

## Improving Students Soft Skills using Thinking Process Profile Based on Personality Types

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### ABSTRACT

The challenge in education field these days rises as the cause of society's expectation for higher education. This increasingly complex expectation demands that higher education prepares the students to gain integrity. Higher education provides not only hard skills for the student, but also soft skills. By observing the hard skills side, in the previous research, the author discovers a learning method based on cognitive process that is classified by personality types. This finding is proved to be effective in enabling students to solve problems. By utilizing the finding as well as employing qualitative and development methods, this research serves a purpose of developing learning method that can improving students' soft skills attributes based on personality types. This leads to the conclusion that the cognitive process will also have the same influence on personal and interpersonal behaviors. The findings gained from this research demonstrate that soft skills attribute showed by every personality is various and it can be improved through the application of learning models that put forward cognitive process based of personality type classification. According to the gained findings, it is recommended that this learning model can be expanded to cover other subjects in higher education syllabus

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### 1. INTRODUCTION

Concern over education, especially higher education nowadays, is the lack of synergy between higher education in preparing manpower and companies as users. It is caused by shortfalls in higher education awareness of companies' requirements for the supply of adequate manpower. Today, it has been found that one of main factors of failing in career is not mastering some certain skills, for instances: honesty, ability to cooperate, ability to make decision, ability to solve problems, etc. The abilities are missed in higher education teachings, and it has just been realized in the past ten years. Whilst, according to the survey conducted by National Association of Colleges and Employers (NACE) in 2002 in USA [1], 457 businessmen and businesswomen stated that GPA is in the 17<sup>th</sup> rank of 20 qualities that are arguably important to be found in university graduates. Those intangible qualities are actually more required. To illustrate, an individual who has extraordinary abilities, but is lack of ability to cooperate, can raise difficulties for the organization where he is working at. That kind of abilities is known as soft skills.

Soft skills are very important for graduates of higher education once they start their career or business [2]. This causes the higher education nowadays attempts to teach soft skills to their students, although many of them are not well-structured as a system. In this research, soft skills will be implemented with a system, known as soft skills management system [3]. In soft skills management system, achievement

of the expected soft skills has to be planned, executed, and evaluated in order to make the development direction and its achievement are clearly noticed.

On the other hand, taking the role as a teacher, it can be put into intense awareness that every student has different characters [4]. Consequently, both learning technique and attributes of soft skills of every individual depend on each character. These differences, by psychological experts, are believed as the implication of different personality type. In this research, classification of personality types according to David Keirse is used for dividing the personality types into four groups: Rational, Idealist, Artisan, and Guardian.

By incorporating the research done by Dewiyani [5], this research becomes important. It is because a breakthrough in improving soft skill attributes of students can be achieved by creating mathematical learning model through comprehension of cognitive process profile in solving mathematical problems according to personality types. This study is directed to fulfill the important objective of developing learning model that can improve soft skills' attributes of the students.

This learning model has been applied to first-semester students in Linear Algebra class with 8 subjects, in Information Systems program. However, it can be generally applied to students in higher education to learn any subjects, provided that introductory suitable research for cognitive process profile is given.

## 2. LITERATUR REVIEW

### 2.1. Soft Skills

Soft skills as non-technical skills that are intangible but extremely demanded [6]. So many attributes of soft skills are recognized by our society. Some of them are Winning Characteristic, consisting of communication skill, organization skill, leadership, logic, effort, group skill, and ethics. Soft skills has originated among sociology terms describing EQ (Emotional Intelligence Quotient) of an individual, that can be categorized into social life, communication, verbal expression, habit, friendliness, and optimization. Soft skills are certainly different from hard skills, emphasizing on IQ. This leads to the evaluation of these aspects: science mastering, technology and technical skills related to one's major.

Soft skills can be classified into two: intra personal skills and inter personal skills [7]. Intra personal skills refer to individual's ability in managing himself for optimally developing works, for example, time management, stress management and creative thinking. Meanwhile, inter personal skills are defined as individual's skills in managing their relationship with others for optimal work developments, i.e.: ability to motivate, to lead and to negotiate. For further explanation in this writing, these abilities will be referred as attributes of soft skills.

Illah Sailah [3] states that, there are plenty of soft skill attributes owned by every individual in different level. This is due to different habits of thinking, speaking, acting, and taking certain attitude on various contexts. However, these attributes can develop as the individual is getting used to applying the attributes until finally they can be instilled as characters. According to Center for entrepreneurship education and development, Halifax, Nova Scotia [3], there are 23 attributes of soft skills dominating job opportunities. In this research, those 23 attributes are used. They are possible to be grouped into intra personal and inter personal skills as presented in the Table 1.

