

Undergraduate nursing students' experience using the combination of Flipped Classroom and Jigsaw strategy

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ABSTRACT

STIKES Suaka Insan Banjarmasin has been using the technique of Aronson Jigsaw as a cooperative learning by combining it together with flipped learning since the last semester. Earlier work by one of the authors suggested that Nursing students' in STIKES Suaka Insan had lack of ability in terms of independent learning and did not enjoy their studying in the large group setting. Some publication revealed that Jigsaw strategy consider to enhance cooperative learning by making each student focus on particular topic and be more responsible towards the learning outcome. In support of the implementation of Jigsaw, flipped learning has a strength to present the new environment for the millennial. Hence, by combining flipped learning and jigsaw strategy (FLJ) approach will provide an opportunity for the students to become more independent and ready to answer the challenges for 21st century Nursing Education. The aims of this study were to determine the effectiveness of FLJ on students' independent learning and determine the combination of FLJ trends among nursing students at STIKES Suaka Insan Banjarmasin.

This study combined experimental and descriptive qualitative research design, participated 2 groups who were divided by randomization process totaling 64 students; 32 students in control group (interactive lecture) and 32 students in the experimental group (combination of flipped classroom and jigsaw strategy). The study administered 21 agreement statements regarding independent learning among two groups and it was analyzed using mann-whitney u test. In addition to quantitative approach it is also important that the study gives attention on the trends of flipped classroom and jigsaw strategy based on students' perspective. Hence, 20 students in the experimental group were asked to join in focus group discussion (FGD). All the data in FGD were analyzed by content analysis.

Mean Score for the control group was at 63.74 and mean score for the experimental group was at 72.56. The qualitative analysis revealed some characteristic of the learners who joined in FGD. It also showed the factors affecting their learning in FLJ which includes time, facilities specifically rooms and types of co-learners within their class.

Findings revealed that the students in the experimental group gained higher score in their independent learning than the students in the control group. It indicated that teachers' adoption of FJL for students' learning activities is helpful for students to improve their independent learning. The findings provided the option for the nurse educators in STIKES Suaka Insan to develop FLJ by implementing its strategy and provide the nursing students to become more independent towards the learning outcome.

Keywords: Interactive lecture, Combination of flipped classroom and jigsaw strategy, Independent learning, Trends of flipped classroom and jigsaw strategy.

I. INTRODUCTION

In response to the global call for transformative education for health professionals for the 21st century, Indonesia has developed a new curriculum for Nursing Education. Professional nursing education in Indonesia has undergone major changes over the past decade. The curriculum was developed into an integrated program to improve students' knowledge, attitudes, and skills in dealing with the country's health problems. The purpose of the integrated structured curriculum is to mold the nursing students to become independent learners and thus become independent professionals; who are not only capable to solve problems, but be able to become the agents of change [1]. Instilling independence to the nursing students will pave the way to encourage them to be more responsible for their own learning. Therefore, the teaching and learning strategy is being shifted from

teacher-centered into student-centered education [2]. Sekolah Tinggi Ilmu Kesehatan (STIKES) Suaka Insan Banjarmasin in South of Borneo is one of the nursing schools in Indonesia. It provides 2 nursing programs; Diploma of Nursing and Bachelor of Nursing. The vision for the Bachelor of Nursing program is to provide excellent professional nurses in South of Borneo who are knowledgeable in medical-surgical nursing by educating them in global perspectives and caring practitioner equipped with fundamentals of nursing. This vision motivates the BS Nursing program to ensure the quality of nursing education, especially in medical-surgical area by improving teaching and learning method which is appropriate for the millennial.

STIKES Suaka Insan Banjarmasin has been using the technique of Aronson Jigsaw as a cooperative learning to replace the role of interactive lecture as an ultimate method in teaching medical surgical nursing course.

