

TRANSFORMING ARCHITECTURE LEARNING INTO COMMUNITY SERVICE: Reflection on the Design of Banongan Ponds and Islamic Boarding Schools with Actor-Network Theory

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Abstract - All universities in Indonesia have an important role as outlined in the Tri Dharma, namely carrying out the mission of education, research, and community service. Every academic community is obliged to carry out and integrate these three roles. However, in reality, the development of science and technology through education and research is still quite far from its use for the community. As members of the academic community, architecture students can contribute to bridge the gap between the development and use of science and technology, for example by implementing architectural learning to help design social facilities in a participatory or collective manner. Therefore, this study discusses the transformation of architectural learning into community service by taking a case study of the design of ponds and Banongan Islamic boarding schools in Situbondo Regency. The aim of the study is to reflect on the transformation process by using qualitative research methods based on the perspective of actor-network theory. The results of the study indicate that the synergy between architectural learning and community service can provide a learning space to advance pro-community architectural knowledge while at the same time producing pro-innovation social facilities for the welfare of people's lives.

Keywords – Architecture learning, Community service, Pro-innovation, pro-community, learning space, actor-network theory.

Introduction

Universities in Indonesia have a mission of education, research, and community service based on the Tri Dharma. But unfortunately, the mission of education or research and community service has not been fully implemented in an integrated manner. This means that most educational and research activities have not really been oriented to community service or empowerment (Yuliar, 2011). On the other hand, a number of community service activities have not been based on the educational process and research results, but are still often considered as an effort to provide donations and assistance to disadvantaged communities (Riduwan, 2016).

The implementation of a comprehensive mission of education, research, and community service can realize the expansion of reciprocal relations between academics and the community. Community involvement in research activities of academics, such as through seminars, counseling, and workshops, can encourage research activities to always produce adaptive applied benefits and have social and noble values (Widaningsih & Barliana, 2009; Noviana, 2010; Rahmat & Mirnawati, 2020). On the other hand, the implementation of the results of research activities that generally produce novelties can result in innovation, added value, and efficient use of products and technology for society (Kadiman, 2008; Etzkowitz & Leydesdorff, 2000; Yuliar, 2011). Thus, the linkage between the development and use of science and technology is an important matter and a requirement for the development of pro-society science and its pro-innovation application.

The development of pro-society knowledge and its pro-innovation implementation will run easily if academic actors (researchers, lecturers, and students) have a conducive and relevant relationship with non-academic actors (community, businessmen, and policy makers). This can be achieved by providing enough science and technology options to be negotiated collectively with the existing social contexts, interests, and characteristics of potential users (Adib, 2016; Putri & Mutiarin, 2018). Another way is to create discussion and communication forums to bridge academics and non-academic actors before the research and development of science and technology takes place (Peshin et al., 2009; Fizzanty, 2017; Hermawati, 2017). In addition, in general, the development of pro-community knowledge and its pro-innovation application will be achieved when learning and research is carried out in the form of participatory and community services (Munawaroh & Mutiarin, 2019; Rochmah, 2020).

As actors in academics, university students can participate in synergizing the development and use of science and technology, namely by integrating learning/lecture and research activities into community service (Maurina & Prastyatama, 2016). More specifically, architecture students can apply the learning outcomes of architectural design to help provide social facilities that are truly in accordance with the aspirations and needs of the community or community group. This can be done through participatory/collective design efforts, namely by involving the active role of the community directly during the design process (Tumilar, 2019; Hayes et al., 2021). In the end, the participatory/collective design process is expected to be able to produce a network of reciprocal relations between academics and non-academic actors in order to open up learning spaces, especially for students and the community.

The case study that was appointed to discuss the transformation of learning/lectures into community service in this study was based on the author's lecture assignment as a master student of the architectural study program in the course "Local Culture and Architectural Design" at the Bandung Institute of Technology. In short, in this assignment the author was asked by the lecturer to choose a research topic about socio-cultural practices in society. The selected topic of socio-cultural practice is then used as a participatory/collective design case (project) by involving the community directly during the design process. The purpose of this design project is to provide added economic, social, and environmental value to the community through architectural design. Based on the author's considerations and the approval of the lecturer, the research topic was selected on shrimp farming practices by local communities in Banongan Beach, Situbondo Regency. In the end, the pond and pesantren design project was formulated in order to realize the common goal of the local community, namely developing shrimp farming business practices with agricultural technology integrated with pesantren and tourism activities.

The purpose of this study is to reflect on the process of transforming architectural learning into community service. Because basically the transformation (Permana et al., 2018) of the development of science and technology through education and research into adoption activities is not a transformation of knowledge that moves linearly in one direction—because there are differences in competence between academics and non-academic actors. However, it can reveal various networks of relationships that go both ways or back and forth between academics as researchers, elements of science and technology, and society as adopters (Hartiningsih, 2015; Wirasuta, 2019; Yuliar, 2011).). The existence of relations in the transformation process can be well analyzed through the perspective of actor-network theory (Priyatma, 2013; Yuliar, 2011). Thus, specifically, the results of this study are intended to provide an understanding of what and how the relationships, adjustments, and resultant actual situations that occur between students, architectural knowledge, and the community in the transformation of architectural learning into community service through the design of ponds and the Banongan pesantren in a participatory/collective manner.

