Development of Ikigai instructional method to cultivate computational thinking of millennial generations

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Abstract. Digitalization in industrial revolution 4.0 era has many impacts towards all aspects of life. Massive technology advancement shifts industrial demands in Indonesia from quantitative to qualitative demands. These qualitative demands can be interpreted that today's industry workforce not only need technique competencies but also must have good Computational Thinking (CT) which is the pillar of collaboration, communication, creativity, and problem-solving skills. This issue did not balance with the enhancement of cognitive skills of Indonesians, especially youth or millennial generation. Millennial generation required to overcome multilevel challenges to improve thinking skills particularly on individual level. The low level of intrinsic motivation in using computational thinking to solve its problem became one of millennial culture characteristics. One of the solutions is cultivate student's intrinsic motivation to use CT by utilize Ikigai concept on teaching and learning activities from early grade. The Ikigai role as motivation template has been endure for millennia and proven, if used properly, to be most important factor that help eastern culture people achieve self-actualization. This study aims to develop instructional design that include Ikigai concept to support the achievement of intellectual competencies. Product development is done by Research and Development (R&D) Method with Akker procedure scheme. Product expected to improve students CT in accordance to standard needed in industrial 4.0 era. At this point, we currently at Empirical Testing phase. As expected, we got good response from teacher for product's ease of use and provide clear assessment of students CT Skills. Student that can be described as skilled programmer often have poor communication or collaboration skills with societies. However, when the students have clear life-goal, those lack of social skills are gradually improved. Otherwise, student with good social skills but has poor technique (coding), become more motivated to pursue computing knowledge.

1. Introduction
Literacy is one of the main aspects that can help individuals in globalization era which has a characteristics of unlimited media access [1]. Literacy was originally only defined as the ability to read and write. However, as time goes by, this definition develops into higher abilities such as understanding, knowledge, and analysis of complex concepts. This development is one factor the changing needs of the industrial world demand quantitative to qualitative demand. These qualitative demands can be interpreted that today's industry workforce not only need technique competencies but also must have good Computational Thinking (CT) which is the pillar of collaboration, communication, creativity, and
problem-solving skills [2]. Therefore, literacy skills need to be developed starting from early education because good CT can be achieved if an individual has good foundation of literacy skills.

Previous studies show that situational and personal factors very much affect a person's level of literacy. Situational factors consist of family, community, surrounding environment, culture, and media. Personal factors consist of age, education, socioeconomic status, ethnicity, occupation, and motivation. Self-motivation is a basic desire that encourages individuals to achieve various needs of themselves. To meet the basic needs of students, the teacher uses the natural curiosity of students' curiosity by presenting suitable and meaningful material to students [3-5]. We believe, one of the solutions is cultivate student's intrinsic motivation to use CT by utilize Ikigai concept on teaching and learning activities. The Ikigai role as motivation template has been endure for millennia and proven, if used properly, to be most important factor that help eastern culture people achieve self-actualization [6-9].

Based on preliminary investigation, the millennial generation experienced a multilevel challenge in its efforts to improve the literacy skills [10]. There is also result that show Indonesians Millennial Generation had low level frequent to use High Order Literacy Skills (HOLS) [11]. Therefore, the low level of high literacy skills needs special attention in order to preparing graduates with the competencies that are suitable for the needs of the industrial world. Competencies expected from students are expressed in general learning objectives that must be mastered or displayed after the learning process is complete. By combining Ikigai concepts and progressivism education theory for learning models and supported by the right evaluation instruments, it can accommodate students to develop HOLS then help achieve self-actualization. The type of assessment instrument for our design are performance assessment. Performance assessment developed in accordance to occupation competencies. We also implemented Goal-Setting Intervention, personality test according to Myers-Briggs Type Indicator, then assess learner style of every participant according to 4MAT system [12-14]. Therefore, learning experience provide by our design not only has purpose to prepare student for a profession, but also give holistic experience that would redefine student as a person.

