

# Action Research as a Bridge Between Two Worlds: Helping The NGOs and Humanitarian Agencies Adapt Technology to Their Needs

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Published online: 22 October 2009  
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**Abstract** This paper reflects upon the process of introducing social media systems into supported employment programs for peoples with severe mental illness in Taipei. Such intervention represents the encounter of two different worlds that are often-unknown to each other, i.e. IT student engineers and job coaches in NGOs. With the participatory and cyclic feature of action research approach, the process can be divided into three stages: technology-led stage, mutual infusion stage, and service-led stage. The focus of this research is to illustrate how action research provides a site for the infusion of two different horizons, that is technology experts in academia and social service providers in NGOs. The existing problems in the use of IT within NGOs were studied and changes through co-inquiry and interventions were implemented towards better utilization of IT and higher levels of service qualities. The researchers utilized an action research approach to investigate the problems, plan the actions, intervene, assess the effectiveness resulting from the actions, and specify learning outcomes.

**Keywords** NGO · Action engagement · Evaluation · Reflection

## Introduction

This paper is about the design and implementation of information systems to overcome inefficiency and frustration in connection with legacy systems and improve the

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dissemination of mission critical information at a NGO in Taiwan that provides supported employment for people with severe mental illness. The researchers utilized an action research approach to investigate the problems with user participation and enable social workers to improve their service quality. Since 2006, the project has been an initiative to bring the latest information technology to the NGO sectors where IT professionals are rarely involved and social workers rarely consider IT when prioritizing the things they normally do. The project team is a multi-disciplinary one with 11 electrical and computer engineering (ECE) and computer science (CS) major students supervised by social scientists and IT professionals with a common goal to promote NGO's service levels in the workflow and fieldwork and improve professional communication. Two researchers with IT backgrounds were in charge of planning and supervising software engineering throughout the project. The other two researchers provided support in terms of theory and strategic planning for project execution.

An action research approach is adopted so that the future users that the system is created for can contribute to the design in the development process from the very beginning. The following questions will be answered: (1) In what way can action research be applied to user-centered design and development of NGO's e-services? (2) In what way can action research be used empirically and its effectiveness measured in the context of practitioners' fieldwork?

## Theoretical Foundation

According to Friedman (2001), there are four distinguishing features of action research. The first is creating communities of inquiry within communities of practice. This means that both researchers and practitioners must redefine their roles and develop a set of common values, norms, terminology and procedures. The second feature is building "theories in practice". The theories consist of a set of interrelated theories of action for dealing with problems typical for practical situations. One of the objectives of action research is to make the tacit knowledge of practitioners explicit so that it can be critically examined and possibly changed in order to solve the problems under scrutiny. A third feature of action science is combining interpretation with rigorous testing and analysis. And finally, the fourth feature is creating alternatives to the status quo and informing change in light of values freely chosen by social actors. In other words, conducting action research can be seen as a continuous spiral process of inquiry, analysis, and action. Action research in essence integrates practical problem solving with theory building and change.

Action engagement (Rolfen et al. 2007) is an important and effective supplement to other ways of collecting data beyond field observations, interviews, and focus groups. Action engagement combines the experiential method and the role-playing method. It implies that researchers involve themselves in the organization by working as ordinary employees or staff. Reinharz (1993) focuses on self-awareness as a source of insight and develops the experiential method as a new method for sociological research. Experiential research derives from active engagement and involvement. It emphasizes the importance of "be here now" and openness to one's experiences. Jøsendal and Skarholt (2007) reflect on the researcher's role through their theatre approach where role-playing is the main theme. Role playing is a method to empathize oneself by acting in the shoes of the role being played. One experiences feelings, consciousness, reflections and thoughts about new ways of seeing things and new things to see often to the extent beyond observations alone. Action engagement is a useful tool for capturing tacit organizational knowledge which

might be impossible to describe in rules. Polyani (1996) argues that tacit knowledge about organizational practices has a kind of undetermined and dim quality that cannot be transformed or suspended by rationality. However, action engagement does not mean to give up independence when interpreting personal experiences in the field. To have an independent viewpoint, one should avoid getting caught by a social group's feelings and opinions when grasping the native's point of view (Rolfsen et al. 2007). In our research, the periods of working as participants are much too short to take the practitioners' opinions as our own.