Method

This study uses a framework based on actor-network theory. The actor-network theory is a theory based on a network of relationships between actors that are formed through a series of translational or adjustment processes (Latour, 2005). The unique thought concept of actor-network theory that distinguishes it from other social theories is the introduction and inclusion of technical objects into the network of relations among social actors (Tabak, 2015; Latour, 2005). Based on the network theory, both social actors and technical objects are considered to be active agents in the network of relations. Therefore, every social phenomenon should be seen from a socio-technical "glass". Furthermore, because it examines relations in adjustments, actor-network theory is a suitable approach to study phenomena in motion, not in static settings (Couldry, 2008).

In the realm of architecture, network actor theory has been used to describe a series of design processes (Fallan, 2008; Storni, 2015) and extract explicit and academic knowledge from design practice (Ekomadyo & Riyadi, 2020). There are also other studies that use actor-network theory to study the negotiations between designers, market participants, and users (Yaneva, 2009). Several other studies have tried to map the role of a certain built environment in social relations, such as coworking spaces in the StartUp community in Bandung (Agirachman & Ekomadyo, 2017), communal spaces in social activities of waste management (Achsani & Ekomadyo, 2018), public spaces communal learning in social learning (Ekomadyo, et al., 2019), or decreased attention to an old building due to the shift in technology used by the community (Rizal & Ekomadyo, 2021). There are also those who link an architectural object in the knowledge production process within a community group, such as the role of traditional leaders in each process of building a Bugis house (Hatta & Ekomadyo, 2020), a network of actors and art artifacts in Kampung Lukis Jelekong (Prasetyo & Ekomadyo, 2021).), or how the innovation network is discontinued at the prototype stage and the implementation of a geodesic dome (Aditra & Ekomadyo, 2021).

In this study, actor-network theory is used to reflect the process of transforming architectural learning into community service by taking case studies on the design of ponds and Banongan Islamic boarding schools. This reflection is basically an activity to explore the practical experience of the transformation and turn it into clearer general knowledge. Furthermore, by providing a description of the reflection of the transformation of architectural learning into community service, it can be easier to trace the relationships, adjustments, and resultants of the actual situation between students, architectural knowledge, and society.

This research is a descriptive-explanative type of research to describe the stages of transformation from architectural learning/lecture activities to community service activities to assist the design of ponds and Banongan Islamic boarding schools. In other words, this research is actually a study to describe and narrate the stages of the learning-design-research activity process itself. The description of the stages of the learning-design-research activity process is explained as an effort to search for networks of relationships. Data collection was carried out by making transcriptions of each learning-design-research activity carried out with the help of recording devices, picture taking tools, and notes. To facilitate the representation of research data in the form of a network of relations, a sociotechnogram is shown: a simple illustration diagram containing the elements 1) 'points' nodes that show actors/actors and 2) 'lines' edges that show relationships. Then, the research data were analyzed and concluded qualitatively with the perspective of actor-network theory to reflect the transformation process that occurred.

Results and Discussion

Overview of Existing Social Conditions

Banongan is a coastal area in Situbondo Regency which has high productivity in the fishery sector, especially shrimp farming. However, the prawn farming business practice has not been carried out with a technology system that is environmentally friendly and sustainable. This causes the productivity level of shrimp farming in Banongan to decrease. Responding to this problem, Perusda (Regional Company) Banongan invites the community of fishpond entrepreneurs to implement shrimp farming practices through environmentally friendly agricultural technology innovations. Therefore, Perusda Banongan collaborates with the shrimp farming community to develop agricultural technology innovations. Because Banongan is an area that has a strong Islamic boarding school culture, a member of the fishpond entrepreneur community collaborates with the (chairman) of the pesantren foundation to introduce and teach students the practice of shrimp farming, as Banongan's leading sector, by implementing innovative agricultural technology. environmentally friendly. Furthermore, the author, as an architecture student, was involved in this

collaboration to help design social facilities that accommodate the goals of Perusda Banongan, the fishpond entrepreneur community, and the pesantren foundation.

Stages of the Transformation Process of Architectural Learning Into Community Service

Determination of Research Topics for Design. This research activity was initiated by learning architecture (and its relation to the socio-cultural context of the community) in the “Local Culture and Architectural Design” course in online lecture classes. In this course, students, including writers, are given knowledge by lecturers about local culture as a potential community competitiveness, the role of architecture to facilitate and transform local culture, relevant socio-cultural approaches to understand the interrelationships of local culture and architectural design, as well as case reviews. currently current. To deepen knowledge, self-awareness 'awareness', and critical thinking 'critical thinking patterns' architecture students on the relationship of local culture and architectural design and be able to implement architectural knowledge directly on the development of local culture as well as community empowerment, the author was given the task by the lecturer to make research with a topic coverage of socio-cultural practices in society which can later be developed through architectural design. In the end, the author chose the topic of research on shrimp farming business practices by local communities in Banongan Beach, Situbondo Regency. Shrimp farming business practices will later be developed through the design of ponds and Islamic boarding schools to provide added economic, social, and environmental value for local communities, namely increasing the competitiveness of shrimp sales as a pond commodity, integrating shrimp farming business practices with Islamic boarding schools and tourism activities, as well as providing environmentally friendly agricultural technology systems.

