Responding to change in a medical student rural community service: Insights from activity theory

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Abstract

Introduction: Medical students have voluntarily initiated service-learning programmes with the aim of providing assistance to medically underserved communities, especially within remote indigenous villages. However, their values and goals have been challenged because rural health care demands have changed considerably since the introduction of integrated delivery system (IDS) programmes, that is, programmes that integrate local health care providers with outreach services provided by contracted hospitals. Our study aimed to explore how a health care service-learning group negotiates its position and how it responds to the tension of IDS implementation and changes in rural health care demand.

Methods: Medical students who have been engaged in building or operating the health care service-learning group of one university in Taiwan were invited to participate in the study. We used cultural–historical activity theory (CHAT) to help us interpret the interactions between students, indigenous communities and the public health sectors and to understand the evolution of the service-learning relationship and its effectiveness.

Results: Eighteen participants were recruited for in-depth interviews. The implementation of IDS programmes brought change to the rural community and challenges to students’ service learning. Utilising cultural–historical activity theory, we highlighted points of fragmentation within the system. This tension lead to medical students’ personal conflict and also served as an impetus for change and learning. Flexible goal setting and coping ability were considered critical to the sustainability and maintenance of students’ value systems.

Conclusions: IDS implementation can upset the balance of rural health care supply and demand, resulting in accumulating tensions within and between activity systems. Those contradictions exposed medical students to an expansive learning cycle, resulting in transformational change and learning. Under the context of IDS programmes, health care service-learning can create a ‘win-win’ situation. Not merely medical students but also community residents gain benefits. This result may be extrapolated to health care service-learning programmes with similar context.
Service-learning in remote communities is a valuable experience in medical students’ training\(^1\) whereby students engage in activities addressing human and community needs together with structured opportunities intentionally designed to promote their professional development.\(^2\) Its theoretical underpinnings can be attributed to John Dewey, who posited that the key to learning is the interaction of knowledge and skills with experience.\(^3\)\(^,\)\(^4\) Numerous studies have presented benefits of service-learning during health care training, such as gaining intra-/interpersonal skills\(^5\)\(^–\)\(^9\) and acquiring both academic and professional skills.\(^10\)\(^–\)\(^12\) Furthermore, service-learning has led to civic engagement and social responsibility.\(^13\)\(^–\)\(^15\) Over the past decade, medical schools have begun to incorporate community service into their official structured curriculum in response to the need for a greater focus on rural community health.\(^16\) However, given socio-cultural differences as compared with Western contexts, most community service-learning in Asian countries has been student-initiated and voluntary.\(^9\)\(^,\)\(^17\)\(^,\)\(^18\) Moreover, the biomedical model of treating disease and organic malfunction prevails within the Asian context. Service-learning as defined in its broad sense to encompass the social, psychological and behavioural dimensions of care,\(^19\) as yet, is not explicitly an embedded part of most medical curriculum in Asian countries. Student-initiated service-learning projects within these contexts have faced numerous obstacles, such as volunteer recruitment, obtaining recognition, funding for resources, cultural adjustment and responding to changing models of service delivery.\(^18\) Few studies have reported on how these challenges were addressed to achieve sustainability. This study aimed to explore, through the lens of cultural historical activity theory (CHAT), how a health care service-learning group negotiated its position and how it responded to the tension of changing models of service delivery and demands within the rural health care Asian context.

Provision of high quality health care to rural and remote communities is a longstanding global issue.\(^20\) The concept of the integrated delivery system (IDS) emerged in the 1990s in the United States as a means of enhancing the outcomes and health status of communities economically disadvantaged or suffering from chronic disease.\(^21\) These programmes integrate local health care providers with outreach services provided by contracted hospitals. Taiwan’s National Health Insurance Administration adopted this concept and has gradually implemented 50 IDS programmes for people living in remote areas since 1999.\(^22\) IDS programmes in Taiwan have achieved an acceptable level of satisfaction perceived by residents in remote mountain areas and offshore islands.\(^23\)

Prior to the introduction of IDS programs in Taiwan, only a few doctors and charities were devoted to community health care in rural areas. Under such context, medical students from our educational institution voluntarily initiated service-learning programmes with the aim of providing assistance to medically underserved communities, especially indigenous villages. Their motto was ‘We volunteer for community self-sustainability’. Medical students hoped to improve overall quality of life in rural areas to such a level where residents no longer needed their help and were self-sustaining. Medical assistance usually took the form of individual resident consultations for health problems such as self-wound care, low back pain, control of chronic hypertension or diabetes mellitus. Rural villagers provided accommodation for students and engaged students in community life through, for example, church activity that was an important aspect of the community. Given the scarcity of medical resources and specialist medical services, the consultation projects conducted by medical students were highly regarded and supported by the remote indigenous communities. However, with the expansion of IDS programmes and improved primary care, demands for voluntary medical services from students have decreased dramatically. This change has challenged the value and direction of service-learning within this context. Consequently, medical students have strived to find solutions to sustain their health care service-learning groups.