Table 1. Attributes of Soft Skills and their codes

| Code | Intra personal skills | Code | Intra personal skills | Code | Inter personal skills |
|------|-----------------------|------|-----------------------|------|-----------------------|
| R1   | Initiative            | R9   | Analytical ability    | E1   | Reliable              |
| R2   | Ethics/Integrity      | R10  | Stress management     | E2   | Verbal communication  |
| R3   | Critical thinking     | R11  | Self management       | E3   | Cooperating           |
| R4   | Desire to learn       | R12  | Problem solving       | E4   | Flexible              |
| R5   | Commitment            | R13  | Summarizing           | E5   | Working as a team     |
| R6   | Motivation            | R14  | Independent           | E6   | Listening             |
| R7   | Enthusiastic          | R15  | Tough                 | E7   | Logical argumentation |
| R8   | Creative              | R16  | Time management       |      |                       |

Table 1 shows attributes of soft skills that divide into intra personal skills and inter personal skills. Intrapersonal skills are those skills and communications that occur within a person's own mind, and interpersonal skills are skills which refer to interactions with other people or personalities. In table 1, R prefix represents soft skills under Intra Personal skills category, and E prefix represents soft skills under Inter Personal skills category.

In order to obtain qualified degrees from higher education, soft skills should be mastered well, in addition to hard skills (knowledge and technical skills) studied during the study program. This is for the purpose of preparing the graduates of higher education to not only become skillful robots that lack of sense of humanities.

Given the importance of the soft skills that is already believed and for the sake of mastering them, it is necessity to implement these soft skills through a system called soft skills management system. Through soft skills management system, the achieving process of the goal can be realized and intentionally done by benefitting from a well-prepared plan, execution and evaluation [8].

## 2.2. Cognitive process profile of students in solving mathematical problems based on classification of personality type

Every student is different. In education, differences, in both behavior and character, is obviously noticed by each participating individual. Differences in behavior are frequently called Personality by psychological experts. Personality is defined as behavior explanation descriptively without providing values. In 1984 David Keirse, a professor in psychology from California State University, classified personality into four types, Rationalist, Idealist, Artisan, and Guardian. This classification is based on how individual gains his energy (Extrovert or Introvert), how individual takes information (Sensing or Intuitive), how individual makes decision (Thinking or Feeling), and how individual's likes to live his outer life (or what his behaviors that are others tend to see), (Judging or Perceiving).

Dewiyani [5] discovers in her research that profile of cognitive process showed by each personality type in solving problems are different, for instance, in understanding problems, each personality type takes different approach in early stages. *Rational* type begins to solve the problems by following the sequence of sentences of problem statements, extracting the main idea of each sentence, symbolizing these ideas. The set of techniques done by *Idealist* consists of following the sequence of sentences constructing problem statements, extracting the main ideas, and repeatedly moving a pen. *Artisan* starts the problem solving process by following the sequence of sentences in problem statement, extracting the essential ideas, and moving parts of body frequently. Finally, the *Guardian* initiates to solve the problem by following the sentences' sequence in problem statement, grasping the primary ideas, and highlighting the important parts of problem statement.

By noticing one step of problem solving process, the problem can be recognized and identified as differences in cognitive process profile demonstrated by each personality type. Overall depicted profile of cognitive process in solving mathematical problems will be used as a foundation in determining attributes of *soft skills* which have to be improved on each personality type [9].

## 2.3. Learning Model

In this research, general model is used in designing learning method as constructed by Plomp [10]. Plomp subdivide the design process into five phases, consisting of: (1) Preliminary investigation, (2) Design, (3) Realization/construction, (4) Test, evaluation and revision, and (5) Implementation. Those five phases correspond to the principle of *soft skills management systems* that has been previously discussed.

## 3. RESEARCH METHOD

### 3.1. Research Types

In order to acquire attributes of *soft skills* required to be improved on a particular personality type, an *explorative* qualitative research type is selected. Qualitative research is chosen since determination processes of students' cognitive process profiles and attributes of *soft skills* have natural background and the primary instrument in the research is the researchers. The research is also *explorative* because *soft skill* attributes of the students are being investigated. Steps conducted during the research are selecting research subjects, determining supporting instruments for the research, creating data collection procedure, and executing data analysis. This research endeavors to describe phenomenon in the real situation (*natural setting*). That phenomenon is a situation in which higher education students with particular personality types demonstrate *soft skills* inside themselves while they are given problem-solving questions. The students' situation will be observed based on the attributes of *soft skills* that are decided earlier to be observed.

