Role-sharing through Studio-Collaboration Based Learning: Lecturer-Student-SME's Owner Scheme

Bayyinah Nurrul Haq[1]
[1]Faculty of Creative Industry dan Telematic, Trilogy University,Indonesia
[1]bayyinah.nh@trilogi.ac.id

ABSTRACT

This paper discusses the design process experienced by industrial design students from the role sharing of lecturers - students - SMEs. A case study from a lecture at the design studio class of the Trilogy University which project theme aims to design a product according to the needs of the SME where they collaborate. The design stage conducted by students includes design research, concept development, exploration, production, and final presentation. The case study research is conducted in a descriptive qualitative. The results show differences in role sharing between lecturers - students - SME's owner due to differences in the type and background of the SME, business strategy andeducational background of SME's owner. To deal with these differences requires lecturers who have competence as, facilitators, and instructors.

Keywords: *Studio Based Learning, role sharing, Product development process*

1. INTRODUCTION

Studio-based learning (SBL) is a major course in product design majors that introduces core skills as problem-solving from the real world [1], design methods [2], and decision making through direct practice [1]–[5]. SBL courses generally have large credit scores as in [1], [2], [6]they require students to spend time in studio classes, workshops or doing field research. There is a similarity between SBL and Project-Based Learning (PBL) as a learning model referred to terms of its purpose and process and learning outcomes. Both SBL and PBL asks students to complete assignments in the form of projects for one semester [1], [6], [7]. Different from PBL that gives a clear problem and guideline [8], the task that becomes the project in SBL is an open problem, an ill-defined problem, an unsolved problem [1], [8]. Another distinct is the collaboration of lecturer and student interaction in SBL as in [2], [9] shows interaction that allows them to experience the division of roles get or provide feedback. The changing role's purposes are to achieve the expected final design, alternative solutions, or decide the stagnation of ideas[8], [10]. Research shows how campus invites partners from the community or industry to collaborate with students during the implementation of SBL to get an authentic experience in the industry[2], [3], [8], [11]. This effort gave positive results to various parties such as students get an authentic experience in the industry, meet and interact with designers or professionals in the industry[2], [8], [12]. This also provides motivation and reinforces the implementation goals of SBL [10], [11].The benefits for lecturers are as innovative learning strategies shows in [2], [8], [10]. While the benefits for the community or Small Medium Enterprises (SME) owners are getting ideas and new innovative product solutions [5], [8], [10].

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This study discusses the sharing of roles between Lecturers - students and community or SME owners during Studio lectures interaction at Trilogy University. The theme of the studio project is Design-based Product Design for SMEs. The division of roles is reviewed from each stage of the design process carried out during Studio lectures. The design process that is used as a reference is the flow that discussed in Wodehouse (2010) which simplified into four stages activities, namely: 1) Data gathering 2) Concept development 3) Exploration 4) Production Ramp-up - Production - prototyping[12].

2. METHOD

This study was descriptive qualitative by using a case study approach, so it needs to understand every phenomenon related to its context[7]. The Case study was conducted in Industrial Design at Trilogy University (DP), Jakarta.

Data is collected through interviews, observations during learning activities, study of documents related to learning activities and results. Data analysis was carried out in a qualitative descriptive manner[7]. There are 4 samples of students used as study material in this paper, named with initial RAN, MAR, RIN and RIS. Each student chooses a different SME. Two students carry out collaborations at SME which are purely business-oriented while the other at a sociopreneur-based SME. All four SMEs are based in Jakarta and surrounding areas, but one SME carries out production in two different places (Jakarta - East Nusa Tenggara).

Implementation of DP SME lectures studio consists of 14-16 weeks. Every seven weeks the lectures are held in the form of presentations in class which are witnessed by friends and fellow lecturers outside the lecturer supporting the course. Table 1 shows the flow of learning activities of DP SME students.

Table 1. Studio DP SME - learning process

Design Stage	Schedule	Lecturer	Student	SME's owner
Design Research	Week 1- 2	Introductory: SME in Indonesia Survey Briefing	Action Plan Look for SME	
	Week 3-4	Progress report reviewer	The survey, Observe, Interview SME	Interviewer/respondent
			Apply for design contract	Accept/reject design contract
			Compile progress report	Data provider, Production Facilities provider
	Week 5 - 6	Report analysis reviewer	Data analysis	Data provider, Production Facilities provider Report analysis reviewer
Concept Development	Week 7	Progress report reviewer	Progress Report	-
	Week 8		Mood Board analysis Concept design development	-
			Design Decision	Accept/reject design decision
Exploration	Week 9 - 12	Progress Report reviewer	Design Exploration Progress Report	Design reviewer

	Week 13	Reviewer	Design Decision	Accept/reject design decision
Production Prototyping	Week 14 - 16		Production – Ramp Up	Production Facilities provider Prototyping supervisor
Final Presentation	Week 17	Reviewer	Design Presentation	-

3. RESULT AND DISCUSSION

3.1. Result

Based on the learning process there was a picture that showed a division of roles between lecturers - SMEs Owner - Students. This relates to the learning objectives, competencies expected to be obtained by students. The description at each stage is as follows:

a. Design research stage

The four students carried out the design research stage in two places, at the SME location, and on-campus for the needs of data collection, data analysis, and progress assistance. There are differences in the process of the four associated with this type of SMEs in terms of displaying information about the business profile, details of the research stage shown in table 2.