Earlier work by one of the authors suggested that Nursing students' in STIKES Suaka Insan had lack of ability in terms of independent learning and did not enjoy their studying in the large group setting which was done by interactive lecture. Some publication revealed that Jigsaw strategy consider to enhance cooperative learning by making each student focus on particular topic and be more responsible towards the learning outcome. By focusing on a particular content of the course, Jigsaw strategy could increase the ability of the students to communicate, develop the critical thinking skill, and problem solving skills [3]. Those competences are expected to be achieved by nursing students in recent year. In support of the implementation of Jigsaw, flipped learning has a strength to present the new environment for the millennial. Hence, by combining flipped learning and jigsaw strategy (FLJ) approach will provide an opportunity for the students to become more independent and ready to answer the challenges for 21st century Nursing Education.

Many nurse educators in STIKES Suaka Insan do not fully realize the positive effect of FLJ among nursing students because of lack of references, personal experience, and personal evidence to apply said teaching method. Hence, the result of the study provided justification to apply new teaching method by showing the positive impact for the millennial and the Information obtained from this study can be used as a parameter and standard in applying the FLJ approach in their actual classes.

II. RESEARCH QUESTIONS

1. How do student independent learning differ after using two teaching approaches, namely interactive lecture and FLJ?
2. How do nursing students perceive the trends of FPJ after experienced that teaching approach?

III. REVIEW OF RELATED LITERATURE

A. Interactive Lecture

The lecture is the most common method in teaching adult learners [2]. Many teachers could not remove lecture from their teaching activity. They reform their instructional style from traditional lecture to active learning in order to address students centered learning; they engage the students within group projects, discovery activities, experiments, and class presentation. Steiner et al explained interactive lecture as the lecture in which involves the participation of students in the content of a lecture for the specific subject matter. Thus, the students are no longer passive during the learning process. Interactive lecture raises the higher order thinking. It can facilitate problem solving, decision-making, and enhance

the communication skills. There are some approaches which the teacher can apply to help the students learn during the lecture process [5]: 1) Utilize the real examples to explain the abstract context of your lecture; 2) Provide the handout of the overview content, completed chart with enough space for taking a note and enumerate what the outcomes of the lecture session; 3) During the explanation time, give a time for "pausing" thus the students could have enough time to take a note; 4) Ask the questions to measure the level of students' understanding. Questioning is the key aspect in the interactive lecture. By addressing the question based on the objective of the lecture, could promote students' ability in analyzing, synthesizing, and evaluating.

Students learn well by "doing". During Interactive lecture, The teacher insert some various methods to encourage students to be more active in the learning process. Such a; brainstorming and buzz groups [6]. Brainstorming is a technique for encouraging the students' comprehension of an issue or topic. The teacher invites answer to a question or issue for the students and writes them on a board or other media without comment. Then, the teacher reviews the list of "answer" with the students. The answer could become the topic for the next lecture. This technique allows the students to learn from each other [7]. Buzz group refers to the activity of getting students to process and use new information to solve the problems. It encourages interaction between two to five students who working in a group for five minutes on a question, problem, or exercise set by the teacher.

B. Jigsaw Strategy

Jigsaw strategy was developed by Elliot Aronson. The ability of the groups' formation to resolve the task is the one of the goals in jigsaw strategy. The home groups allocate one member to each expert or research group to gather data to bring back to the home group [3]. To Implement the Jigsaw:

- Divide the material needed to cover a topic into four roughly equal parts. In upper division or graduate classes, you might assign four different articles. In introductory level classes you might need to assign four different sections of a chapter or four abridged articles. Finding four equal parts is sometimes tougher than it seems.
- Assign a different topic to each team member. You make assignment: for examples, all #1's will read the article by Johnson & John, all the #2' will read the article by Kagan, all the #3's will read the article by Milis, and all the 4's will read the article by Davidson.
- Develop and assign homework questions or essay over the material. These can be turned in for points or a grade in undergraduate classes. Jigsaw falls

apart if students are not prepared. Assigning questioning, reading logs, study guides or reaction papers helps to ensure preparation. You may write different questions for each article or you may simply ask for a summary. In small classes some faculty just check off students' work as they come in. Other faculty grade and/or response to the assignment.