Preparation of Facility Program and Design Criteria. After the research framework was completed, the author held an informal online discussion with a representative of the Banongan shrimp farming community—previously, the lecturer introduced the representatives of the pond entrepreneur community to the author. In this discussion, the fishpond entrepreneur proposed and explained a business model plan to develop shrimp farming by implementing an agricultural technology system. The agricultural technology system aims to control and maintain an accurate balance of water temperature, water pressure, salinity level, and oxygen levels in the pond without chemical engineering—such as the addition of antibiotics—so that shrimp farming business practices can be run more environmentally friendly. The representatives of the pond entrepreneur community hope that this agricultural technology innovation can be applied by other Banongan pond entrepreneurs to jointly increase the productivity of shrimp farming. In addition to developing shrimp farming using an agricultural technology system, the representatives of the aquaculture business community in collaboration with the pesantren foundation in Banongan hope that the pond land can also be used to establish Islamic boarding schools, considering that Banongan itself is an area that has been influenced by a strong Islamic tradition. —with natural materials, such as bamboo.

Site Information Document Collection. Before starting the design activity, the author was assisted by representatives of the shrimp farming community and the director of Perusda Banongan as the land owner to collect design site data—before that, representatives of the aquaculture business community introduced the director of Perusda Banongan to the author. Representatives of the aquaculture community and the director of Perusda Banongan provide documents containing information on the location, boundaries, size of the area, conditions, development plans, and procedures for maturation of the design site land. Perusda Banongan in collaboration with the fishpond entrepreneur community hopes that land development through design activities at the site location will later be able to assist the development of environmentally friendly agricultural technology in shrimp farming business practices, empower local shrimp farming community entrepreneurs, improve land restoration in coastal areas, and increase regional income from tourism programs. Therefore, the objectives of the land development plan are also the basis for consideration in the preparation of the facility program and design criteria.

Concept Formulation and Preparation of Pre-Design Drawings (Schematics). After jointly developing the design criteria with representatives of the shrimp farming community and the director of Perusda Banongan, the researchers formulated a design concept to answer the design criteria. Based on the facility program and design criteria, a design concept was formulated to integrate shrimp farming ponds and their management facilities (technology) with Islamic boarding school education rooms and tourism facilities. Concepts and pre-design drawings underwent several adjustments and improvements. In the end, to facilitate the integration between facilities, the concept of a circular and semi-open building made of bamboo with a modular system was agreed upon.

Drafting Development Drawings and Presentation to Stakeholders. Gambar prarancangan yang telah disepakati disempurnakan menjadi gambar pengembangan rancangan. Selanjutnya, penulis melakukan presentasi final kepada perwakilan komunitas pengusaha tambak udang dan direktur Perusda Banongan untuk menjelaskan gambar pengembangan rancangan. Dalam gambar pengembangan rancangan ini ditampilkan sejumlah fasilitas rancangan dengan wujud bangunan secara lengkap dan menyeluruh, yaitu tambak-tambak budi daya udang beserta fasilitas pengelolaannya, ruang-ruang terbuka untuk memasarkan udang dan melakukan aktivitas wisata, ruang-ruang kelas, masjid, dan asrama pesantren. Setelah gambar pengembangan rancangan disetujui, gambar kerja dibuat untuk digunakan oleh komunitas pengusaha tambak dan Perusda Banongan pada tahap konstruksi.

Research Paper Writing. After the learning and design activities were carried out, the authors wrote a research paper to reflect on the transformation of architectural learning into community service through these design activities. The writing of this research paper aims to describe the stages during the process of transforming architectural learning into community service in order to gain knowledge and lessons from practical experience during the transformation process. Through a description of the transformation of architectural learning into community service, the relationships, adjustments, and resultant actual situations among writers as students of architecture, architectural knowledge, and stakeholders involved in design activities, are explored and discussed. namely the shrimp farming community, Perusda Banongan, and the pesantren foundation. In making research papers, the authors conduct discussions with lecturers in online lecture classes to get feedback on improvements to research papers that will be published in research journals.