Once the attributes of *soft skills* that are going to be improved are acknowledged, the next method to be used for continuing the research is development method. It is because one of the research's purposes is to develop a learning model that effectively improves *soft skills* of the students.

### 3.2. Data collection method

For the first step, data to be used is qualitative, in the form of description students' *soft skill* attributes based on particular personality types. Data is collected by providing research subjects, grouped based on personality types, with problems. Then, the subjects can solve the problems by using any method. This means they are permitted to discuss the problems with other students that are not participating as research subject. Also, they are allowed to solve the problems on their own. While solving the provided problems, research subjects must not be put under pressure, so that the expected natural condition can be obtained. Researcher records verbal expressions of the subjects, as well as take note their behavior (non-verbal expression) including unique activities while solving the mathematical problems. By using the recorded video, it is expected that soft skill attributes inside the students can be observed. If there is lack of data, researchers have to clarify by re-interviewing. Meanwhile, on the learning model stage, data is collected following the phases introduced by Plomp.

### 3.3. Instruments of data collection

In the interest of acknowledging the attributes of *soft skills* that should be developed on each personality type, the primary instrument is decided to be the researchers. Researchers act not only as research organizers, but also main instrument in data collection that cannot be replaced by any other instruments. Besides, there is also instrument in the form of worksheet. Worksheet instrument in this research is worksheet containing mathematical problem to be solved, distributed to each subject.

On learning model composition stage, research instrument to be used is worksheets required in constructing five phases introduced by Plomp [10].

## 4. RESULT AND DISCUSSION

### 4.1. Research Subject

Research subjects consist of eight students of Information Systems program. These students can be subdivided into: two students of *Rational*, two students of *Idealist*, two students of *Artisan*, and two students of *Guardian*. This grouping is done by following personality type classification by David Keirse [11].

### 4.2. Data Analysis of soft skills attributes

Derived from observation result on each personality type while solving mathematical problems and according to the result of the work, the outcome can be detailed as follow.

#### 4.2.1. Rational Type

From the observation of the rational types when solving a mathematical problem appears that this type work with serious immediately and independent. Problem is read as a whole, taken important information, the planned completion of the well, according to plan and carry out the settlement and recheck. Ability intrapersonal skills in rational type have been quite good, but the ability ekstrapersonal skills that still need to be improved, especially at work in a team. In more detail, soft skills in rational types can be seen in Table 2.

From Table 2, can be concluded that the rational type has 2 points intra personal skills that must be developed and 6 points interpersonal skills that must be developed. This means that, in general, the ability of interpersonal skills of type Rational must be considered in the learning process. Mark (+) indicates attributes of soft skills which should be maintained, and (-) indicates attributes of soft skills which should be improved. Code of soft skill attributes can be referred from Table 1.

Table 2. Observation result, analysis result, and attributes of soft skills on *Rational* type individuals