Table 2. Design research stage on Studio DP UKM

	RAN	**MAR**	**RIN**	**RIS**
Data gathering	Interview	Interview	Interview	Interview
Data Source	Website Owner	Website Owner	Owner	Owner
Data analyzing method	SWOT analysis Product Portfolio analysis	SWOT analysis	SWOT analysis Product Portfolio analysis	SWOT analysis Product Portfolio analysis
Problem defining	"trend demands require new styles development "	"need a new product line"	"need a new product theme"	"need a new product theme"
Lecturer's Response	depends on SME's owner's decision	Agree	Agree	depends on SME's owner's decision

b. Concept development

The SME category based on its business base influenced in this phase. There are some differences in responses to the submission of solutions by students. Table 3 shows how MAR and RIS implement collab - design in sociopreneur-based SMEs. Whereas RAN and RIN work with SME based entrepreneurial businesses.

Table 3. Concept development stage on Studio DP UKM

	RAN	**MAR**	**RIN**	**RIS**
Design Innovation (proposal)	Making existing types, developing new material blends	Create new types that integrate existing product features	Make an existing type but change some parts	Open new market Develop new techniques and materials (additions)
	Rattan coffee table, top table made of glass	Card wallet as well as a coin wallet	Sandal shoes – sling back with a Betawi theme	an easy chair with a wooden frame is covered with a woven newspaper

				which is rolled and woven
	Rattan is a new material that tested by the company recently.	SME standard material	SME standard material	Chair frame material has never been used by the company. Used newsprint material is the main raw material available at the SME
	Try a new style that will be carried by the company next year.	Following the style, which is already there.	Following the style, which is already there.	Try a new style with an existing "feel".
Business innovation	Opening up Business to Business type market opportunities	the same segment, target, market strategy	the same segment, target, market strategy	the same segment, target, market strategy
Lecturer's Response	Agree	Agree	Agree	depends on SME's owner's decision
SME's Owner Response	Agree to the terms	Agree	Strongly agree	Agree to the terms

c. Exploration – testing and refinement

Students activities on this phase are test concepts by making visualizations, presentations in the form of sketches, drawings, 3D drawing, and submission of material charts. During the 9th-12th week, students did more independent exploration work, because the SMEs that were used as collab sites generally did not have facilities for drawing. Like on-campus or at a student's home.Table 4 shows differences in where, how, and the results of student activities in this phase.

Table 4. Exploration, testing and refinement stage on Studio DP UKM

	RAN	MAR	RIN	RIS
Sketches/drawing	At home	On campus	On campus	On campus
3D drawing	At home	On campus	On campus	At home
Detail drawing	At campus	At home	SME	At home
Lecturer's Response	the proposed design is understandable but asks some improvement.	the proposed design is understandable but asks for SME's opinion.	the proposed design is understandable but asks for SME's opinion.	the proposed design was less understandable and asks for SME's opinion.
SME's Owner Response	Agree to the terms	Agree to the terms	some of the designs submitted were highly approved	the design submitted was less preferred

d. Production ramp up - prototyping

After the final design is approved and deemed ready for production, four students experienced varies conditions. Table 5 shows this condition is influenced by the basis of the SME where they collab. RAN and RIS who innovate the use of materials for their design faced production constraints.According to the final design, SME where RAN collab is not ready to produce. SME's machine operators are not ready to combine two materials that have different production techniques, so 3-4 weeks is considered inadequate.

MAR has been hampered by the availability of main material, tenun ikat fabric. The fabric is only produced two to three times a year. If there is no material stock, the SME will not produce. To outsmart the situation MAR must find other materials that have the same character and do production in SME.

The SME where RIN collab is a conventional entrepreneur-based SME. As a conventional entrepreneur, having strength in terms of material stock and reliable craftsmen. SME's owner always chooses designs that still have the same product form and usage, the use of materials and the same design details. Because the RIN design does refer to existing designs, the production process runs smoothly according to the specified time target.

RIS collab at a community-based sociopreneur SME, apparently, they are not ready to produce furniture based on wood frames. That material has never been used before. They asked RIS to work on the framework outside the community, and do the rest in the community.