Our research questions are set as follows:

1. How does a health care service-learning group negotiate its position and respond to the tension of IDS implementation?
2. What opportunities for change present themselves through interactions between health care service-learning groups and rural communities?
3. How are these opportunities negotiated within a service-learning context?

### 1.1 Theoretical framework: CHAT

CHAT has been used as a theoretical framework to help us gain insights into the interactions between students, indigenous communities and the public health sectors and to understand the evolution of the service-learning relationship and its effectiveness from multidimensions. CHAT was chosen as our analytical methods because it enabled us to unpack what might be occurring over time when a new activity was introduced into interacting systems.

CHAT originated from the work of Vygotsky (1987) and Leont'ev (1978) and was further developed by Engeström (1987).\(^24\)\(^,\)\(^25\) It is a conceptual framework to describe and analyse how conceptual and material tools mediate humans’ interactions (i.e. conflict and friction) within their environments.\(^26\) The basic unit of analysis is the system that consists three major (subject, object and community) and three minor (tool, rules and division of labour) components. An activity system is oriented towards an object. The object embodies the long-term purpose of the activity, generating horizons for possible actions.\(^27\) The community in which subjects are embedded forms the social collective of the system.\(^28\) Individuals or subgroups (subject) that engage in the activity utilise mediating artefacts (also known as tools) to achieve their object. Rules exist within an activity system and govern actions and the way people are organised. According to CHAT, interaction within and between systems of activities is complex. It offers us a way to respond to the complex, multifaceted and increasingly multisystem problems encountered by the student-initiated service-
Drawing on CHAT principles, expansive learning is a product of the social dynamics between humans, played out within the material, cultural and historical contexts of work practices. It provides a unique way of analysing and promoting learning for change. Expansive learning initiates with questioning and analysing the problems and focuses on modelling the new solution, followed by examining, testing and implementing the new model. Learners reflect on the process to consolidate and generalise the new practice. Expansive learning is a cyclic process that focuses on learning of new patterns of activity that are not yet there; they are learned as they are designed.

In our Taiwan work settings, some service-learning projects persisted for long periods, whereas others ended within 1 year. It was our goal to identify those critical points that lead to project variation. We explored CHAT as a conceptual framework to help evaluate the effectiveness from multidimensions, through which interaction between medical students, host indigenous communities and public health sectors could be fully interpreted. Our findings illustrate a naturally arising expansive learning cycle. That is, CHAT moves our thinking about learning from the transmission of existing culture and practice to its transformation through expansive learning.

2 | METHODS

2.1 | Study design

We conducted a largely qualitative study with current and former medical students of Chang Gung University (CGU) College of Medicine in Taiwan, who were currently or had previously been a member of a voluntary student run health care service-learning group, LOKAHDA. A qualitative study design enabled an in-depth exploration of the perspectives and experiences of medical student participants of the LOKAHDA programme helping us understand students’ concerns about changes in rural health care demands after implementation of IDS programmes. Demographic data were collected to provide contextual information. This included participant gender, age and details about each participant’s community service involvement. Grade of medical students, number of voluntary times and total time of involvement were all included.

2.2 | Participants and recruitment

Participants were recruited through posters displayed on the university and hospital’s bulletin boards. The members of LOKAHDA who were willing to participate responded by telephoning or emailing our research team. The inclusion criteria of participants were as follows: (1) current or former medical students from CGU College of Medicine in Taiwan, who were members of the health care service-learning group, LOKAHDA; (2) at least one experience involving community service with LOKAHDA as a medical student.

Ethics approval was obtained from Chang Gung Medical Foundation Institutional Review Board (IRB No. 201901715B0A3). Written informed consent was obtained from all participants after we explained the risk and benefit of this research. Participation was voluntary.