## Action Research

We conducted a 3 year project and participated in supported employment programs for people with mental impairments. There are eight such social inclusion programs in Taipei, Taiwan in 2006-8 funded by the Taipei City Government through a NGO-government partnership (Salamon 1995). Job coaches, job titles for the social workers in our research, have been engaged in the discussion forum soon after it was set up in March 2007. The NGO has no communications department or any intranet, like most of the NGOs in Taiwan.

### Action Research Steps

Research methods of action science including in-depth interview (Emerson 1983; Kvale 1996; Spradley 1979; Yin 1994) and action engagement (Rolfsen et al. 2007) were adopted to collect data to analyze the needs of the users as well as site administrators.

### *Problem Diagnosis-Stage 1*

The objective of the problem identification was to examine the current issues and problems of IT use within the NGO's. In an action research project, quantitative and qualitative investigations to the daily routines of the organization are important before interventions are organized and implemented. In January 2007, field observations were arranged for the IT research team to gain more understandings of job coaches on their work sites. In February and March of 2007, semi-structured interviews were conducted with several senior supervisors and job coaches to enable the researchers to better understand the situations faced in the everyday IT use of job coaches in general.

As systems development in the light of action research can be characterized by a humble attitude towards the expertise of the future users of the software under development, systems development takes the experience of the practitioners as a starting point (Mathiassen 1998; Mathiassen et al. 2002). Therefore, in-depth interviews were employed to understand the experiences and subjective opinions of the practitioners. It was done on a one-subject, per-person basis. We explored the experiences and difficulties the users had had in their routine process and confirmed what we saw in the field work. It helped raise the real issues behind the scene and shed light on the possible solutions.

While capturing the subjective opinions of the targets is the purpose of the interviews, the researchers should refrain from involving their own subjective point of views. The protocol of in-depth interviews should therefore be followed rigorously (Yin 1994). The

agenda of the interviews were set beforehand and each interview lasted for no more than 2 h. On average, the interviews lasted for 1.5 h although the intended amount of time allocated for interviews was 1 h. The interviews were recorded with consensus and the transcripts of the recording were reviewed by the interviewees to make sure they were correct and accurate.

*The Initial Findings* The results of our initial findings informed us that the purpose of existing information technology for job coaches in supported employment was not to assist their work but to monitor their progress. Once the job coach has successfully located a job opportunity, she has to file a form and submit it to a database developed by the Council of Labor Affairs (CLA). Although the data contains information of extensive job opportunities for disabled persons, this database does not allow job coaches to share these opportunities among themselves. The possibility of matching between job opportunity and trainees efficiently through information technology is thus deprived. The efforts that job coaches devoted to persuading employers to hire mentally ill persons are likely to become fruitless, due to the lack of information sharing in current database. To compensate this shortage, the Bureau of Labor Affairs in Taipei City has set up a substitute of job opportunity sharing that is operated through e-mail and updated every other week. However, a bi-weekly issue simple cannot provide timely information with respect to job openings. Some of the openings are even already fulfilled when the e-mail arrives. In other words, the existing system was not easy to use by all and was labor intensive. It was not desirable because it took a lot of energy and time to work with.

*Initial Intervention* In April and May of 2007, we conducted two focus group meetings with job coaches who came from five institutes. The purpose was to explore whether there were common grounds regarding the existing problems and requirements with regards to IT systems. Focus groups are organized to collect and reflect the thoughts of the group through intense dialogues between researchers and the targets and among targets themselves. The purpose of including focus group studies in the process of system development was to explore whether there were common grounds regarding practitioners' IT requirements. Before the first focus group meeting started, briefings were made to the participants about the backgrounds and purposes of the study. In the second focus group meeting, we briefed the practitioners for 1.5 h about the best nonprofit technology practices of the world top ten NGOs. They felt appreciated for the ideas we shared in the meeting. Trust began to build as more commitment and proactivity was recognized by each other. This focus group meeting was later identified as a critical event that contributed to their own intention to "stay" in contrast to previous indifference to IT issues. The minutes were made public on the internal online discussion forums so that the dialogues were re-examined and re-thought through after the groups ended.