| Observation Result  | Analysis Result  | Attributes of Soft Skills  |
|---|--|--|
| Do not have the initiative either to form a group or to join a particular group.  | Prefer to be alone.<br>Feel disturbed if demanded to solve the problems by doing discussion.<br>Independent.           | (+) Desire to learn (R4).<br>(+) Motivation (R6).<br>(+) Independent (R14).<br>(+) Tough (R15).<br>(-) Verbal communication (E2).<br>(-) Cooperating (E3).<br>(-) Work as a team (E5).                         |
| Immediately try to solve the problems seriously, without wasting any time.  | Serious.<br>Focus on goals.  | (+) Commitment (R5).<br>(+) Enthusiastic (R7).<br>(+) Self management (R11).<br>(+) Reliable (E1).<br>(+) Solving problems (R12).<br>(-) Cooperating (E3).<br>(-) Work as a team (E5).                         |
| Read the overall problem statements sequentially.   | Think synthetically in a well-structured context.  | (+) Analytical ability (R9).<br>(+) Critical thinking (R3).<br>(+) Summarizing (R13).<br>(-) Cooperating (E3).<br>(-) Work as a team (E5).   |
| Find out the meaning of questions in understanding the problems.<br>Re-write arguably important information to be used in problem solving by using the help of variables.   | Have good analysis.<br>Thorough in organizing important points.<br>Have a great abstraction.                           | (+) Analytical ability (R9)<br>(-) Work as a team (E5).<br>(+) Integrity (R2).<br>(+) Motivation (R6).<br>(+) Self management (R11).<br>(+) Summarizing (R13)<br>(-) Work as a team (E5).                      |
| Have plans in solving the problem in detail.  | Thorough in constructing plans.  | (+) Summarizing (R13).<br>(-) Work as a team (E5).<br>(-) Time management (R16).   |
| Have procedure in solving the problems without being focused on prior knowledge.  | Highly creative.   | (+) Initiative (R1)<br>(+) Creative (R8).<br>(-) Verbal communication (E2)<br>(-) Work as a team (E5).   |
| Once the problems are solved, the subjects re-check the solution steps by changing sequence of the steps.   | Expect the perfection of the answers.<br>Determined.   | (+) Initiative (R1)<br>(+) Commitment (R5).<br>(+) Tough (R15).<br>(-) Time management (R16).<br>(-) Working as a team (E5).   |
| After solving the problems, this type tries to check on the solutions with friends. If differences between the answers occur this type tends to redo the calculation. In addition, this type does not try to understand techniques applied by others. | Expect perfection without any mistakes in getting the work done.<br>Lack of willingness in accepting others' opinions. | (+) Initiative (R1).<br>(+) Critical thinking (R3).<br>(+) Desire to learn (R4).<br>(+) Creative (R8).<br>(-) Verbal communication (E2).<br>(-) Cooperating (E3).<br>(-) Flexible (E4).<br>(-) Listening (E6). |
| Do not take advantage of opportunities to explain their opinions when they are allowed to explain their work in front of the class.   | Not prefer to appear in public.<br>Prefer personal things, introvert trait dominates this type.                        | (-) Verbal communication (E2).<br>(-) Cooperating (E3).<br>(-) Flexible (E4)<br>(-) Listening (E6).<br>(-) Logical argumentation (E7).   |

#### 4.2.2. Idealist Type

Idealist type is the type that is more emphasis on what should be done from a problem. After his curiosity about the problem to be solved, then this type can work well step by step carefully. Although they have a tendency to work on the problems independently, but this type can be little tolerance in working in groups. Verbal ability and cooperation should be further enhanced. In more detail, soft skills in idealist types can be seen in Table 3.

Table 3. Observation result, analysis result, and attributes of soft skills on Idealist type individuals

| Observation Result  | Analysis Result  | Attributes of Soft Skills  |
|---|--|--|
| Do not pioneer forming groups; instead, join a group in which the members are relatively closed to the research subjects.   | Prefer to be alone, but can be little tolerant to live in as part of a group.                                  | (+) Enthusiastic (R7)<br>(+) Independent (R14).<br>(-) Cooperating (E3)<br>(-) Work as a team (E5).  |
| Tend to work independently, do not discuss with other team members while solving the problems.  | Can be disturbed if discussion is a must in solving the problem.   | (+) Independent (R14)<br>(-) Verbal communication (E2).<br>(-) Cooperating (E3).<br>(-) Work as a team (E5).   |
| Try to solve the problems as well as possible.  | Fancy perfection.  | (+) Initiative (R1)<br>(+) Commitment (R5).<br>(+) Tough (R15).<br>(-) Time management (R16).<br>(-) Work as a team (E5).  |
| Do not read the problem statements sequentially, but prioritize the question statements.  | Expect to know the main task to be done in the earlier stage.  | (+) Desire to learn (R4)<br>(+) Commitment (R5).   |
| Look for the main ideas of sentences in order to understand the problem.<br>Rewrite important information to be used in solving problems without the help of variables.   | Have good analysis skill.<br>Thorough in organizing important points.  | (+) Critical thinking (R3)<br>(+) Analytical ability (R9).<br>(+) Analytical ability (R9).<br>(+) Summarizing (R13).<br>(+) Independent (R14).<br>(+) Reliable (E1)  |
| Do not see the plans for solving the problems as an important point.  | Prefer to immediately solve the problems so that the task can be noted as done.                                | (+) Integrity (R2)<br>(+) Commitment (R5).<br>(-) Reliable (E1).<br>(-) Stres management (R10).  |
| Apply procedure of problem solving by use known procedure from prior knowledge of pervious subjects.<br>Once the problem is solved, re-check the finished calculation.  | Obey the principle.<br>Do not dare to bring up a breakthrough.<br>Expect perfection of answers.<br>Determined. | (+) Commitment (R5).<br>(+) Motivation (R6).<br>(+) Creative (R8).<br>(+) Commitment (R5).<br>(+) Motivation (R6).<br>(+) Solving problems(R12)<br>(+) Creative(R8)<br>(-) Verbal communication (E2).<br>(-) Listening (E6).<br>(-) Logical argumentation (E7).<br>(-)Self management (R11).<br>(-) Work as a team (E5).<br>(+) Independent (R14). |
| After solving the problems, subject of this type attempt to re-check their answers with their friends. If the differences in the answers occur, subjects of this type still believe that their own answers are correct and do not try to repeat the calculation. If different techniques exist, subjects of this type try to understand other team members' techniques. | Expect perfection of answers.<br>Less capable of accepting others' opinions.                                   | (+) Commitment (R5).<br>(+) Motivation (R6).<br>(+) Solving problems(R12)<br>(+) Creative(R8)<br>(-) Verbal communication (E2).<br>(-) Listening (E6).<br>(-) Logical argumentation (E7).<br>(-)Self management (R11).<br>(-) Work as a team (E5).<br>(+) Independent (R14).   |
| Do not take advantage of given opportunities to present their opinions in front of the class.   | Do not prefer appearing in public.<br>Prefer personal things, introvert trait dominates this type.             | (-) Verbal communication (E2).<br>(-) Cooperating (E3).<br>(-) Flexible (E4)<br>(-) Listening (E6).<br>(-) Logical argumentation (E7).<br>(+) Independent (R14)  |