2.3 | Data collection and analysis

Eighteen individual in-depth interviews were held with participants from January to November 2020 on the university or hospital premises. Study-specific topics were developed to assess the impact of the IDS on medical students’ voluntarily community service. Our interviews focused on several domains: (1) motivation of community service participation, (2) obstacles faced when participating in community service and (3) potential solutions to overcome these obstacles. For example, to capture the impact of IDS programmes, we asked, ‘What are your impressions about changes in rural healthcare demands since the implementation of IDS programs?’ The interviews were audio-recorded and transcribed into free-flow text. Subsequently, the transcripts were analysed independently by two researchers (CYH and YCC).

2.3.1 | Interview procedures

Two researchers (CYH and YCC) conducted the interviews. Each interview was held in a comfortable and non-threatening atmosphere to encourage open and honest responses, lasting approximately 30-40 minutes. Free discussion was allowed during the interview as the interview guide only served to prompt the interviewees about potential areas to discuss.

2.3.2 | Coding and analysis

All digital audio recordings of interviews were transcribed verbatim and identifying features removed. We drew on the process of inductive coding and the framework of Activity Theory to systemically identify, analyse and report the patterns we found. Two members of our research team (CYH and YCC) independently reviewed and inductively coded topics for discussion from 4 (20%) transcripts. This provided initial focus in identifying common key aspects of the data that directly related to the research questions and provided an initial coding framework that was used for coding subsequent transcripts. After all transcripts were coded, every transcript was analysed for a second time to ensure that all newly derived codes that came up in later transcripts were also checked in earlier transcripts.

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(see Figure 1). However, this alone did not yield a satisfactory explanation of the dynamic changes experienced under the context of IDS implementation, because it could not accommodate the presence of two simultaneous, mutually influencing activities (students and indigenous communities). Therefore, we used a third generation activity system, in which two activity systems could be positioned alongside each other to reveal both the commonalities of and the contradictions between the activities (Figure 3).

3 | RESULTS

Our interview findings are presented through the lens of CHAT, from the perspectives of former and current medical students interviewed. The demographics of interviewees, that is, their gender, age, grade of study, number of voluntary times they were involved in the project and other details about each medical student during their community service involvement, are listed in Table S1.

3.1 | Volunteer medical consultation: Mapping activity systems and objects of focus

When LOKAHDA (community) was initiated, the two main service-learning programmes were volunteer medical consultations and home visits. Figure 1 represents the activity system of the volunteer medical consultations project from 2002 to 2008 (AS0). Table 1 displays example quotes from our transcripts to illustrate aspects of the activity system. Approximately 20 medical students (subject) visited the villages of Fuxing Township every 2 months to provide health care services. The volunteer medical consultations’ primary object of focus, from the students’ perspective, was to learn how to provide health care services to promote medical accessibility for residents in medical underserved areas and raise health awareness. Students hoped that indigenous people would develop enhanced medical compliance to better control chronic systemic diseases. Improving rural health care and students’ own professional development (outcomes) were the anticipated products to emerge from the system. Before their community placement, students received training lectures (tools) including ECG interpretation, the technique of taking blood pressure and cast/splint in preparation for their LOKAHDA experience. System rules influenced the maintenance of LOKAHDA. Internal system rules applied such as reflection sessions in weekly routine meetings. Mutual engagement between students helped them keep flexible and sustained their initial values—improving the well-being of indigenous people by keeping in close contact and supporting them in their community. Reflections improved operations as there was constant evaluation, and the group strived to do more and provide better service for the target beneficiaries. Members within LOKAHDA assisted and trusted each other under every unexpected circumstance, so that consultations could be performed as planned. Although dealing with administrative affairs and routine group meetings took time and were frustrating at times, students in LOKAHDA enjoyed their work and the process of community service.

During each service-learning placement, the students were assigned various tasks in the village (division of labour) including setting up the clinic, registering villagers, taking blood pressure and history taking. After being clerked by medical students, patients were referred to doctors for diagnosis, therapeutic plans and dispensing medication. The home visits complimented the medical consultations. A questionnaire was completed during each home visit, giving medical students an opportunity to identify social issues and concerns about villagers. Therefore, it was anticipated that medical students could help improve awareness of health issues and habits of indigenous people.
TABLE 1 Example quotes of various items in activity systems