### *Problem Diagnosis-Stage 2*

To further improve the researchers' involvement in this action research project, some of the members on the project team volunteered as non-paid staff working with on-the-job trainees who were mentally ill and then on the supported employment. With assistance from a senior district supervisor of the participating NGO, two cases towards increasing the researcher's level of involvement were action engagement at a pizza chain restaurant in

July 2007 and a pay-by-hour municipal parking lot in October 2007. In the pizza store, 5 IT research team members engaged themselves in preparing salad, baking pizza, and cleaning tables as assistant trainees in order to be able to know what the working situation of the mentally ill trainee was like. In the municipal parking lot job, one team member assisted the program trainee as an assistant janitor, who was in charge of cleaning work covering one thousand square yards.

*Finding* First, since job coaches shuttle between various workplaces, the geographic distance hinders the coach from providing effective, on-site and in-time assistance to both trainees and employers. Second, the major barrier toward employment for the mentally ill persons is the stigma for mental illness which devalues them and deprives them from contributing to the society. Supported employment enables the public to witness the fact that mentally ill persons can work and be useful to others. Such narratives need to be told, recorded, and circulated to debunk the myth about mental illness. In order to increase the possibility of persuading candidate employers to hire mentally ill individuals, a standardized package should have been established and facilitated through technology to strengthen the job coach's presentation and reinforce his/her professional image. Unfortunately, this issue was not addressed in the existing system.

Finally, most training in the supported employment programs for the mentally ill persons is operated under psychiatric rehabilitation hospitals. As non-medical professionals and contract workers in medical systems, job coaches often find themselves isolated in the organizations they serve. In addition, work overload due to workforce deficiency has become a source of stress to job coaches. Job coaches for the mentally ill persons met with each other once a month and communicated mostly via emails. Experience and knowledge sharing on the organizational scale and emotional support among job coaches were underfacilitated.

In other words, the legacy system was not useful because the needs of the users were not considered and the users did not want to be part of it. If the user didn't find himself related with the system he was using, he could argue that the system was of no use. Therefore, senior supervisors and job coaches, the group with which we worked, could not envisage the benefits that might gain with more involvement with the latest IT. For them a useful online service would be one where they can see the benefits and which would encourage them to make the extra effort to use it. They often found that entry barriers of the latest IT were rather high and experiencing new IT was difficult and not interesting to them. Therefore, it was not quite possible for them to anticipate the benefits of using latest IT or even know what was out there. The fundamental problem was that the existing system in use was designed from the perspective of the administrators rather than the user. Therefore, when gauging how accessible and how possible the features might be for them, one found frustration. In particular, senior social workers showed considerable resistance to the latest IT.

*Action Planning* When collaborating with the NGO for actionable plans, we identified the crucial needs about online communication among job coaches as follows:

1. Job opportunity sharing and paperwork reduction: The legacy database was designed for regulating job coaches. Therefore, data contributed from job coaches is isolated from access by each other. A data sharing mechanism is needed to enable job coaches to benefit from the information sharing. A platform for job coaches to share job opportunity and improve the matching process is desired.

2. Mutual support among job coaches: Low job recognition of the social services and low job retention of the mentally impaired trainees on the competitive workplace is a constant frustration job coaches have to live with, which creates tension, insecurity, and emotional burden. Information technology can facilitate support mechanisms by establishing a platform for information exchange, knowledge sharing and social support.
3. De-stigmatization of mental illness: The major barrier toward employment of mentally impaired persons is the stigma for mental illness which devalues them and thus deprives them from contributing to the society. Supported employment enables the public to witness the fact that mentally impaired persons can work and be useful to others. Such narratives need to be told, recorded, and circulated to deconstruct the myth about mental impairment. In fact, the success or failure of the NGO depends on such public awareness of social inclusion programs. The collective action of telling these stories by job coaches is possible via the intervention of IT.