2. Method

Product development is done by Research and Development (R&D) Method with Akker procedure scheme. It consists of 4 phases, which are, (1) Preliminary Investigation, (2) Theoretical Embedding, (3) Empirical Testing, and (4) Documentation, analysis, and reflection on process and outcomes [15]. On Phase 3 (Empirical Testing), we conduct formative evaluation for assessment instrument as state on figure 1:

![Figure 1. Formative evaluation.](image)

We use Lawshe Content Validity Ratio (CVR) analysis for Expert Review stage. We use CVR index 0.51 because The CVR conducted on 14 panels. The panels are expert on education major and had experience more than 10 years. After that, the instrument must pass validity and reliability test on the small group evaluation and field test stage. The instrument will use on pre-test so it will create a dividing line between the sample that is the top, mid, and bottom achiever. Then the second instrument will use on post-test to assess and evaluate sample HOLS achievement. The samples number are 65 students (34 Males & 31 Females) majoring on System and Technology Information that meet the criteria needed for our research.
Based on those analysis, we plan that our goal-setting intervention treatment will consist of 3 stage, at stage 1 we try to assess personality and goal of the samples, the stage 2 are goal monitoring to assess and evaluate whether goal can be achieved or not. Lastly, the stage 3 will involve all communities on study location to share the samples “I Will” statement on web and social media [16].

3. Results and discussion

3.1. Indonesian’s Ikigai
As per procedure scheme state, we attempt to create intervention goal-setting based on Ikigai analysis then implement those findings to goal setting intervention and learning instruction. Basically, Ikigai template gave two main commitment that is commitment to self and commitment to group. We analyse that commitment to self are universal truth by nature. In contrast, commitment to group are tend to cultural relativism. Although Indonesia and Japan share relatively same culture, Ikigai template cannot be purely implemented on Indonesians. Many statements said that Indonesian had a great deal to emphasis success in life based on religions and must be approached very carefully because religions are very sensitive matter. So, we decide to modify the template to facilitate these cultural differences. Figure 2 illustrate framework of those process.

Figure 2. Indonesian’s Ikigai.

3.2. Pre-test results
We are currently at empirical testing phase at field test stage and still ongoing. Instruments use to assess and evaluate students HOLS achievement had pass of every validation and reliability test, it fulfil the requirement needed to be used on pre-test. The dividing line (class interval) created based on pre-test result show on table 1:

Table 1. Pre-test class interval.

| No | Interval | Freq. |
|----|----------|-------|
| 1  | 30-37    | 2     |
| 2  | 38-45    | 10    |
| 3  | 46-53    | 12    |
| 4  | 54-61    | 16    |
| 5  | 62-69    | 10    |
| 6  | 70-77    | 6     |
| 7  | 78-85    | 9     |

As seen on table 1, there are 12 samples on bottom class, 38 on mid class, and 15 samples on upper class. Bottom class represent samples with low rate of HOLS otherwise upper class has high rate of HOLS. The mid class diver to 3 which are mid-bot, mid, and mid-up. We interpret that mid class had neither good rate nor bad rate of HOLS, mid-bot tends to have low rate of HOLS, and mid-up have higher potential to get high rate of HOLS than 2 other mid class.
3.3. Ikigai treatment

The treatment consists of 3 stage. Based on pre-result, we invited the student started from the bottom class to participate. The first treatment is compulsory, so every student must participate on the treatment, while the next treatment is voluntary so we can see if there is difference between student who participate on every treatment ant those who are not.

At stage 1 first treatment, we told participant to write down and describe their ideal future versus the life they want to avoid. The guidance consists of habit, learning style, family, social life, leisure, family, and career. Every participant is given 1 hours’ time in a quiet and comfortable place. The first treatment is very important as it was intended to lay out foundation for their personality and other factor that affected academic achievement particularly the rate level of HOLS. Then we do interview session with question item such as such as, why you do that (good habit) and why you still do that (bad habit). After the session ended, we gave them variety of task with element of Ikigai for every personality that hopefully will help them discover a piece of purpose of life they want.

We are currently on stage 2 Goal monitoring. Early sign based on stage 1 treatment are very promising, we got a very good response from participant, not a single participant quit the treatment, also most of participants state that they feel much better after defining goals so they seemingly have direction in what to do every day.

4. Conclusions

We realize it is still too early to say that our design has great impact to cultivate computational thinking of millennial generations. However, the early findings show promise that our hypothesis are correct and still meet our expectations. We got good response from teacher for product's ease of use and provide clear assessment of students CT Skills. Student that can be described as skilled programmer often have poor communication or collaboration skills with societies. However, when the students have clear life-goal, those lack of social skills are gradually improved. Otherwise, student with good social skills but has poor technique skills, become more motivated to pursue computing knowledge.

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