thinking	Creative thinking
	Marketing the product	Sales skill
	Selling skill	
	Adaptation skill	Adaptation skill
Teamwork ability	Teamwork ability	
Decision making ability	Decision making	
Abilities to face uncertainties	Facing uncertainties	
Continuous improvement	Continuous improvement	
Rhetoric	Rhetoric	

	Needs	Aggregated Needs
PERSONALITY	Creative/innovative	Creative/innovative
	Brilliant	
	Imaginative	
	Stickler	Unyielding
	Stubborn	
	Unyielding	
	Enthusiastic	Enthusiastic
	Leading	
	Independent	Leadership
	Confident	
	Loving	Loving
	Caring	
	Patient	Patient
	Realistic	Realistic
	Straight forward	
	Risk taker	Risk taker
	Opportunist	Opportunity
Perfectionist	Vision and attitude	
Ethics		
Responsible		
Willing to learn	Willing to learn	
Open minded		
Passionate	Passionate	

Table 2. First Ranking Result for Knowledge

No.	Knowledge needs	Student (R ₁)	Entrepreneur (R ₂)	Academic Program (R ₃)
1.	Business market analysis	6	9	12
2.	Supply chain	13	10	7
3.	Financial analysis	11	13	10
4.	Financial management	10	12	8
5.	Business risk analysis	7	11	6
6.	Product quality control	9	6	5
7.	Economics	3	2	1
8.	Business strategy	8	4	13
9.	Legal law	12	5	3
10.	Human management	4	3	9
11.	Marketing communication	2	7	11
12.	Operations management	1	8	4
13.	Statistic	5	1	2

Table 2 is the example of knowledge ranking process.

To calculate the Kendall's coefficient of concordance, the researcher needs to calculate the mean value and total standard deviation. If the object *i* is given the rank R_{ij} by judge number *j*, in which there are *n* total objects and *m* judges, therefore the total rank given to object *i* is:

$$R_i = \sum_{j=1}^m r_{ij}$$

The mean value of the total rank is:

$$\bar{R} = \frac{1}{2} m(n+1),$$

The sum of standard deviation, *S*, is:

$$S = \sum (R_i)^2 - n (\bar{R})^2$$

Therefore, the Kendall's coefficient of concordance (*W*), is:

$$W = \frac{12S}{m^2 (n^3 - n)}$$

Table 3. First *W*'s calculation for Knowledge

No.	Knowledge needs	Student (R ₁)	Entrepreneur (R ₂)	Academic Program (R ₃)	Rank sum (R _i)	Standard deviation
1.	Business market analysis	6	9	12	27	729
2.	Supply chain	13	10	7	30	900
3.	Financial analysis	11	13	10	34	1156
4.	Financial management	10	12	8	30	900
5.	Business risk analysis	7	11	6	24	576
6.	Product quality control	9	6	5	20	400
7.	Economics	3	2	1	6	36
8.	Business strategy	8	4	13	25	625
9.	Legal law	12	5	3	20	400
10.	Human management	4	3	9	16	256
11.	Marketing communication	2	7	11	20	400
12.	Operations management	1	8	4	13	169
13.	Statistic	5	1	2	8	64
SUM					273	6611

Table 3 shows the result of the Kendall's coefficient of concordance (*W*) of knowledge competences. The mean value of the total rank is:

$$\bar{R} = \frac{1}{2} m(n+1)$$

$$\bar{R} = \frac{1}{2} \times 3 \times (13 + 1) = 21$$

The sum of standard deviation is:

$$S = \sum (R_i)^2 - n (\bar{R})^2$$

$$S = 273^2 - 13 (21)^2 = 878$$

Therefore, the Kendall's coefficient of concordance (*W*), is:

$$W = \frac{12S}{m^2 (n^3 - n)}$$

$$W = \frac{12 \times 878}{3^2 (13^3 - 13)} = 0.53062$$

From the result, there is still a moderate agreement between rankers about the knowledge needs since *W* = 0.53062 (did not surpass 0.67). Therefore, the researcher removes the needs with rank sum close to the mean value since if the rank sum value has