- When class meets again, students consult with expert from other teams. When students arrive in class, they turn in their homework and then meet in expert groups. If you have a large class, you will have to have more than one expert group for each article: you don't want eight people in one expert group. Give the expert group instructions on their task.
- Experts return to their teams and teach. When students return to their base teams, have each team teach in the same order. This way, if a team's 2 is absent, team members can disperse and sit with the teams next to them when it's time for the #2s' to teach. If they all teach on their own schedule, you can't compensate for absences.
- Team synthesis activity. Try to design an activity that will synthesize the information that students learned in the four articles. They might analyze a case, write a team essay or position paper or solve a problem.

The jigsaw structure is somewhat complex. It may be best suited for when the students are comfortable with group work. There are high expectation and responsibilities placed on the students. Teaching the students in the original group can be a demanding experience for students. This can be mitigated if the jigsaw structure is altered so two group members share the same section and then join with another pair of students. If the sections are more open-ended so there is no single right answer, or if students are encouraged to take notes during the focus groups to provide a support when the original groups re-assemble [8].

The core competencies in Jigsaw strategy (Excellence, 2007):

- Writing, speaking and or other forms of self-expression
- Information gathering, such as the use of the library, computer/electronic resources, and experimentation or observation.
- Synthesis and analysis in problem solving and critical thinking including where appropriate, the application of reasoning and interpretive methods, and quantitative thinking.
- Collaborative learning and teamwork.

- Activities that promotes and advance intercultural and/or international understanding.
- Activities that promote the understanding of issues pertaining to social behavior, scholarly conduct, and community responsibility.
- A significant alternative competency for active learning designed for and appropriate to a specific course.

C. Flipped Classroom

Development of science and technology, especially with the advent of the internet paved the way for introduction of a number of teaching strategies for innovative learning. One of the new teaching methods for millennium students is a flipped classroom. This refers to a class where the teaching process and the assignment have been flipped over [9]. Commonly, teaching process and the information giving occur during class time and students will accomplish their assignment at home. In flipped classroom, the information and the direction will be given at home through video lectures, reading materials, or other instructional delivery methods. Then, students will work on the assignments in the classroom setting. A flipped classroom improves the innovative teaching strategy in the sense that it increases the students' involvement in class discussion, be their own master to accomplish the problem, find the solution, and enable them to engage in inquiry-based learning, and project-based learning [10].

The combination of the behaviorist and constructivism learning theory in a flipped classroom is described in the tenets presented on the following table. A flipped classroom is a combination of the behaviorist and constructivist learning theories [11]. The behavioral theory emphasizes on the teacher as the center of instruction in the teaching - learning process. The teachers still have control of the content including lectures and tutorials. The constructivist in a flipped classroom reflects the role of experience to develop the knowledge and create meaning. Students have a special role to participate and be active in the lecture content. The teachers collaborate with the students to understand the course concepts. The students learn in a social environment with classmates and get exposed through the information, feedback, and perspective from the other students.

The literature review published by Flipped Learning Network (FLN) in 2014 explained the four pillars of a flipped classroom. The component of the pillars describes the things which the teacher should affiliate to employ the flipped classroom, including (1) flexible environment, (2) learning culture, (3) intentional content, and (4) professional educator to engage the students in that process. Flexible environment refers to providing a new approach for the students to learning the specific material

and achieve mastery learning. Promoting a learning culture means a providing an opportunity where the teachers are not the center of the teaching process by engaging the students in meaningful activities. The teacher should organize the relevant learning content and consider the accessibility to all the students in realizing the intentional content. As a professional educator, teachers should maximize students' evaluation by observing them during the classroom schedule and recording data for a future flipped class improvement.