From Table 3 can be concluded that the Idealist type has 3 points intra personal skills that must be developed and all points of interpersonal skills that must be developed. This means that, in general, the ability of interpersonal skills of type Idealist must be considered in the learning process. Mark (+) indicates attributes of soft skills which should be maintained, and (-) indicates attributes of soft skills which should be improved. Code of soft skill attributes can be referred from Table 1

#### 4.2.3. Artisan Type

Artisan type not reading the problem coherently, but only in a few sentences that they thought interesting. Often get a new way of solving problems, and immediately terminate employment without re-examine the work that has been done. Quite good interpersonal skills, being intrapersonal skills must be improved, for example self-management. In more detail, soft skills in artisan types can be seen in Table 4.

Table 4. Observation result, analysis result, and attributes of soft skills on *Artisan* type individuals

| Observation Result  | Analysis Result   | Attributes of Soft Skills  |
|---|---|--|
| Immediately try to join a group and actively attempt to unite as a team.  | Sociable.<br>High social conscience.  | (+) Verbal communication (E2).<br>(+) Logical argumentation (E7)<br>(+) Cooperating (E3).<br>(+) Enthusiastic (R7)<br>(+) Creative (R8).<br>(+) Flexible (E4)<br>(-) Commitment (R5).<br>(-) Self management (R11).                              |
| Do not immediately solve the problems, but spend some time for socializing in the beginning of the session.<br>Fancy discussion, almost never attempt to solve the problems individually.   | Not very skillful in managing time (more time is spent for socializing)<br>Less independent, take advantage of sociability to solve the problems. | (-) Motivation (R6)<br>(-) Time management (R16).<br>(-) Self management (R11).<br>(-) Independent (R14)<br>(-) Commitment (R5)<br>(+) Verbal communication (E2)<br>(+) Cooperating (E3)<br>(-) Analytical ability (R9)<br>(+) Enthusiastic (R7) |
| Read the problem statements sequentially, but do not read the whole statements, some parts of the statements are skipped.<br>Look for main ideas of sentences in order to understand the problems.  | Lack of attention to detail.<br>Have good analysis skill.   | (+) Analytical ability (R9)  |
| Do not take note about important information gathered from problem comprehension, but just tell the information to other team members.  | Less prefer detailed and organized things.  | (-) Integrity (R2).<br>(-) Self management (R11).<br>(-) Summarizing (R13).<br>(-) Tough (R15).  |
| Do not see plan for solving the problem as an important point.  | Prefer to immediately solve the problems, particularly by cooperating with other team members so that the work is presumably done.                | (+) Solving problem (R12)<br>(-) Self management (R11)<br>(-) Reliable (E1)  |
| Apply procedure of problem solving without being focused on particular topics of prior knowledge.<br>After solving the problems, re-check only the finished calculation together with other team members.   | Extremely creative.<br>Do not focus on perfection of answers; get satisfied just by given the existing result.                                    | (+) Critical thinking (R3)<br>(+) Creative (R8)<br>(+) Initiative (R1).<br>(+) Work as a team (E5).<br>(-) Desire to learn (R4)<br>(-) Tough (R15).<br>(-) Time management (R16).  |
| Once the problems are solved, subjects of this type immediately spend the rest of the time for chatting to their team members and their presents can make other members of the team become enthusiastic.<br>Instantly, grab the opportunities to present their opinions once the opportunities are being offered. | Social conscience and very adaptable.<br>Fancy appearing in public.   | (+) Verbal communication (E2)<br>(+) Cooperating (E3)<br>(-) Reliable (E1)<br>(+) Verbal communication (E2)<br>(+) Summarizing (E6)<br>(+) Logical argumentation (E7)  |