*Data Collection* To address such needs, an online, internal only forum was introduced to the supported employment NGO with 29 social workers and one supervisor. The number of social workers was 30 where 14 of them participated in the discussions in the observed periods from Apr. 2007 to Mar. 2008. The other 16 members registered as users but failed to use the system after registration because of quitting the job, lack of convenient access to computers, no sufficient time, no history of technology use, or feeling unnecessary to use any social software. The population size reflected that it was a study of minority groups of social workers who dedicated themselves to maximizing employment opportunities for individuals with mental impairments. Field use of the forum over a period of 1 year generated the dataset that we collected as a basis for knowledge discovery.

Access to the NGO discussion forum was granted to the authors at all times during the research. As a common practice of action research, the participating social workers recognize that the authors are readers with explicit identification on the forum. The primary data consisted of archived messages of the online forum, supplemented with key interviews. It follows in the tradition of research studies that rely primarily on electronic data as the locus of the phenomenon of interest (Wasko and Faraj 2005). Six interviews were conducted after all the empirical data analysis was completed to help us further interpret the outcome of the research. The interviews were conducted with two participants who were major posters to the forum, and four participants who occasionally posted to the forum but “lurked” extensively on it. In addition, focus groups and participatory observation (Spradley 1979; Emerson 1983; Kvale 1996; Baskerville 1999) were adopted to help us become oriented in the supported employment NGO setting during the time period of research.

*Intervention* Since its launch in March 2007, the forum has been used for disseminating time-sensitive job opportunities to colleagues, providing space for collective expressions of affection, and enabling sharing of information and experience. It survived with participants continuing information sharing and social support. It has remained an online, internal only forum since its launch. Furthermore, none of the NGO’s senior executives were invited to register for this forum. The participating job coaches and the only one supervisor felt that it was secure to post to the forum. Except two job coaches who preferred to use real identities, all the other participants used nicknames when they posted or replied to discussions.

*Evaluation* Effective communications have been identified as essential parts to the success of such NGO programs. Unlike previous works in evaluating online social software based on single methods (Kay 2006; Hall and Davison 2007), this paper carries out a comprehensive set of assessment methods and infers the online human behavior based on triangulation of traffic measurement and discussion category report.

As a basic analysis, we evaluated the effectiveness of the discussion board according to the traffic-centric metric (Kay 2006). It was observed that 12 members initiated at least one topic. The number of unique subjects was 111 which contained 258 messages, some of them being replies to particular subjects. We saw that 48 out of 111 topics received replies, which was 43.2%.

The NGO has a bulletin newsletter to distribute employment opportunities for job coaches to choose for their mentally ill trainees. Unfortunately, the newsletter is issued bi-weekly due to staff workload. Some available openings can become closed before the newsletter arrives at job coaches. The average 65 h of message time span with  $SD = 46.4$  hours means time reduction in job bulletin delivery from an average of one week to an average of less than 3 days.

To gain deeper insights into job coach behaviors, discernable differences among subject types of online discussions are investigated. According to subject categories, messages on the forum that we study can be categorized into 5 types: (1) general information sharing, (2) job opportunities, (3) emotional support, (4) learning of IT technology, and (5) administration. The subject categories were the researchers' designation which we found helpful when we drilled down through a series of discussion threads. It was particularly beneficial when we moved from summary information to detailed data by focusing in on a category of research interest. The social workers that we interviewed also thought the categorization was suitable for them because it essentially reflected their daily routines and online communications.

The administration category receives the most numbers of original postings and replies. It reveals that the NGO uses the forum in their daily administrative matters most. It can be effective in paperwork reduction and information dissemination efficiency. The number of topics about learning of IT skills is the second highest. It is somewhat to our surprise that social workers, who didn't receive much IT skills in their trainings, exhibit substantial interests in learning the latest trends of information technology and applications. Topics in the category of emotional support receive the highest percentage of replies. The forum has been perceived as a reciprocal channel of showing concerns, support and care among the members.