Table 5. Production ramp up, prototyping stage on Studio DP UKM

	RAN	MAR	RIN	RIS
Material	The new material available	Raw material not available	All material available	The new material not available
Method	The new technique that the operator can learn.	Same technique	Same technique	the new technique, rejected by all operators.
Machine /operator /Craftsmen	Tools are available, the target date disagreed.	Tools available, Time approved	Tools are available, the target date agreed.	Tool not available, Time disapproved.
Lecturer's Response	recommend a design revision	recommends looking for materials with the same character	Production Plan approved	recommend a design revision
SME's Owner Response	Accepted on condition Asked to look elsewhere for certain parts	Willing to production	Willing to production	Accepted on condition Asked to look elsewhere for certain parts

3.2. Discussion

Based on observations, it turns out that there is a change in the role of the Lecturer - Student - SME 's owner, in SBL practice generally what happens in class is the role of the Lecturer/staff as a decisive client in the client - servicing model [4]. In this case, what happens is the difference in the roles of the three affected by 1) type of company, 2) type of product 3) marketing strategy and product sales. The explanation is as follows:

• Division of roles influenced by types of SMEs - challenges for design students

There is a difference between sociopreneur-based SME and pure entrepreneur-based SME. At pure entrepreneur-based SMEs students are challenged with business strategies that run in the company. The student problems are the concept design development and a design exploration that must proceed according to the rules of SME's Owner.

While in sociopreneur-based SMEs, the challenge is the organizational culture that will affect production ramp - prototyping. At the SMEs, the student faced design constraints, such as material availability and craftsman skills that must be taken into account from the start. The consequence is the final design chosen must be completely changed to accommodate material or craftsmen problem. Material unavailability happened because it has not been produced by the community due seasonal production. Craftsmen problem occurs when they do not master the production technique associated with the selected design.

In the previous research, the refinement process occurred after collaboration between lecturers and peers only, because students had discretion in the production ramp - prototyping

ramp [9]. They will only depend on on-campus facilities. In this case, SME has a strong role in determining decision making in terms of generating concepts and design refinements.

• The division of roles is influenced by the background of SME's Owner - innovation and decision making

Factors affecting the level of product innovation in the company is the designer of decision freedom in exploration and exploitation of the design [5]. In this case, innovation and designer freedom are influenced by the background of the SME's owner.

There are different ways of implementation between SMEs that have traditional entrepreneurial with modern entrepreneurs. This grouping is viewed from the background of SME's owner regarding the educational background related to the design or sales-entrepreneurs. Traditional SMEs tend to emphasize the development of existing products based on their experience. So that product innovation is carried out only in the area of changes in shape, color, blend of materials that already exist in the factory or consumer tastes that are recognized by SME's owner. This shows how students learn about intuitive thinking in decision making from the real world[1], [10].

On the other hand, product development at SME's that has a design school background or the like tends to expect students to innovate in-line with marketing strategies, design styles that are / will be developed. It is a familiar condition with the design process that is usually done in the classroom, but students still find challenges in interpreting the product innovation strategy in the modern SME into the testing - refinement phase, especially in the form of drawings, sketches, and tastes[8].

• The role of lecturers as facilitators in each design stage

Lecturers act as monitors, providers of information and at the same time always reflect on each process that is being undertaken by students. This is influenced by the consideration of competencies that affect the success of students who must be prepared from the beginning[2], [6]. Competencies that play a role in the success of studio collaboration -based learning projects that involve the SME are:

Students research abilities in the design research stage include the ability to interpret data, do framing precisely the various problems of products owned by SME. Proper framing can be categorized as an intuition area, because not all decisions are purely on the results of data analysis[3], [12].

Communication skills, especially in terms of negotiations with people from various social, economic and educational backgrounds. The flexibility of interpersonal communication affects the smoothness of each design stage experienced, especially when in the SME environment[1], [9].Time management capabilities, related to the maturity of the calculation of the length of time of production and determine the tolerance of delay. Students are faced with a real manufacturing process, various technical obstacles that are only found in the real world[2].

These things are soft skills that lecturers may need to prepare from the start, simulations in class can be an alternative to introduce design research methods and communication techniques, negotiations[4], [8].In studio-based learning, generally, the lecturer-student activities that occur are assistance, evaluation, giving direction and advice. Referring to Diaz (2017)the difference ina design process that each design student goes through will vary depending on the fieldwork, the type of project, and the institution where the designer works[6]. Then a reflection session with students is needed for each process that has been undertaken either individually or together. This is to bridge the gap between the design process that is studied theoretically with its practice in the real world[1], [6]. In the end, students will build a complete conclusion on the learning process that they have passed [13].

4. CONCLUSION

The studio-based learning - collaboration approach based on this experience, shows the difference in the role sharing between lecturer - student - SME's owner. This difference promises positive things in studio-based learning innovation. Students as the center of learning activities get a lot of insight, find different perspectives on problems to understand unique design decisions. SME which is part of design collaboration gets new insights from a theoretical academic point of view to carry out design innovations. The lecturer gained experience as a facilitator who could oversee outside the ring but occasionally becomes an instructor that had to be able to take control to correct the bad conditions faced by students when they made mistakes.

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