The Process of Transforming Architecture Learning into Community Service in a Sociotechnical Perspective

Relationship Network at the Stage of Determining Research Topics for Design. Kegiatan pembelajaran/perkuliah arsitektur diselenggarakan secara daring melalui aplikasi telekonferensi. Karena dalam kondisi pandemi, aplikasi telekonferensi menjadi medium esensial untuk menghubungkan proses pembelajaran antara dosen pengampu dan mahasiswa. Dosen pengampu menyampaikan materi perkuliahan berdasarkan (dokumen) silabus mata kuliah dengan membuka kegiatan diskusi untuk melibatkan peran aktif mahasiswa. Mahasiswa, termasuk penulis, diberikan kebebasan dan kesempatan untuk bertanya dan menyampaikan pendapat kepada dosen pengampu terkait materi perkuliahan dan tugas penelitian. Tak jarang kegiatan diskusi interaktif ini menghasilkan wawasan-wawasan baru bagi dosen pengampu dan para mahasiswa. Kemudian, untuk membantu pelaksanaan (proposal) kegiatan penelitian menjadi pengabdian kepada masyarakat melalui perancangan fasilitas sosial sesuai dengan (dokumen) arahan tugas penelitian, dosen pengampu mengenalkan kepada penulis seorang perwakilan komunitas pengusaha tambak udang di Banongan sebagai calon pengguna fasilitas-fasilitas sosial yang akan dirancang oleh penulis. Dengan demikian, proposal kegiatan penelitian menjadi medium yang mengintensifkan relasi akademisi antara penulis dan dosen pengampu, lalu dosen pengampu menjadi mediator yang menginisiasi relasi nonakademisi antara penulis dan komunitas (**Error! Reference source not found.**).

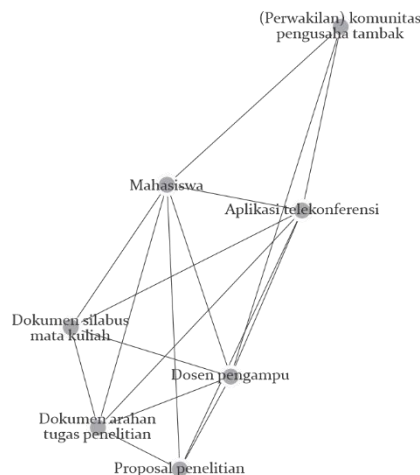


Figure 1: Network of relationships at the stage of determining research topics for design, 2020.

Source: Authors.

Relationship Network at the Facility Program Preparation Stage and Design Criteria.

An online meeting between the author and representatives of the shrimp farming community took place to discuss the facility program and design criteria together (Figure 2). This activity became the author's starting point to enter into the network of local community relations (non-academics) (Figure 3). In addition to accommodating the goals and needs of the pond entrepreneur community, program facilities and design criteria also facilitate the objectives of the pesantren foundation as a social partner and Perusda Banongan as the owner of the design site land which has been delegated to representatives of the pond community. In other words, (the report) on the formulation of the facility program and design criteria resulted from efforts to adjust the goals and interests of the authors as the initiator (project) of the design, the shrimp farming community, the pesantren foundation, and Perusda Banongan. In this design the author aims to provide social facilities to develop local socio-cultural practices and empower the community by using architectural (theoretical) knowledge. The pesantren foundation has the aim of establishing Islamic religious education spaces, and Perusda Banongan has the goal of increasing land restoration in coastal areas and increasing regional income through the provision of tourist facilities. These adjustments are considered very important to produce collective goals among the actors in order to achieve inclusiveness, a sense of shared ownership, and sustainability in the designed social facilities. In this design, a collective goal was obtained, namely developing shrimp ponds with integrated agricultural technology with Islamic boarding schools and tourist facilities.



Figure 2: Preparation of the online facility program and design criteria, 2020.

Source: Authors.

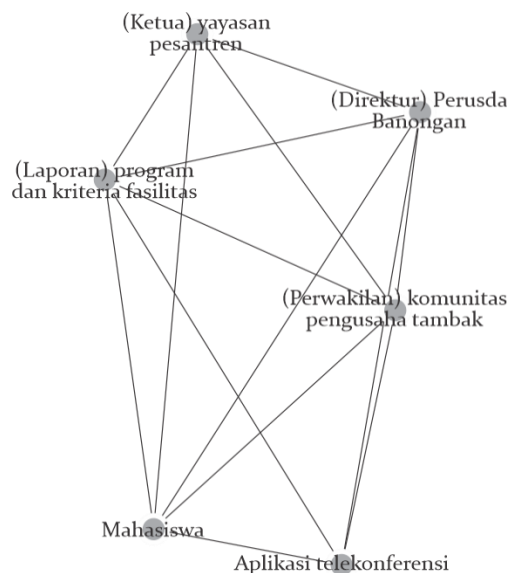


Figure 3: Network of relationships at the facility programming stage and design criteria, 2020.

Source: Authors.

Relationship Network at the Stage of Site Information Document Collection. To assist in calculating the size of the facility program area in the design site area, representatives of the shrimp farming community and the director of Perusda Banongan provided the author with a site design information document (Figure 4 and Figure 5). In addition to determining the extent of the facility program in the available site area, the authors also use site information documents to determine the actual context of the design site (Figure 6). In a pandemic situation, this site information document is very useful for writers as designers to understand and obtain design site data without having to come directly to the design site location. In other words, the site information document is useful for writers to make remote calculations and qualifications, namely to make relations, calculations and adjustments with technical objects (design sites) that cannot be reached, in design activities.