*Identification of New Problems* We expected the discussions facilitated by the online forum to mainly serve the purpose of conveying job opportunities which were needed by most job coaches. In the beginning, we found the category of job opportunities exhibited the lowest rate of replies, a fact that was a little disappointing. To find out the reason why the expectation was not met, we conducted a series of follow-up interviews with six social workers, namely, the job coaches. It turned out that they were excited when they were enabled to receive new job opportunities in the discussion forum. The visit frequency of messages in this category confirmed the enthusiasm at the early stages when the discussion forum was newly launched. It turned out gradually that the job openings flowing from the Council of Labor Affairs into the system were not categorized properly and therefore rarely prioritized persons with mental disabilities. Furthermore, most of the leads that appeared

useful did not result in successful job interviews for their trainees. Therefore, the job category became less effective over time. The other reason according to interviewees why there was the lowest number of reply rates was due to ethics issues. Discussion of details about job openings may often involve sensitive issues and therefore the social workers preferred to conduct the discussion over the phone in private.

*Post-Intervention* To overcome the usefulness issue, the NGO changed the source of job openings to a clearinghouse maintained by an alliance of NGOs where job openings were better organized. Since job coaches were hesitant to discuss job openings for their disabled clients over the system because of privacy concerns, a Skype component was embedded by the system to each posting of job openings so that they could choose to talk over the phone instead of writing down text. The Skype use was considered a reply and counted by the system. A month later, the rate of replies on the job opening category rose to the second place. Due to the timely dissemination of useful job openings facilitated by the system, the number of interviews almost doubled a year after the introduction of the system.

The job coaches did not think the discussion forum blog took extra efforts due to two reasons. First of all, the information service contributed to achieving the objectives of the NGO in a positive direction. Second, the use of RSS syndication in the discussion forum appeared easy to use and working for them. They didn't bother to check in the discussion forum several times a day on the desktop or mobile phones; they simply let the RSS notify them when job openings showed up.

*Implications* The results of the study related to the functioning of the NGO in terms of paper reduction, peer support, and timely information dissemination, and particularly increased rates of job interviews. The setup of such social software systems was quite straightforward and of minimal cost. However, to be successful an NGO needs to implement policies about online social interaction. Specifically, privacy is an important ethic issue and job coaches do their best to uphold the privacy of their clients and the employers they engaged with. The organization should make a clear statement on what could be written down on the system and what should not. When should the alternative communication tool be used that can help the system functioning better with privacy concerns? Information overload is an increasing problem in most workplaces. In fact, the interviews revealed that receiving irrelevant emails frequently was a major driver for the social workers to adopt discussion forums. NGO should encourage their staff to discern among the multiple communication tools existing simultaneously within the organization. For example, people use email frequently when in fact blogs or forums should be considered in some occasions, such as making announcements or disseminating information to a large group of recipients. Careful use of communication tools will generally cut back the overload. The study shows a mix of email with other communication tools may translate to efficiency when competing tools produce a favored outcome between extremes. However, the transition of one tool to another may incur a learning curve which many people do not like to experience. In addition, it is tempting to keep using email as a one-stop service, a kind of Swiss army knife of communications, that permits users to chat, discuss and send/receive info in one location. These are among the issues to be considered in policy making when introducing new communication tools to organizations.



## Discussions

Research implications of the use of online forums to facilitate NGO programs as a computer mediated communication tool are mixed. Given limited resources in most NGOs, computer mediated communication can be beneficial to paper reduction, timely information dissemination, and emotional support. In particular, research findings show that discussion forums are appropriate tools in terms of peer support. However, communications in virtual spaces are only a small part of their life styles. There are still many occasions of emotional support that have to be delivered face-to-face or at least over the phone. This reminds us that the introduction of information system is often in the frame of social practice. In addition, inadequate human resources as often seen in NGO staffing results in challenging work burden. Therefore, some staff may diminish the use of computers as computer mediated communication is often interpreted as extra efforts. This can further increase the level of resistance to familiarizing themselves with IT tools or become adept in IT skills which, paradoxically, may be of help to both the individuals and organization in the end.