Lipton (2014) [12] in alchemy learning listed some steps to implementing a flipped classroom:

- Starting with a video maker of a lecture or lesson, providing reading materials, other learning resources or string together multiple online and digital resources into a lesson.
- Sharing the video or learning materials with the students through online system.
- Asking the students to access the learning materials at home or another possible place to study.
- Spend the class time differently and utilize it for meaningful activities.

The main principle in a flipped classroom is the students have accessed the learning material before they enter the class in order to ensure they are ready for meaningful activity during the class schedule. For many years, so many students attended the class without any preparation, and that served as the main impetus to flip the classroom.

D. Study on Jigsaw strategy and Flipped Classroom

Missildine, Fountain, Summers, and Gosselin (2013) examined the effect of a flipped classroom and innovative learning activities on academic success and the satisfaction of a nursing student. The study found that the examination scores were higher for the flipped classroom, however the students were less satisfied with a flipped classroom method than the previous method (lecture). Flipped classroom has a positive impact and experience for both faculty and the students. Students come to class ready to actively engage in collaborative learning through the use of case scenario, small group discussion, and other interactive activities. Because the nurse educators do not spend the entire class period lecturing, they have more time to facilitate in-depth discussion of class content and other active learning strategies.

A flipped classroom format supports creativity and charges the students with taking responsibility for their own learning by applying independent learning. In a flipped classroom, the significant role of motivation and demonstration of a greater awareness of the students' responsibility in making learning meaningful and

monitoring themselves are the basic indicators of independent learning [13].

Another study was conducted by Goda, Yamada, Hata, Matsukawa, and Yasunami (2016) examined the effect of flipped jigsaw collaborative learning on English as a foreign language learning (EFL) anxiety. The result showed that EFL learning anxiety items related to course preparation demonstrated significant changes following the flipped jigsaw activities. This implies that flipped jigsaw collaborative learning activities may promote learners' outside-the-classroom preparation, and that such preparation may lead to better performance and leaning anxiety reduction [14].

IV. METHODOLOGY

This study combined experimental and descriptive qualitative research design. Specifically, a randomized post-test only control group design was used to determine the effectiveness of the two strategies. The descriptive qualitative research design was also used to compliment the experiment. participated 2 groups who were divided by randomization process totaling 64 students; 32 students in control group (interactive lecture) and 32 students in the experimental group (combination of flipped classroom and jigsaw strategy). In addition to quantitative approach it is also important that the study gives attention on the trends of flipped classroom and jigsaw strategy based on students' perspective. Hence, 20 students in the experimental group were asked to join in focus group discussion (FGD). The research took place at STIKES Suaka Insan Banjarmasin, Indonesia. The subject of this study came from BS Nursing Student level III, who took the renal system course. Renal system is a crucial course for BS Nursing students. The load of this course is 3 units, and taught in a block schedule for 5 weeks. During the last week, the course coordinator arranged it as a schedule for make-up class. The researcher utilized the make-up class to conduct this study. This study was divided into three phases. The first phase refers to the preparation stage where the researcher completed the instructional module for the lesson, video, and the survey that were used for the study. The implementation consisted of 5 sessions; 4 sessions will be employed for teaching and learning (experiment process/second phase) and the last session for data gathering (third phase).

The survey questionnaire for independent learning was adopted from Sumartiningsih (2015) [15]. The survey questionnaire emphasized the development of a flipped learning for BS Nursing Students in University of Pelita Harapan, Indonesia. The tool has been confirmed as reliable with the value of Chronbach's alpha was 0.78 for Independent learning and 0.87 for Critical Thinking Skill. It completed with the ethical clearance from Mein Mochtar Riady Institute International ethic committee in Malaysia.