| Student activity system of volunteer medical consultations project (AS0) | Transformed activity systems (AS1 & AS2) |
|---|---|
| **Tools** | **AS1**: Preparatory lectures for LOKAHDA experience, e.g. bedside clinical skills | **AS1**: Preparatory lectures for LOKAHDA experience, e.g. bedside clinical skills and cultural diversity of local residents |
| ‘Before community placement, lectures including EKG interpretation, technique of measuring blood pressure, introduction of local healthcare system were arranged by grade six and grade seven medical students. Also, they would share their previous experience and principles in community service (S-01).’ | **AS2**: Visiting district medical centre; Student’s service-learning programmes |
| **Rules** | **AS1**: Reflective mechanism; Student-based health care intervention; Close knit member relationship & engagement; Mutual trust between students | **AS2**: Unique cultural diversity; Being supportive of students |
| ‘Every week, we have our routine meeting for more than 3 hours. It’s hot and stuffy to stay in our office. We usually draw the meeting to a close very late in night. No one complained but all enjoyed the process (S-11).’ | ‘We invited senior indigenous residents to share their cultures and stories with our club members. We hope to figure out difficult situations they are facing through these speeches so that we could conduct more helpful projects to help them (S-15).’ |
| **Division of labour** | **Division of labour** | **Division of labour** |
| ‘We set up our goals: first, we provide medical resources to those medical underserved areas; second, home visit is necessary to learn whether their cultures and habits are associated with their diseases (S-13).’ | ‘We conducted “Juicy peach” project because small-holder farmers in Fuxing Township have difficulty selling surplus of peaches due to lack of high technology and funds each May... Their goal is selling, while ours is receiving peaches. “If we order over 100 boxes, you ship peaches for free.” That’s our deal. Then we bargain with the prices. We don’t receive a commission on sales. Everything works smoothly (S-06).’ |
| **Primary object** | **Primary object** | **Primary object** |
| ‘We learned how to prescribe medications and treatment to disease in our school. However, the local residents’ medical compliance was very poor—lack of consistency to take medicines. How to make them take medicines regularly? It is a social-psycho problem to let the patient trust you. That’s our goal of medical consultation project. I learned these after I went community servicing. Medical education is poor in this aspect (S-01).’ | ‘We revised our projects after every reflective meetings to help our programs meet local requirements. We tried to integrate existing local resources to help them improve their quality of life in all perspectives (S-16).’ |
| ‘We help them sell surplus peaches for economic help. It’s a successful project because they trust us and become more kindly to our members. That’s an opportunity to develop a closed rapport with local residents (S-07).’ | ‘We help them sell surplus peaches for economic help.’ |

3.2 Compromised effectiveness of volunteer medical consultations

The IDS brought convenience to local residents. Residents were now able to visit the district public health centre for illness consulting instead of relying on the volunteer medical service. Although volunteer medical consultations continued to deliver health care services and medications, study participants questioned the effectiveness of the LOKAHDA initiative in controlling chronic diseases and improving the well-being of indigenous villages. This led to a personal conflict for some medical students as to the value of their programme.

When considered through the lens of CHAT and our second generation analysis, the object of this activity system had become fragmented through disruption of rules, tools and division of labour, represented in Figure 1a–c. For disruption (a), medical students had relatively poor clinical skills, as compared with physicians with specialties, leading to feelings of inadequacy in the medical care they provided. Due to different social customs and cultural norms, disruption (b) showed increasing tension between rules and object. For example, rice alcohol is part of culture and life for indigenous people. However, what students had learnt in their medical training was that excessive drinking leads to poor disease prognosis. Students’ intentions were to hold group education in local organisations to raise health awareness. Failure of convincing indigenous people of dropping the ‘bad’ habit was seen as failure in achieving the groups’ focus.

Disruption (c) points out the tension between division of labour and object within the activity system. Main members of LOKAHDA were medical students who had not their licence yet. Therefore, when compared with the district public health centre where professional...
doctors provided out-patient care, local residents preferred to go to clinics for medications. Difficulties in obtaining recognition, funding and resources, as well as volunteer recruitment, increasingly troubled the student-initiated service-learning group. As a result, it was difficult to meet their dual outcome of professional development and improvement of rural health care and quality of life (represented with broken arrows).

3.3 Adaptation to change: Engaging in an expansive learning process

The introduction of IDS to rural communities can be viewed through CHAT as a disturbance or contradiction to the existing historically driven student service-learning activity system of volunteer medical consultations. This provided an opportunity for medical students to question current practices and processes and, in effect, engage in an expansive learning cycle to bring about transformation. Medical students considered how to improve inefficient or redundant processes in community service. They found that medical services provided by students were not meeting the demands of local villages. After several discussions and reflections, LOKAHDA’s members decided to suspend their volunteer medical consultation and home-visit project in 2008. Instead, a new model of service delivery was proposed. As a result, several community resident-centred projects based on local demands were established. For example, medical students learnt that smallholder farmers in Fuxing Township were having difficulty in selling their surplus peaches due to inadequate advertising and sales management each May. They formed a project named ‘Juicy peach project’ to help sell the surplus peaches. Meanwhile, individual farmers needed to provide peaches on time with constant and assured quality. They introduced an incentive that if the order amount was over 100 boxes, the villagers shipped peaches for free. The collaboration was successful based on a tight relationship and trust building between students and the villagers.