From Table 4 can be concluded that the Artisan type has 10 points intra personal skills that must be developed and 1 point of interpersonal skills that must be developed. This means that, in general, the ability of intrapersonal skills of type Artisan must be considered in the learning process. Mark (+) indicates attributes of soft skills which should be maintained, and (-) indicates attributes of soft skills which should be improved. Code of soft skill attributes can be referred from Table 1.

#### 4.2.4. Guardian type

Immediately after receiving the questions, then this type of divide tasks and get started right away with a very active discussion. Any statement in question was observed with either, carefully planned settlement plan. Attributes that should be raised is self management and summarizing. In more detail, soft skills in guardian types can be seen in Table 5.

Table 5. Observation result, analysis result, and attributes of soft skills on *Guardian* type individuals

| Observation Result   | Analysis Result   | Attributes of Soft Skills  |
|--|---|--|
| Immediately try to form a group, delegate tasks, and lead discussion in group.   | Have leadership skills.<br>Ability to manage friends.<br>Ability to motivate friends. | (+) Work as a team (E5).<br>(+) Motivation (R6).<br>(+) Independent (R14).<br>(+) Reliable (E1)<br>(+) Verbal communication (E2).<br>(+) Cooperating (E3). |
| Immediately lead the team to solve the problems.   | Highly responsible to solve the problems.   | (+) Solving problem (R12).<br>(+) Time management (R16)<br>(-) Self management (R11).  |
| Active in taking part in group discussion and able to encourage other team members to intensively join the discussion.       | Have plenty of techniques to activate other team members.                             | (+) Reliable (E1).<br>(+) Motivation (R6).<br>(+) Verbal communication (E2).<br>(-) Self management (R11).   |
| Read overall problem statements sequentially.  | Think synthetically in a structured way.  | (+) Critical thinking (R3).<br>(+) Desire to learn (R4).<br>(+) Analytical ability (R9).   |
| Understand the meaning of each question in order to be able to have adequate comprehension of the problems.                  | Have good analysis ability.   | (+) Analytical ability (R9).   |
| Do not take note about important information from understanding the problems.  | Less prefer detailed and organized things.  | (-) Self management (R11).<br>(-) Summarizing (R13).   |
| Have well-prepared plan for solving the problems.  | Fancy perfection.   | (+) Commitment (R5).<br>(+) Motivation (R6).<br>(+) Enthusiastic (R7).<br>(+) Creative (R8).<br>(+) Tough (R15).<br>(+) Logical argumentation (E7)         |
| Apply procedure of problem solving without focusing on particular prior knowledge.   | Extremely creative.   | (+) Creative (R8).   |
| Once finished solving the problems, re-check the answers only on the finished calculation.                                   | Expect perfection for answers.<br>Determined.   | (+) Commitment (R5).<br>(+) Motivation (R6).<br>(+) Creative (R8).<br>(-) Stress management (R10)  |
| Once the problems are solved, instantly lead team members to create report, delegate the task of presenting the result, etc. | Able to lead.<br>Provide closure for problems well.                                   | (+) Motivation (R6).<br>(+) Reliable (E1)<br>(+) Verbal communication (E2).<br>(+) Flexible (E4)<br>(+) Work as a team (E5).                               |

From Table 5 can be concluded that the Guardian type has 3 points intra personal skills that must be developed and no point of interpersonal skills that must be developed. This means that, in general, the ability of intrapersonal skills of type Guardian must be considered in the learning process. Mark (+) indicates attributes of soft skills which should be maintained, and (-) indicates attributes of soft skills which should be improved. Code of soft skill attributes can be referred from Table 1.

#### 4.3. Development of learning model for improving soft skills of students

By adapting general model of learning through Plomp, the learning model development is obtained as described in the following section.

##### 4.3.1. Preliminary investigation phase

Based on analysis of environment, the problem to be studied is the development of learning model for improving students' *soft skills*. In teaching process, students should be actively incorporated for collaborating and teachers facilitate the collaboration and interaction among the students. Thus, in this phase study to be done can be specified as follow (1) Encourage the students to have awareness of the importance of soft skills and their attributes that have to be both maintained and improved, (2) Learning theories, (3) Learning model theory. Result obtained from this phase is explained in Table 6.