Table 4. Critical Needs

Knowledge	Skill	Personality
Business market analysis	Interpersonal skill	Creative/innovative
Supply chain	Research skill	Enthusiastic
Financial analysis	Negotiation	Leading
Financial management	Opportunity/idea exploration	Patient
Business risk analysis	Making business plan	Risk taker
Economics	Presentation skill	Passionate
Business strategy	Global & multicultural perspective	
Operation management	Network building	
Statistic	Sales skill	
	Adaptation skill	
	Teamwork ability	
	Decision making ability	
	Abilities to face uncertainties	
	Rhetoric	

a same value with mean value; it means there is a total disagreement within the needs.

From the first ranking, there are three needs that have a rank sum close to mean value, which are Product Quality Control, Legal Law, and Marketing Communication. For the second process of ranking, the rankers will be asked again to rank the needs while Product Quality Control, Legal Law, and Marketing Communication have been removed from the list.

The ranking process will be done several times until the Kendall's coefficient of concordance surpass 0.7. The process goes the same with skill ranking and personality ranking.

After the validation of all competences, the researcher finds the critical needs that act as "the what" for phase 1 of QFD. Table 4 is the list of the critical needs ("the what").

QFD phases

To design the curriculum, the researcher will develop the HOQ with the help of critical competences and entrepreneurship strategies. The curriculum will be established through six phases.

Phase 1

This phase correlates the needs and the competences. Below is the table of ratings from each representative of student, entrepreneurs, and Academic Program. The ratings are averaged. The average ratings from representatives are defined as the QFD weighted factor (WFs) for Phase 1. Table 5 shows the result of averaged rating for Phase 1.

Table 6 is the matrix that correlates the needs and the competences. The competences come from the competences that want to be achieved by Entrepreneurship Study Program through the proposal of the curriculum.

From the HOQ phase 1 (Table 6), the result shows that "Entrepreneurship thinking" has the highest absolute weight and "Analytical thinking" has the lowest absolute weight. Therefore, "Analytical thinking" will get scale 1 as the lowest relative importance factor and "Entrepreneurship mindset" will get scale 13 as the highest relative importance. The relative importance works the same as weighted factors for next phase. Respectively, "Facing challenges and opportunities" will get scale 12, "Business model/design" will get scale 11, "Leadership and teamwork in a group" will

get scale 10, “Marketing knowledge” will get scale 9, “Financial knowledge” will get scale 8, “Creativity/innovation spirit for changes” will get scale 7, “Product/service development” will get scale 6, “Business implementation” will get scale 5, “Operations knowledge” will get scale 4, “Business dynamic skills” will get scale 3, “Human relation knowledge” will get scale 2.

The process of giving the scale goes the same with phase 2 until phase 5. Subject with highest absolute weight will get the highest scale and subject with lowest absolute weight will get the lowest scale. The rest will get the remaining scales respectively.

Phase 2

This phase correlates the competences and the group courses taken from the Dikti. There are 5 groups of courses, such as MPK (Mata Kuliah Pengembangan Kepribadian) group, MKK (Mata Kuliah Keilmuan dan Keterampilan) group, MKB (Mata Kuliah Keahlian Berkarya) group, MPB (Mata Kuliah Perilaku Berkarya) group, and MBB (Mata Kuliah Berkehidupan Bermasyarakat) group. From the HOQ phase 2, the result shows that MBB group has the lowest absolute weight and MKB group has the highest absolute weight. Therefore, MBB group will get scale 1 as the lowest relative importance factor and MKB group will get scale 5 as the highest relative importance. The relative importance works the same as weighted factors for next phase. Respectively, MPB group will get scale 4, MKK group will get scale 3, and MPK group will get scale 2.