Taking a rigorous approach to data collection and analysis is essential in order to avoid bias. In our empirical study, this takes the form of triangulation with various methods including in-depth interviews, field study, focus groups, and action engagement. These methods are theoretically different with regard to methodologies; however, they are all employed in practice with a common goal to comprehend the context of the organizational process and capture the immediate problems that need to be solved. Given this goal, in-depth interviews with the staff enabled us as outsiders to get to know them face-to-face, understand what they do, learn their languages, and build friendship and trust. However, the number of interviews was limited to six but not all the social workers as the purpose was to identify relevant issues and set the stage for follow-up focus groups. Through focus groups, large amounts of data can be collected in a very short time. Focus group discussions were based on the issues that students discovered during the interviews. Focus groups help expose issues that are hidden, to prioritize issues, and to form a consensus about prioritization of issues. For example, in the focus group discussions, the students found that PDA interfaces were not a requirement of the organization but rather provision of daily statistics of housing conditions in the vicinity of metro stations.

When it comes to the intervention, the students need concrete details to make some technical decisions. However, it is not the staff that come in and tell them how to make the decisions; the students need to make such decisions by themselves. To make informed decisions, the students as outsiders to the participating NGO need to involve themselves in the world of the insiders. The value of outsiders becoming socially engaged participants of the everyday realities of the insiders implies an approach working with insiders as ordinary staff in the organization. Action engagement provides the students with stronger relational ties to the insiders and insights to local organizational practice. The ties in turn help the students put their feet into the staff's shoes and comprehend the importance of the project, what it means to the organization, and eventually self-motivate themselves.

Throughout the action research, we encourage students to use feedback that we consider an important aspect contributing to rigor of the study and which can mitigate against inappropriate assumptions or interpretations outsiders can easily step into. The students and the instructors check regularly that interpretations resonate with collaborators and that any particular understanding we are forming is accurate. In our study we use both formal and informal feedback. Informal feedback happens on an ad hoc basis and helps to ensure that we have not misunderstood. For example, when an apartment was registered on the

computer as wheelchair accessible, the student volunteers interpreted it as an accessibility certification by the government authority. However, the staff would say that it only meant to be accessible by the home owner's standard. A prospective tenant with motor disabilities would be advised to inspect the apartment in person with the professional assistance of the NGO. Without such feedback, erroneous interpretations would have been taken for granted. More formal feedback usually takes the form of a meeting, often over a formal meeting agenda or an informal lunch, during which we discuss our findings with the participants both to offer them some thoughts for their own reflection, and to check our observations with the participants to see if we have misunderstood. The findings of problem identification based on the triangulation of various action research methods are described in the following section.

### **The NGOs' and Researchers' Experiences of Being Part of the Action Research Project**

One of the members of this project team has more than 15 years of experiences building information systems for business, governmental, and NGO sectors. Although he constantly practices Body of Knowledge (BOK) of project management (PMI 1996), the participatory approach to identifying the issues with an organization, generating workable solutions to make changes, and making constant reflections in the continuous spiral process of inquiry, analysis, and actions, is an inspiring experience to him. Compared to separating the project into phases such as requirement identification, implementations, and system validation, each often carried out by different groups of professionals, as may be the usual practice in project management, the action science approach gives a more holistic perspective into the development process and pays more attention to the context of the issues through prolonged participation in the project. Almost all the IT members on the team experience the differences between action science and the engineering approach. The differences come from two distinct points of view: the systematic design and the systemic design. The former involves steps or phases in logical and linear arrangements. The systematic view of design is held by those who are primarily engaged in engineering design (Banathy 1996). Gregory (1963) considers that a systematic approach highly constrains design if it is used in nonengineering contexts. On the other hand, the systemic view of design is portrayed as a dynamic, open, and learning focused approach that can lead to rethinking of underlying assumptions about problems and changing the design methods in the development process (Banathy 1996). For those in the team who receive engineering training, it is a learning experience to redefine their roles, reexamine the mindset, reeducate oneself with new conceptions, and discover the values of systemic practices when it comes to collaborating with social scientists and practitioners in a multidisciplinary NGO project. The learning guided by action science in the context of our project is in the form of doing while learning and learning while doing.