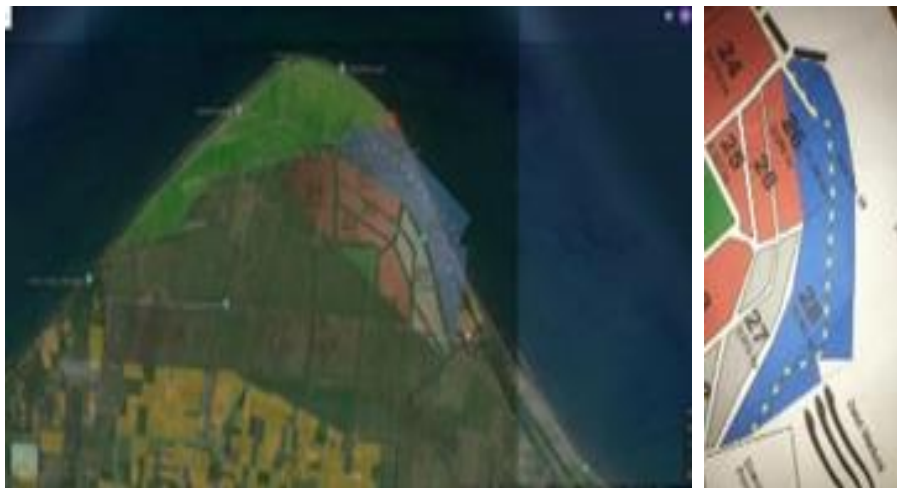


Figure 4: Site information document, 2020.
Source: Authors.

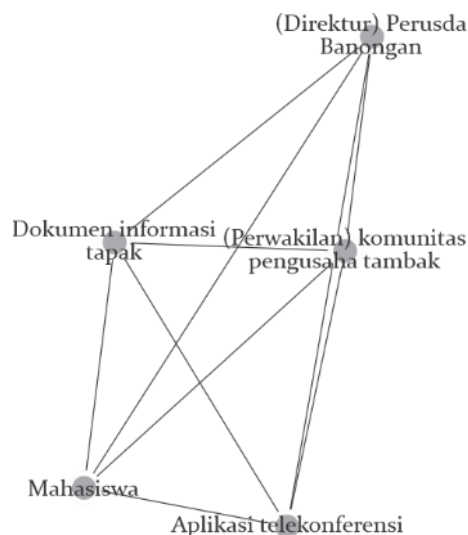
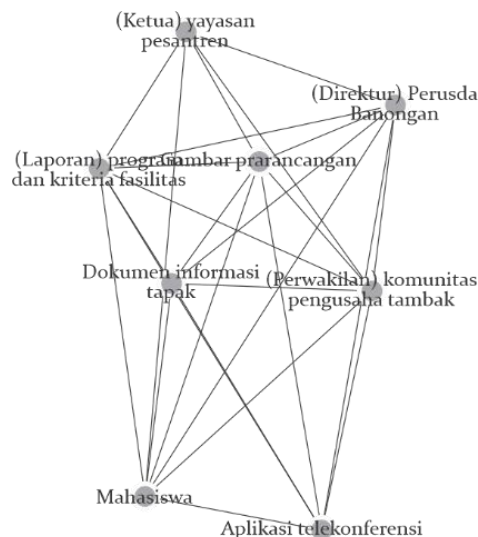


Figure 5: Relationship network at the stage of collecting site information documents, 2020.
Source: Authors



Figure 6: Photo of the condition of the design site

Relationship Network at the Concept Formulation Stage and Making Pre-Design Drawings (Schematics). After the facility program and design criteria were formulated, the authors held an online meeting with representatives of the shrimp farming community and the director of Perusda Banongan to discuss the design concept (Figure 7). Efforts to adjust the expected design concept between the author, the fishpond entrepreneur community, the pesantren foundation, and Perusda Banongan were carried out through intensive discussions. To facilitate the discussion of the design concept among all parties, the authors visualize the design concept proposals in pre-design drawings. The existence of adjustments to the design concept resulted in the creation of pre-design drawings being iterated several times. At the end of the discussion, a joint design concept was reached, namely a circular and semi-open building made of bamboo material with a modular system to facilitate integration between the designed facilities.



Gambar 7: Networking relationships at the stage of concept formulation and making pre-design drawings (schematics), 2020.

Source: Authors.

Relationship Network on Drawing Development Design and Presentation to Stakeholders. The author again held an online meeting with representatives of the shrimp farming community and the director of Perusda Banongan to present the final draft (Figure 8 and Figure 9).

The presentation—which was then followed by discussion activities—was aimed at explaining the overall design development drawing, accommodating minor improvements, as well as discussing the preparation for construction activities. The design development drawings are expected to later be translated into working drawings for construction work (Figure 10). On the other hand, the design development drawings that have been agreed upon by all parties, both the author and the stakeholders, are used as “field” data for compiling the author's research paper.



Figure 8: Presentation to stakeholders online, 2020.
Source: Authors.