Phase 3

This phase correlates group course with specific courses that can fulfill the critical needs. The specific courses are taken from the proposal of proposed curriculum for Entrepreneurship Study Program. The specific courses are “Mathematics for Business”, “Entrepreneurship Leadership”, “Business Statistics”, “Business Operations”, “Finance and Business Valuation”, “Marketing and

Branding”, “Business Risk Analysis”, “Business Economics”, “Product and Process Design”, “Business Ethics and Law”, Human Resources and Organization”, “Creativity and Innovation”, “Cost Accounting and Pricing”, “Business Planning”, “Commercializing Innovation”, “Business Modeling”, “Negotiation and Contract of Business”, “Business Initiation”, “Business Strategy”, “Religious Study and Ethics”, “Business Practice 1”, “Managing Start-up Business”, “International Business”, “Growing Business”, “Business Practice 2”, “Productivity Management”, “Entrepreneurship Theory”, “Revenue Management”, “Market Orientation”, “Business Investment”, “Project Management”, and “Applied Anthropology”.

From the HOQ phase 3, the result shows that there are several courses that have the same absolute weight. There are 32 specific courses with absolute weight starts from 2, 9, 12, 15, 27, and 45. There are 3 specific courses with absolute weight as much as 45. It means that these 3 courses fill up the relative importance from 30 until 32. Therefore, these four courses get the relative importance as much as 31 as it is the middle value of 30 until 32. Moreover, there are 2 specific courses that have absolute weight as much as 27. It means that these 2 courses fill up the relative importance 28 and 29. Therefore, these 2 courses get the relative importance as much as 28.5 as it is the middle value of 28 and 29. Next, there are 10 specific courses that have absolute weight as much as 15. It means that these 10 courses fill up the relative importance from 18 until 27. Therefore, these 10 courses get the relative importance as much as 22.5 as it is the middle value of 18 to 26. There are also 4 specific courses that have absolute weight as much as 12. It means that these 4 courses fill up the relative importance from 14 until 17. Therefore, these 4 courses get the relative importance as much as 15.5 as it is the middle value of 14 to 17. There are 12 specific courses that have absolute weight as much as 9. It means that these 12 courses fill up the relative importance from 2 until 13. Therefore, these 12 courses get the relative importance as much as 7.5 as it is the middle value

Table 7. Summary of Curriculum Design

Sequence	Courses	Credits
Semester 1	Fitness	2
	Tata Tulis Karyallmiah	2
	Critical Reading and Writing	2
	Konsep Pengembangan Ilmu Pengetahuan	2
	Mathematics for Business	4
	Entrepreneurship Leadership	3
	TOTAL CREDITS PER SEMESTER	15
Semester 2	Introduction to Information Technology	2
	Sistem Alam dan Semesta	2
	Pancasila and Citizenship	2
	Business Statistics	4
	Business Operation	3
	Finance and Business Valuation	3
	TOTAL CREDITS PER SEMESTER	16
Semester 3	Marketing and Branding	3
	Business Risk Analysis	3
	Business Economics	3
	Product and Process Design	3
	Business Ethics and Law	3
	Human Resources and Organization	3
	TOTAL CREDITS PER SEMESTER	18
Semester 4	Creativity and Innovation	3
	Cost Accounting and Pricing	3
	Business Planning	3
	Commercializing Innovation	3
	Business Modeling	3
	Negotiation and Contract of Business	3
	TOTAL CREDITS PER SEMESTER	18
Semester 5	Business Initiation	4
	Business Strategy	3
	Religious Study and Ethics	2
	Business Practice 1	3
	Optional course 1	3
	Optional course 2	3
	TOTAL CREDITS PER SEMESTER	18
Semester 6	Managing Start-up Business	4
	International Business	3
	Growing Business	4
	Business Practice 2	3
	Optional course 3	3
	Optional course 4	3
	TOTAL CREDITS PER SEMESTER	20
Semester 7	Productivity Management	3
	Entrepreneurship Theory	3
	Revenue Management	3
	Market Orientation	3
	Optional course 5	3
	Optional course 6	3
	TOTAL CREDITS PER SEMESTER	18
Semester 8	Business Investment	3
	Project Management	3
	Applied Anthropology	3
	Optional course 7	3
	Optional course 8	3
	Final Project	6
	TOTAL CREDITS PER SEMESTER	21
TOTAL CREDITS		144

of 2 to 13. Finally, there is only one course that gets absolute weight as much as 2. Therefore, this course gets the relative importance.