Table 6. Result of Preliminary Investigation Phase

| Type | Intra Personal Skills (R) |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    | Inter Personal Skills (E) |   |   |   |   |   |   |
|------|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|---------------------------|---|---|---|---|---|---|
|      | 1                         | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 1                         | 2 | 3 | 4 | 5 | 6 | 7 |
| R    | +                         | + | + | + | + | + | + | + | + | -  | +  | +  | +  | +  | +  | -  | +                         | - | - | - | - | - | - |
| I    | +                         | + | + | + | + | + | + | + | + | -  | -  | +  | +  | +  | +  | -  | -                         | - | - | - | - | - | - |
| A    | +                         | - | + | - | - | - | + | + | + | -  | -  | +  | -  | -  | -  | -  | +                         | + | + | + | + | + | + |
| G    | +                         | + | + | + | + | + | + | + | + | -  | -  | +  | -  | +  | +  | +  | +                         | + | + | + | + | + | + |

Description: R = Rational type ; A = Artisan type ; I = Idealist type ; G = Guardian type

Code is using references on Table 1.

Plus (+) sign indicated maintainance is required.

Negative (-) sign indicates improvement is required.

Table 6 shows the *soft skill* attributes required to be maintained as well as improved. By applying Table 6, a learning model is designed with intense awareness and it can improve conceivably deficient.

#### 4.3.2. Design phase and Execution phase

In these two phases, a learning model, which can maintain positive soft skill attributes and improve conceivably deficient soft skills, is designed and realized. This learning model is applied in Linear Equation System topic of Aljabar Linear subject. This phase consists of five activities that can be specified as follow [12].

- (1) Design and construct learning syntax that can present learning for improving deficient soft skill attributes.
- (2) Design and determine learning environment or social system that can be specified as atmosphere and applied norms in the model, for example, teachers'roles and activities to be done during the learning process.
- (3) Design and compose reaction principle, by providing teachers with illustration of how to interfere in how students seeing and responding to their behavior during the learning process.
- (4) Arrange and determine supporting system in which requirements and conditions needed for learning model (i.e. class setting, instructional system, learning instruments, and required media) that is being designed can be executed.
- (5) Design and construct implication of learning. The implication can be defined as instructional and attending implications.

Outcome of 1<sup>st</sup> phase is in the form of learning syntax as depicted in Figure 1.

Whereas 2<sup>nd</sup> phase results in learning environment which is subdivided into four groups based on personality types defined by David Keirseay while solving problems. It is so in order to make the learning instrument to be used can fit the cognitive process and attributes of *soft skills* needed to be improved.

Product of 3<sup>rd</sup> phase is reaction principle. This principle describes that teachers have to actively interfere in students'processes of improving their *soft skills* according to established preliminary investigation results. This activity must be executed many times as it is not easy to improve soft skill attributes in an individual and is often accomplished through habituation.

Outcome of 4<sup>th</sup> phase is that supporting system is a learning model designing for being executed if only all students have realized the importance of soft skills in their lives and are willing to improve conceivably deficient *soft skills*. Result of 5<sup>th</sup> phase is the implication of study is the observation of changes happening on each student for their improvement of *soft skills* [13].