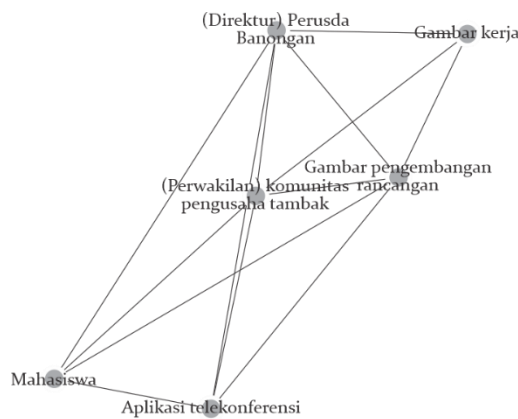


Figure 9 Network of relationships in making draft development drawings and presentations to stakeholders



Figure 10: Design development drawings, 2020,
Source: Authors.

Relationship Network at the Research Paper Writing Stage. After the collective design activities with stakeholders have been carried out, the authors present the final results of the design activities—previously, during the design process, the authors also periodically submit “field” reports—to the lecturers and compile research papers based on the author's practical experience during the design activities. Thus, the author re-enters the network of academic relations. During the preparation of the research paper, the author conducted a two-way online discussion with the lecturer. Research papers become a medium that strengthens the academic/learning relationship between the author and the lecturer. Furthermore, the research paper is also a medium that creates new academic relations between authors and research journals through peer review of research papers (Figure 11).



Gambar 11: Jejaring relasi pada tahap penulisan makalah penelitian, 2020.
Source: Authors.

Reflection on the Transformation of Architecture Learning into Community Service

At each stage during the process of transforming architectural learning into community service (then into research development/re-learning), socio-technical relationships occur. These sociotechnical relations involve social actors, from academics (students, lecturers, and research journals/publications institutions) and non-academics (shrimp farming community, pesantren foundations, and Perusda Banongan), and a number of technical instruments (proposals and papers). research and pre-design drawings and design development) which are generally circulated to facilitate the relations between these social actors. These sociotechnical relations always go both ways or back and forth through adjustments. These back-and-forth relationships show that the transformation of architectural learning into community service is not patterned in one direction, namely from learning activities to the use of learning outcomes or from academia to non-academics. The two-way relations between academic and non-academic actors through the assistance of a number of technical tools open up opportunities for reciprocal development and application of architectural knowledge.

Two-way relations between academic and non-academic actors through the help of a number of technical tools run through adjustments of goals, interests, and needs between social actors—as well as (the existence of) a number of technical tools (for example, site information documents that limit the calculation of area capacity). facility program in the available site area). In the process of transforming architecture learning into community service through design, adjustment efforts occur until a "slice" of collective design goals or objectives are found, especially among the authors as academic actors and a number of stakeholders (shrimp farming community, pesantren foundations, and Perusda Banongan).) as non-academic actors. In general, the collective goal articulated by the author is to implement architectural knowledge at the theoretical level on local socio-cultural practices and community empowerment. Meanwhile, the collective goal articulated by a number of stakeholders is to build shrimp farming facilities with integrated agricultural technology with Islamic boarding schools and tourism facilities through a design process based on architectural knowledge principles.

After the adjustment efforts, the results of the actual situation experienced by the author and a number of stakeholders can be observed. Through the process of transforming architecture learning into community service, the author as an architecture student feels more critical and sensitive to the existence of socio-cultural practices in society as a contextual element that must be truly understood and incorporated into architectural learning in addition to the "three elements" that have been described. commonly taught—strength, function, and beauty. Then, through this transformation process, the author also became aware that architectural knowledge should be able to be applied to answer social needs and problems in society, not merely fulfill the wishes of the designer. On the other hand, through the synergy between architectural learning/research and community service, the construction of social facilities can be carried out in a more focused and sustainable manner in accordance with architectural principles.

The existence of these relationships, adjustments, and the resultant actual situations indicate that the transformation of architectural learning into community service - a synergy between the two - creates and develops learning spaces in the field of architecture, both for academics and non-academics. The learning space plays an important role in the development of pro-community architectural knowledge and its pro-innovation application. The development of pro-society architectural knowledge can increase community support and involvement in research activities of academic actors. On the other hand, the application of pro-innovation architectural design knowledge generates added value for the community in the utilization of development results and the provision of social facilities so as to ultimately help advance the level of community welfare.

Conclusion

The process of transforming architectural learning into community service in the case study of the design of ponds and the Banongan Islamic boarding school involves two-way socio-technical relations between academic actors (students, lecturers, and journal publication institutions), non-academic actors (community of fishpond entrepreneurs). shrimp, pesantren foundation, and Perusda Banongan), and a number of technical tools (proposals and research papers as well as pre-design drawings and design development). Socio-technical relations run through adjustment efforts, especially between the author's goals as academic actors, the needs of stakeholders as non-academic actors, and the competence of a number of these technical devices until a collective goal is achieved, namely developing social facilities in the form of shrimp ponds with agricultural technology that integrated with pesantren and tourist facilities. The transformation of architectural

learning into community service through the design of ponds and Banongan Islamic boarding schools is beneficial for writers, as students of architecture, to better understand the existence of local socio-cultural practices in the community in architectural and design learning activities. On the other hand, this synergy is beneficial for non-academic stakeholders to obtain sustainable provision of social facilities based on architectural principles. Furthermore, the transformation of architectural learning into community service provides a tactical learning space that plays an important role in developing pro-community architectural knowledge and pro-innovation architectural design.