Phase 4

This phase correlates the specific courses with the sequence of appearance of each course. From the HOQ phase 4, the result shows that there are several semesters that have the same absolute weight. There are 8 semesters with absolute weight starts from 247.5, 477, 540, 877.5, and 1008. Semester 1 and 2 with absolute weight 265.5 will get the relative importance as much as 1.5 as it is the middle point of rank 1 and 2. Semester 3 and 8 with absolute weight 477 will get relative importance as much as 3.5 as it is the middle point of 3 and 4. Next, semester 4 with absolute weight 540 will get relative importance as much as 5. Semester 5 and 6 with absolute weight 877.5 will get relative importance as much as 6.5 as it is the middle point of 6 and 7. Lastly, semester 7 with absolute weight 1008 will get relative importance as much as 8 as it gets the highest absolute weight.

Phase 5

This phase correlates the specific courses with the teaching methods. From the HOQ phase 5 above, the result shows that project-based learning has the lowest absolute weight and in the other hand, mastery learning has the highest absolute. Therefore, project-based learning gets relative importance as much as 1, firsthand experience gets 2, business incubation gets 3, case study gets 4, mentorship gets 5, business simulation gets 6, and lastly mastery learning gets 7.

Verification

The verification shows the relationship between specific courses and needs and specific courses and competences. This step can be done by making a matrix between specific courses and needs/competences. The matrix will show what kind of competences can be delivered through the specific courses or what kind of needs can be fulfilled through the specific courses. Below is the example

of the relationship matrix between specific courses and critical needs. The process goes the same with relationship matrix between specific courses and competences.

Curriculum design

Based on the QFD result, here is the summary of curriculum design and the explanation for Entrepreneurship Academic Program. The summary includes the courses that obligated for students to be taken in year 1 as the student of "TahapPersiapanBersama" of Bandung Institute Technology and elective courses that can be chosen by the students their selves in selected semester. The credit limit for elective courses is 21 credits, with at least 9 credits are taken from other faculty courses. Elective courses derive from main courses but with more specific subject. Table 7 shows the summary of the curriculum design.

Table 8 shows the available elective courses from Entrepreneurship Study Program.

Practical Implication

Each course has competencies to be delivered. A relationship matrix can be created to help on identify competencies for each course. The matrix consists of four symbols that show the relationship between the competency and specific course.

Table 8. Summaries of Elective Courses

Elective Courses	Credits
Innovation Theory	3
Creative and Cultural Entrepreneurship	3
Introduction to Anthropology of Business	3
Business Computation	3
Social Entrepreneurship	3
Quality Control	3
Business Optimization	3

- “♦” shows that there is no relationship between the specific courses and competences.
- “○” shows that there is slight relationship between the specific courses and needs.
- “⊙” shows that there is potential/moderate relationship between specific courses and competences.
- “■” shows that there is strong relationship between specific courses and competences.

To make sure that all the competences can be delivered to the students through the courses, each course comes up with the syllabus. A syllabus consists of the competences that will be fulfilled through learning particular course, learning guidance (prerequisite and learning methods), and expected learning outcome. Besides the syllabus, each course also comes up with SAP (SatuanAcaraPerkuliahan). The SAP helps in