LOKAHDA shifted its goal from providing pure medical services to multidimensional projects. This can be considered a dynamic change to LOKAHDA as indicated in Figure 2. Each programme was initiated according to unsolved problems and ended when problems were solved. By doing so, medical students worked with local residents to develop solutions to the obstacles faced by indigenous people, to improve local life quality.

3.4 Connecting of activity systems for mutual benefit

Figure 3 describes findings from our third generation CHAT analysis. AS1 is the transformed student activity system, whereas the AS2 is generated by analysing medical students’ qualitative data, not directly

| Volunteer medical consultations and home visits (2002–2008) | Dynamic change | Community resident-centered projects with multi-dimensional help (2008–) |
|-----------------------------------------------------------|----------------|---------------------------------------------------------------------|
| Medical-associated                                      |                |                                                                     |
| Volunteer medical consultation                           |                |                                                                     |
| Home visit                                               |                |                                                                     |
| First-aid-kit                                            |                |                                                                     |
| Chinese herbal medicine                                  |                |                                                                     |
| Group education in local organizations                   |                |                                                                     |
| Educational                                               |                |                                                                     |
| Elementary school camp                                   |                |                                                                     |
| Cultural                                                  |                |                                                                     |
| Deeper understanding rural culture project                |                |                                                                     |
| Local population database collection                     |                |                                                                     |
| Economical                                               |                |                                                                     |
| Tangerine project                                        |                |                                                                     |
| Juicy peach project                                      |                |                                                                     |
| Social                                                   |                |                                                                     |
| Elderly care project                                     |                |                                                                     |
| Home accompanying                                        |                |                                                                     |

**FIGURE 2** Overviews of LOKAHDA service projects since 2002 [Color figure can be viewed at wileyonlinelibrary.com]
from indigenous people themselves. Several adaptations had occurred within the student activity system (illustrated in bolded type) from AS0 to AS1. Here, there is a shared focus between two previously disconnected and mis-aligned activity systems (represented by the curved arrow linking the primary objects between AS1 and AS2). This was achieved by students within LOKAHDA being flexible in goal setting and coping ability. Example quotes are included in Table 1 to help demonstrate the transformative changes.

Within this re-aligned service-learning context, both medical students and community residents gained benefits from the service-learning projects. For medical students, it was a self-growth and experiential learning process. A resident-centred project focus changed medical students’ conception of diseases and cultural perspectives of indigenous people. They developed different views on community service; from one where medical services are provided based on provider availability to one where meaningful medical services are provided based on service needs. That is, crafting a community service project that maximised help to and engagement with the underprivileged was now seen as important. The chief beneficiaries from the earlier medical consultation project were the medical volunteers themselves.

From a service delivery perspective, study participants felt residents’ quality of life had been improved through both the IDS programmes and medical students’ service-learning projects. Not merely medical problems, but other obstacles, such as economics and children’s education, were gradually improved. As for medical students in LOKAHDA, during the process of full participation in social interactions with rural communities, medical students developed a broader sense of what it meant to be a doctor. Through this socialisation into medicine, they underwent a cycle of expansive learning. Students developed cultural awareness, competence and adaptability.

**DISCUSSION**

Our study has identified the transformative change for a student-led service-learning initiative under the influence of IDS implementation. Applying the theoretical lens of CHAT has helped gain a broadened viewpoint to explore conflicts and tensions in conducting medical service-learning, particularly within an Asian education and health care context where the biomedical model predominantly prevails. This paper illustrates that a ‘win-win’ situation for both medical students and rural residents is possible. Multidimensional resident-centred projects are critical factors in facilitating medical students’ professional development based upon a holistic perspective and in achieving benefits for indigenous residents’ health care. Expansive learning among medical students has helped them shift from a biomedical to bio-psychosocial model of service. This occurred through individuals questioning current practice, challenging the status quo and trying new projects that ultimately brought about new patterns of work activity. The strength of this renewed approach to service-learning has been the co-development of projects for mutual benefits to both students and the community. Negotiations between students, indigenous communities and the public health sectors are critical for sustainability in this dynamic environment. Our findings may be extrapolated to health care service-learning programmes with similar context.