References

- Achsani, Rizky Amalia & Agus S. Ekomadyo. 2018. "Penciptaan Tempat Dalam Pengelolaan Sampah Berbasis Komunitas". *Jurnal Koridor* 9 (1): 85–92. <https://doi.org/10.32734/koridor.v9i1.1313>.
- Adib, Shahibul. 2016. "Kemajuan Iptek Dan Pembangunan Bangsa Dalam Perspektif Islam". *Al-Riwayah: Jurnal Kependidikan* 8 (2): 275–304.
- Aditra, Rakhmat Fitranto & Agus S. Ekomadyo. 2021. "Adoption of Innovation in Segregated Construction Project" 19 (1): 57–67.
- Agirachman, Fauzan Alfi and Agus S. Ekomadyo. 2017. "Analisis Teori Jaringan Aktor Pada Co-Working Space Dan Komunitas Startup Di Bandung". *Jurnal Koridor* 8 (2): 206–212. <https://doi.org/10.32734/koridor.v8i2.1348>.
- Couldry, Nick. 2008. "Actor Network Theory and Media: Do They Connect and On What Terms?". In *Connectivity, Networks and Flows: Conceptualizing Contemporary Communications*, edited by Andreas Hepp et al., 1st ed., 93–110. Cresskill: Hampton Press.
- Ekomadyo, Agus S. & Andhika Riyadi. 2020. "Design in Socio-Technical Perspective: An Actor-Network Theory Reflection on Community Project "Kampung Kreatif" in Bandung". *Archives of Design Research* 33 (2): 19–36.
- Ekomadyo, Agus, S. dkk. 2019. "The Role of Built Environment in Collective Learning: The Case of Rumah Sahabat Salman". *MIMBAR: Jurnal Sosial Dan Pembangunan* 35 (2): 306–313. <https://doi.org/10.29313/mimbar.v35i2.4811>.
- Etzkowitz, Henry & Loet Leydesdorff. 2000. "The Dynamics of Innovation: From National Systems and "Mode 2" to a Triple Helix of University–Industry–Government Relations". *Research Policy* 29 (2): 109–123.
- Fallan, Kjetil. 2008. "Architecture in Action: Traveling with Actor-Network Theory in the Land of Architectural Research". *Architectural Theory Review* 13 (1): 80–96.
- Fizzanty, Trina. 2017. "Mobilitas Peneliti Lembaga Litbang Pemerintah Dan Institusi Bisnis Strategi Penguatan Kapasitas Iptek Di Indonesia". In *Forum Tahunan Pengembangan Iptek Dan Inovasi Nasional VII*, edited by Nur Laili et al., 298–307. Jakarta: Pusat Penelitian Perkembangan Ilmu Pengetahuan dan Teknologi, Lembaga Ilmu Pengetahuan Indonesia.
- Hartiningsih. 2015. "Jejaring Dalam Difusi Inovasi Tungku Sehat Hemat Energi (TSHE), Kasus: Kulon Progo D. I. Yogyakarta". *Jurnal Pekommas* 18 (2): 73–82.
- Hatta, Asta Juliarman & Agus S. Ekomadyo. 2020. "Relasi Jejaring Aktor Masyarakat Suku Bugis Soppeng Dalam Tradisi Mendirikan Rumah (Mappatetong Bola)". *Jurnal Arsitektur ARCADE* 4 (3): 292. <https://doi.org/10.31848/arcade.v4i3.426>.
- Hayes, Niall, Lucas D. Introna, & Noel Cass. 2021. "Participatory Design as the Temporal Flow of Coalescing Participatory Lines". Lancaster: Springer Nature.
- Hermawati, Wati. 2017. "Peran Lembaga Swadaya Masyarakat (LSM) Dalam Proses Adopsi Teknologi Energi Terbarukan Di Perdesaan". In *Forum Tahunan Pengembangan Iptek Dan Inovasi Nasional VII*, edited by Nur Laili et al., 332–347. Jakarta: Pusat Penelitian Perkembangan Ilmu Pengetahuan dan Teknologi, Lembaga Ilmu Pengetahuan Indonesia.
- Kadiman, Kusmayanto. 2008. *Simfoni Inovasi: Cita & Realita*. Edited by Sonny Yuliar. Edition 1st. Jakarta: PT Foresight Asia.
- Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network Theory*. Edition 1st. New York: Oxford University Press.
- Maurina, Anastasia & Budianastas Prastyatama. 2016. "Eksplorasi Struktur Bambu Melalui Integrasi Pendidikan, Penelitian, Dan Pengabdian Kepada Masyarakat". In *Seminar Nasional Menuju Konstruksi Bambu Modern Masa Depan*, 1–8. Bandung: Pusat Litbang Perumahan dan Permukiman, Badan Penelitian dan Pengembangan Kementerian Pekerjaan Umum dan Perumahan Rakyat.
- Munawaroh, Siti & Dyah Mutiarin. 2019. "Implementasi Program "Keluar Bersama" Dalam Inovasi Pelayanan Publik Di Kecamatan Danurejan, Kota Yogyakarta". *JPPUMA: Jurnal Ilmu*