Table 9. Relationship Matrix of Competences and Specific Courses

COMPE-TENCES	SPECIFIC COURSES												
	Mathematics for Business	Statistics for Business	Entrepreneurial Leadership	Business Operation	Finance and Business Valuation	Marketing and Branding	Business Risk Analysis	Business Economics	Product and Process Design	Business Ethics and Law	Human Resources and Organization	Cost Accounting and Pricing	Creativity and Innovation
Business design/model	♦	♦	♦	○	○	○	♦	♦	○	♦	♦	♦	○
Business implementation	○	○	♦	♦	♦	♦	⊙	○	♦	♦	♦	⊙	○
Product/service development	○	○	♦	♦	♦	♦	♦	♦	■	♦	♦	♦	⊙
Marketing knowledge	♦	○	♦	♦	♦	■	♦	♦	♦	♦	♦	♦	♦
Financial knowledge	○	♦	♦	♦	■	♦	♦	♦	♦	♦	♦	■	♦
Operation knowledge	⊙	♦	♦	■	♦	♦	♦	♦	♦	♦	♦	♦	♦
Creativity/innovation spirit for changes	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	■
Entrepreneurship mindset	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Leadership and teamwork in a group	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	○	♦	♦
Facing challenges and opportunities	♦	♦	♦	♦	♦	♦	⊙	♦	♦	♦	♦	♦	♦
Business dynamic skills	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Analytical thinking	⊙	♦	♦	■	⊙	⊙	⊙	♦	♦	♦	♦	♦	♦
Human relation knowledge	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	■	♦	♦

Table 10. Example of SAP
“Finance and Business Valuation”

Week	Session	Book References
Week 1	Introduction to Finance	Scott, Jr., Martin, Petty, &Keown,
Week 2	Finance Management	“Financial Management
Week 3		Principles and Applications”,
Week 4		Prentice-Hall.2002
Week 5		
Week 6		
MID TEST		

achieving the competences by making a step-by-step learning schedule. Table 10 is a form example of SAP.

With the help of syllabus and SAP, the competences can be delivered to the students step-by-step and they also help the educators on reviewing whether the students are already acquire the competences.

MANAGERIAL IMPLICATIONS

This research has several important contributions. Firstly, it gives useful suggestions to the Academic Program regarding the curriculum design. It shows specific courses that can fulfill the needs from many perspectives and what kind of competences that can be accomplished through those specific courses. Secondly, it presents a methodology that can analyze the customer expectations in step by step and translate those expectations into product. In this case, the product is the curriculum.

In designing Entrepreneurship Curriculum by using QFD, the results will be highly dependent to the responses from the students, entrepreneurs, and Entrepreneurship Academic Program through the interviews. Compared to the proposed curriculum from Entrepreneurship Academic Program, there are several differences. There are some core courses in the proposed curriculum not included in the competence-based curriculum from QFD result since those courses do not answer customer needs.

In the other hand, there are some optional courses in the proposed curriculum become core courses in the competence-based curriculum from QFD result since those courses answer customer needs.

Moreover, to create the QFD, it needs the critical needs. The validation process helps on providing the critical needs. Critical needs are the needs with high level of concordance between student, entrepreneur, and Academic Program.

With the outcomes results from this methodology, the Academic Program’s decision makers can have specific suggestion regarding the specific courses. After the curriculum has been made, the Entrepreneurship Study Program needs to do some further researches to help on the implementation of the curriculum from the managerial side. Firstly is the cost research. The cost research consists of all kind of cost that will be occurred in order to implement this curriculum. It is important since it will also determine whether this curriculum is feasible to be implemented or not. Secondly is curriculum evaluation system research. The curriculum evaluation system is important to assess the successful rate of the curriculum in delivering the competences. Thirdly is human resource recruitment research. It is essential to form the process of human resource recruitment and to make the requirements for each available position. Fourthly is forming the syllabus. A research on

forming the syllabus is needed because the syllabus consists of competences that will be fulfilled through learning the courses. Lastly is forming course schedule. A research on forming the course schedule is needed because course schedule consists of steps to achieve the competences that will be delivered from the courses.

CONCLUSION

After all those researches have been conducted, the Entrepreneurship Study Program can make an implementation plan to support the implementation of the curriculum in the university where the

Entrepreneurship Study Program belongs. Basically, the implementation plan consists of activities that can be done to support the implementation of the curriculum. Those activities include socialization of the study program to general public and the university itself, the recruitment of competent educators, training session or workshop for the educators, making syllabus and SAP (Satuan Acara Perkuliahan), book ordering for courses references, preparing the facility for teaching and learning activities, student application and acceptance, and the implementation of the semester. ■

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