The Survey for Independent learning focused on three major themes including what the students actually did for class preparation (Item number 1-10), during the class activity (Item number 11-17), and after class activity (Item number 18-21). The guide questions used in the focus group discussion (FGD) was based on the Small Group Learning written by Cristina Mencias, PhD. The questions were formulated and pondered by the researchers. These questions were later committed to memory by the researcher assigned to be the chairman or the moderator of the discussion. For accurate recording, two cellphones were used during the entire proceedings, one served as a backup, in case there will be failure of recording to the whole process.

Independent Learning on the control group and experimental group were analyzed using Mann-Whitney Test because both data were ordinal. Test (intergroup comparison) and % gain scores were compared using a p value less than 0.05 to be considered significant. For qualitative analysis, all responses of students were coded into common themes that emerged. Themes were drawn from multiple responses per questions. Then, responses that have more than one student's answer in a similar way were counted as a percentage. The researcher coded answers as variations if the response was unique and different.

V. RESULT

A. Competency of students to demonstrate independent learning

Table 1 presents the distribution of students according to their responses in the survey on independent learning. The survey was conducted right after the implementation of the study during the evaluation phase. There were 21 statements regarding independent learning using Likert scale. Ratings ranged from 4: strongly agree to 1: strongly disagree and the highest favored score was 84 points. The mean score for interactive lecture was 63.74 and that of the FLJ was 72.56 The latter exceeds the passing rate indicating the higher propensity of those in the FLJ group to practice independent learning.

Their difference has been tested using Mann Whitney U Test. Obtained values showed a significant difference between students' independent learning in interactive lecture and in FLJ with p-value $0.000 < 0.05$. This result proved that responses students were statistically different from each other. Students appreciated the opportunities given to them to engage in practicing their autonomy and this is consistent with the competence required of professionals in the 21st century transformative learning. By becoming the independent learner, the students are expected in promoting a meaningful change for future nursing profession in Indonesia [1].

TABLE I. COMPARISON OF STUDENTS' PERCEPTIONS ON INDEPENDENT LEARNING BASED ON TWO TEACHING STRATEGIES USED

Parameter	Teaching Strategies	
	Interactive Lecture	FLJ
Mean Rank	63.74	72.56
N	32	32
Mann-Whitney	159.500	
Z-Value	-4.652	
P-Value	0.000 (significant at p=0.05)	

B. Qualitative Result

The result of Focus Group Discussion (FGD) among 20 students revealed their characteristics as a learner. It also showed the factors affecting their learning in FLJ which includes time, facilities specifically rooms and types of co-learners within their class. These are the characteristics of the learner who joined in FLJ group:

TABLE II. CHARACTERISTICS OF THE LEARNER

Response	Theme
<ul style="list-style-type: none"> "We want a thorough grasp of the strategy." "Reinforcements on the different strategies. At this point, we can still be confused as to the correct implementation of the different strategies." 	The Hungry Learner
<ul style="list-style-type: none"> The students are more motivated to answer and explain in (Jigsaw strategy). In large group setting (Interactive lecture) you do not have to answer the question from the teacher, perhaps your classmate will help you to deal with it. "I feel more pressure to explain or teach my fellow students in the same group" "As I mentioned earlier, learning is forced so it encourages me to study." 	The Pressure Learner
<ul style="list-style-type: none"> I enjoyed the class so much. Because the group is small and informal; everyone has their own inputs during and after the reporting. There is much exchange of ideas which you won't experience in larger group. I really enjoy because it is very interactive." 	The Social Learner