- Pemerintahan Dan Sosial Politik Universitas Medan Area* 7 (2): 122–131.
- Noviana, Ivo. 2010. "Participatory Action Research: Peningkatan Kesadaran Masyarakat Untuk Menjadikan Lingkungan Yang Bebas Narkoba". *Jurnal Penelitian Dan Pengembangan Kesejahteraan Sosial* 15 (3): 208–218.
- Permana, A. Y., Susanti, I., & Wijaya, K. (2018). The Transformation of Gegerkalong Girang Area, Bandung City: amid Educative and Religious Areas. *IOP Conference Series: Earth and Environmental Science*, 213(1), 012022. <https://doi.org/10.1088/1755-1315/213/1/012022>
- Peshin, Rajinder, J. Vasanthakumar, and Rajinder Kalra. 2009. "Diffusion of Innovation Theory and Integrated Pest Management". In *Integrated Pest Management: Dissemination and Impact*, edited by Rajinder Peshin and Ashok K. Dhawan, 1st ed., 2: 1–30. Berlin: Springer Science and Business Media B.V.
- Prasetyo, Eko Bagus & Agus S. Ekomadyo. 2021. "The Conception of Actor Network in Jelekong Art and Culture Village of Bandung Regency". *ARTEKS: Jurnal Teknik Arsitektur* 6 (1): 5–12. <https://doi.org/10.30822/arteks.v6i1.286>.
- Priyatma, Johannes Eka. 2013. "Potensi Teori Jejaring-Aktor Untuk Memahami Inovasi Teknologi". In *Seminar Nasional RiTekTra (Riset Dan Teknologi Terapan)*, 1–7. Jakarta: Fakultas Teknik, Universitas Katolik Indonesia Atma Jaya dan Fakultas Sains dan Teknologi, Universitas Sanata Dharma.
- Putri, Lolita Deby Mahendra & Dyah Mutiarin. 2018. "Efektifitas Inovasi Kebijakan Publik; Pengaruhnya Pada Kualitas Pelayanan Publik Di Indonesia". In *Prosiding Konferensi Nasional Ke-8 Asosiasi Program Pascasarjana Perguruan Tinggi Muhammadiyah (APPPTMA)*, edited by Khudzaifah Dimiyati et al., 389–404. Medan: Program Pascasarjana Universitas Muhammadiyah Yogyakarta.
- Rahmat, Abdul & Mira Mirnawati. 2020. "Model Participation Action Research Dalam Pemberdayaan Masyarakat". *AKSARA: Jurnal Ilmu Pendidikan Nonformal* 6 (1): 62–71.
- Riduwan, Akhmad. 2016. "Pelaksanaan Kegiatan Pengabdian Kepada Masyarakat Oleh Perguruan Tinggi". *EKUITAS: Jurnal Ekonomi Dan Keuangan* 3 (2): 95–107.
- Rizal, Randy & Agus S. Ekomadyo. 2021. "" MATTER OF CONCERN " PABRIK ES ALWI ASSEGAF PALEMBANG" 12 (01): 1–13.
- Rochmah, Alif Vanesia Elvina. 2020. "Inovasi Program Gone-Des Untuk Meningkatkan Kualitas Pelayanan Publik Kecamatan Garung, Kabupaten Wonosobo". *Jurnal of Politic and Government Studies* 53 (9): 1689–1699.
- Storni, Cristiano. 2015. "Notes on ANT for Designers: Ontological, Methodological and Epistemological Turn in Collaborative Design". *CoDesign: International Journal of CoCreation in Design and the Arts* 11 (3–4): 166–178.
- Tabak, Edin. 2015. *Information Cosmopolitics: An Actor-Network Theory Approach to Information Practices*. Edited by Ruth Rikowski. Elsevier. Edition 1st. Waltham: Chandos Publishing.
- Tumilar, Elaine Steffanny. 2019. "Nilai Kemanusiaan Dalam Proses Belajar Desain Interior Partisipatif Yang Berpusat Pada Pengguna". *Waca Cipta Ruang: Jurnal Ilmiah Desain Interior* 5 (1): 343–348.
- Widaningsih, Lilis & M. S. Barliana. 2009. "Pendekatan Partisipatif Dalam Metode Penelitian Arsitektur". Bandung.
- Wirasuta, I Made Agus Gelgel. 2019. "Transformasi Bidang Litbang Menjadi Badan Riset Dan Inovasi Daerah Provinsi Bali". *Jurnal Bali Membangun Bali* 2 (3): 107–118.
- Yaneva, Alben. 2009. "Making the Social Hold: Towards an Actor-Network Theory of Design". *Design and Culture* 1 (3): 273–288.
- Yuliar, Sonny. 2011. *Transformasi Penelitian Ke Dalam Inovasi*. Edition 1st. Jakarta: Penerbit Dewan Riset Nasional.