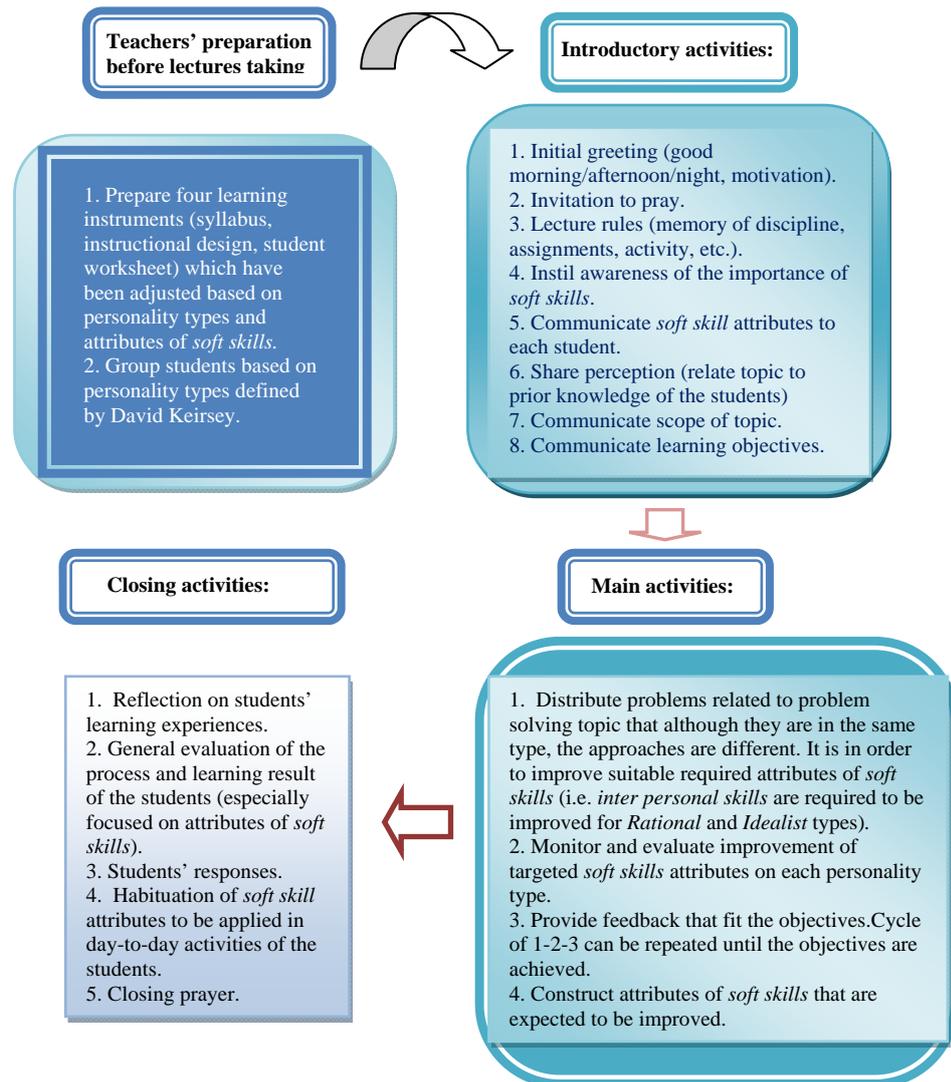


Figure 1. Learning Model Syntax for Improving *Soft skills*

#### 4.3.3. Phase for Test, Evaluation, and Revizion

This phase is focused on two main points.

- (1) To validate
- (2) To hold a practical test for evaluating created learning model prototype.

Activities to be done in this phase can be detailed as follow.

- 1) To validate model, consisting of: (a) requesting experts' consideration about the capability of the created learning model prototype, this activity requires validation sheet as instrument; (b) analyzing validation result given by the evaluators who have done the validation.
- 2) Trial is done in order to observe if the developed learning model is practical and effective. The activities to be done for the trial process are: (a) executing trial in the field, (b) analyzing the trial result, (c) revising based on analysis of trial result.

## 5. CONCLUSION AND RECOMMENDATION

### 5.1. Conclusion

According to discussion on the previous chapters, it can concluded that based on comprehension of cognitive process profile in solving mathematical problems, attributes of *soft skills* that are needed to be

improved and to be maintained due to arguably good for the particular personality types on each personality type are discovered [14].

Once the attributes of soft skills that are going to be maintained and developed on each personality type is identified, a learning model is successfully built. This model is effective in improving the *soft skill* attribute of students through comprehension of cognitive process profile in solving mathematical problems based on personality types.

The developed learning model has tendency to be able to improve students' *soft skills*. It is because the model has applied principle of soft skills management system that demands that the improvement of *soft skills* is conducted through planning, execution, and evaluation processes. Another factor encouraging the model's tendency is that the improvement of *soft skill* attributes is done intentionally with an intense awareness.

This constructed learning model has just applied to eight students of Information Systems program. However, all of those subjects state that this learning model is beneficial since it is initiated with the importance of *soft skills* and their attributes that need to be improved in each personality type. The eight subjects actually get the benefits not only on this subject, but also in their daily activities.

## 5.2. Recommendation

Learning model for improving soft skills of students through the comprehension of cognitive process profiles in solving mathematical problems based on classification of personality type can be continued to be applied to bigger-sized classes, after those classes are divided based on personality type according to David Keirse. Creation of complete learning instrument is the next activity for the purpose of perfection of this learning model. Besides, other subjects can also apply this model by using theoretical references according to the nature of each branch of science.

Dissemination of research result to the teachers is an activity that must be conducted through a learning model for students' soft skills improvement through comprehension of cognitive process profile based on classification of personality type's workshop. The workshop is mainly targeted to teachers who teach any subjects in higher education in order to achieve these objectives.

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