Response	Theme
<ul style="list-style-type: none"> • <i>“I like how the idea exchange.. We got to know ourselves better as learners. We also know the strengths and weaknesses of ourselves and learn the strengths and weaknesses of my classmates. Most of the time, we interact with each other and we actively participate.”</i> 	
<ul style="list-style-type: none"> • <i>“We could get a lot of information, it depends how we adapt it”</i> • <i>“In relation to the case discussions, there are specific cases and then there are expected knowledge that students are supposed to gain, so the teacher has to evaluate those students based on how deep is the research or knowledge they are contributing in the discussion.</i> • <i>“Yes, there is an intervention of the teacher in the discussions made by the students.”</i> 	<p>The Filtered Learner</p>
<ul style="list-style-type: none"> • <i>“What I can say about the ideas is that they’re connected to one another. Like for example when I say something, immediately there is a follow up statement related to what I’m saying. There are some cases when there are people who have different ideas but then what I like about it is that we all accept each others points of views. It is very peaceful and interrelated.”</i> • <i>“The good thing with that is that the students give their ideas, more or less, they are able to remember a lot of details in the sense that, it’s them who give the information, more than listening to the teacher. During these times, they listen to each other, they can agree with each other. There is no pressure in listening just to the teacher. They can agree to what their classmates are saying and they also contribute.”</i> 	<p>The Open Learner</p>

The following are the responses student made about using the flipped classroom and jigsaw strategy in terms of time:

- *“Maybe for me, I need more time, because I should understand the whole of the learning material and everything”.*
- *We adapt to the time*
- *“I think the answer to that question depends on how well the teacher facilitates the discussion itself. For example if the teacher knows the time limit well, he or she will be able to really commit to that time limit, whereas if the teacher is not that good, then the discussion will be prolonged. If the time limit is already met, but the discussion is not yet finished, then the topic itself will be compromised”.*
- *“When it comes to my experience, there is a different moderator who is a volunteer among the students and a facilitator who guides the group. It is the role of the moderator to ask everyone and to summarize in the end. With regards to time table, the moderator is already primed about it, so they are able to finish on time”.*
- *“So that emphasizes the role of the moderator or teacher- to ensure that the group is right on tract, to keep tract of time”.*

There are some common themes to the students’ responses about the room to implement the FLJ strategy:

- *“For me, I think it can be improved, the only classroom that we have, is in a letter U, when we are being regrouped.*
- *“Well specifically, for the classrooms that we use in those subjects, its here in the classrooms, I can say that it’s a good room for small group discussion because of the structure itself. It’s a circle like structure so everyone can see one another and nobody will feel secluded when having discussions. And it’s also cold and very well lit”.*
- *“Yes. It is very conducive for discussion”.*
- *“I think I agree with that. All our facilities are designed in such a way that no person’s back is in front of another person so each and everyone can see each other. Everybody can be viewed by the other members of the class. At the same time, resources wise, we have all the equipment like the projector”.*

These are the following responses of 20 students regarding their fellow student in the FLJ group:

- *“Definitely. As mentioned earlier, the learning in this strategy come from the members themselves.*

Unlike in a lecture where it is highly dependent on the lecturer, in small group it depends on the members of the group.

- *“I agree with what _____ said and what he has mentioned a while ago that in order for a group discussion to be effective, the members must have prior knowledge to the topic.”*

VI. DISCUSSION

The students in the experimental group gained higher score in their independent learning than the students in control group. This research showed a consistent result with the study of Missildine, Fountain, Summers, and Gosselin (2013) examined the effect of a flipped classroom and innovative learning activities on academic success and the satisfaction of a nursing student. The study found that the examination scores were higher for the flipped classroom, however the students were less satisfied with a flipped classroom method than the previous method (lecture). Flipped classroom has a positive impact and experience for both faculty and the students. Students come to class ready to actively engage in collaborative learning through the use of case scenario, small group discussion, and other interactive activities. Because the nurse educators do not spend the entire class period lecturing, they have more time to facilitate in-depth discussion of class content and other active learning strategies. The trends of new teaching method, creates a new environment and becomes the benchmark to apply it in other sessions of learning. Because, the learner characteristics, time, and room support its implementation.

VII. CONCLUSION

Findings revealed that the students in the experimental group gained higher score in their independent learning than the students in the control group. It indicated that teachers' adoption of FJL for students' learning activities is helpful for students to improve their independent learning. The findings provided the option for the nurse educators in STIKES Suaka Insan to develop FLJ by implementing its strategy and provide the nursing students to become more independent towards the learning outcome.

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