To our knowledge, our use of CHAT within this context is novel. This type of approach is particularly well-suited for exploring the challenges that health care is facing. Previous literature evaluating the service-learning groups has identified obstacles that medical student leaders face when conducting community service and has proposed some solutions. However, there are limitations to evaluating the effectiveness of these suggested solutions in real life. In our research, CHAT and the concept of expansive learning provided a
theoretical framework for analysing the complexities and contradictions of health care services under IDS implementation. Additionally, it provided greater understanding of success influences. IDS implementation brought medical improvement and promoted rural health care accessibility in remote areas. Under this context, our study consolidated the value of student-initiated service-learning programs. LOKAHDA has formed effectiveness engagement processes and partnerships with indigenous villages and, thus, could be viewed as a successful community engagement.  

Formal medical training curriculum in countries of Australia, Canada, South Africa and the United States have developed several social engagement programmes, such as Rural Track Clerkship (RTC) or Short-Term Domestic Service-Learning Program.  It is empirically well established that service-learning programmes are helpful for preparing graduates with high levels of professionalism, including compassion, altruism, integrity and a patient-centred orientation. Our work demonstrates additional benefits for medical students. Junior medical students, especially Grades 1 and 2, become exposed to rural indigenous culture, which helps them understand community health needs in the very beginning of their professional development in medicine. In addition to improving clinical knowledge, students become aware of privilege within society, gain cultural awareness, competence and adaptability.

In this paper, we have highlighted how medical students were co-developers of a novel service-learning opportunity with an indigenous community. They were able to adapt to a changing or challenging social context in upholding the belief and value of LOKAHDA—‘We volunteer for community self-sustainability’. Through the lens of CHAT and expansive learning theory, residents from the indigenous community have co-constructed an educational environment in medical, educational, economic, cultural and social aspects for student volunteers in the service-learning programme as mentioned in Figure 2. The co-development mechanism broadens the opportunity for improving well-being of residents in indigenous communities and also increases the chance of transition in the professional development among medical students. Under the context of IDS programmes, health care service-learning brings mutual benefit to medical students, community residents and the health care system.

However, this study has several limitations that may influence the interpretation of the results. Firstly, this is a single-site study conducted for residents in only one indigenous community. Sixteen distinct indigenous peoples are officially recognised in Taiwan. This research, therefore, only represents a small part of Taiwanese indigenous community. Second, due to ethical consideration, strict regulations and guidelines of seeking consent for research with indigenous populations and the communities they lived in, the voices of the indigenous people and health care professionals delivering the integrated services are absent. We tried to minimise this limitation with the help of the CHAT framework and to carefully interpret residents’ feedback from the medical students’ qualitative data. In light of these limitations, careful considerations should be made in applying the results to other contexts. Future research may focus on the perceptions of indigenous people in different communities to gain more integrated views using a collaborative and ethically appropriate manner.

5 | CONCLUSIONS

Medical students’ health care service-learning cannot be viewed as an independent agent. IDS implementation can upset the balance of rural health care supply and demand, resulting in accumulating tensions within and between activity systems. Those contradictions exposed medical students to an expansive learning cycle, where flexible goal setting and coping ability were critical for university service-learning groups to survive and maintain their vision crossing various value systems. Furthermore, transformational change can be achieved where medical students develop professionally based on a holistic perspective towards achieving a shared outcome of rural residents’ better quality of life. Under the context of IDS programs, health care service-learning brings mutual benefit to medical students, community residents and the health care system. This result may be extrapolated to health care service-learning initiatives with similar context.

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CONFLICT OF INTEREST

There is no conflict of interest.

ETHICS STATEMENT

Ethics approval was obtained from Chang Gung Medical Foundation Institutional Review Board (IRB No. 201901715B0A3). Written informed consent was obtained from all participants after we explained the risk and benefit of this research. Participation was voluntary.

AUTHOR CONTRIBUTIONS

Chia-Yu Hu performed the following: (1) substantial contributions to the study designs and conception of analytical methods; conducting interview; analysing and interpreting qualitative data; drafting primary manuscripts with images, tables and wordings. (2) Final approval of the version to be published. (3) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Gillian Nisbet performed the following: (1) substantial contributions to revising primary manuscripts with language edits and important advice; providing expertise in analytical methods of Activity Theory. (2) Final approval of the version to be published.
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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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