Collaboration with IT professionals in NGO sectors is a new experience as perceived by the social scientists on the team. The social scientists emphasize building relations and trust with social workers in the NGO, and make sure the needs of the social workers are heard and understood appropriately by the team as a whole and the IT professionals in particular. It is a unique yet worthwhile experience to constantly reflect on the intervention of IT and explore the alternative ways with IT professionals so that new IT development can be helpful to caregivers in their caregiving process. With the close encounter with IT professionals on the team, social scientists find it easier to make sense of some of the latest

technologies used in the project and even start adopting them into their repertoire of sociological research methods.

What the practitioners have been through is also a new and totally different experience. In the past, they were required to make use of whatever IT technology they were mandated to in order to continuously receive the support from the government funding. Unfortunately, many of them are not familiar with the skills of using computers and the Internet in the working life. In addition, their needs and interests in terms of the often demanding fieldwork were not among the high priorities of those who made the IT decisions. Therefore, it is not unusual that the systems ended up not so friendly and even turned out to be not quite useful in situations where some working hours had to be deprived in order to “deal with” the systems. Being involved in the project is an experience that, to the practitioners, for the first time they were asked about what they needed in terms of fieldwork and invited to participate in the design and development process, instead of just in the test stage at most. The respects they received and felt helped build mutual trust between researchers and practitioners that was beneficial to transforming practitioners’ tacit, abstract knowledge to explicit, concrete knowledge as the team efforts. Furthermore, for each future user of the system, a mentor selected from the researcher group was assigned to help overcome the practitioner’s distrust and fears of IT that have been accumulating in their social services careers. They recalled the experiences sitting in the orientation workshops where they were briefed about new IT systems and forced to pick up the operational skills in less than a couple hours. With continued mentor programs, they felt more comfortable in learning and discovering new features of the system. One job coach mentioned:

I think it is a great experience to see the marriage of social work with IT. The project offers me an opportunity to take a glance at the latest social media systems and other new IT stuff. The best part of it is that the project team provides assistance and guidance when we take part in the design and development process. The mentor program helps us explore the possibilities to make use of IT in constructing working knowledge, sharing field experiences, and informing each other of employment leads that help placement services for trainees.

The mentor program also became a channel for the IT professionals to receive user feedback on a regular basis; the feedback is beneficial to continuous improvement of the system. It is an individual and collective process of empowerment that they experienced when they took part in the design and development of the system and then became users through one-on-one mentor programs. Furthermore, they felt they were cared about, their needs were taken care of and their fears of IT were not unreasonable when they were in empathetic atmospheres the project team has been carefully maintaining. They were willing to get started with the system in their daily working life with a hope to improve their services for care receivers. A senior job coach supervisor said:

The presentation package system certainly helps regarding supported employment for people with mental illness. It is indeed something we wish to have had long before. For example, with the online spreadsheets, we now can show the prospective employers the stipend they will be awarded if they hire our trainees. I can save some of the employer visiting trips and improve the service in the meanwhile because now I can answer on the spot their questions that were not possible before. I think my friends working for other social services programs would love to use the same kind of technology if they see it someday.

## Conclusions

On the face of it, the course enabled a technology transfer process through university-NGO collaboration in the form of software project. With the practice of action research methods and action engagement in particular, the course transcended into part of a social process and researchers' community involvement. Researchers worked with insiders as ordinary staff in the organization thus facilitating a learning situation in which the researchers were encouraged to create new meanings based on their personal participation in the organizational daily routines. The findings from the study have provided insight into the social dimensions that are an intrinsic part of software development, including shared values, assumptions and beliefs, and the influence of participating individuals. Furthermore, researchers achieved increased credibility and trust through action engagement in ways that enabled students to bring in new aspects into the software project. This underlined the importance of a researcher not being above or outside practice but also within practice. We found that researchers became increasingly self-motivated and committed to the project to an extent that other incentives might not be able to achieve. Being there and acting there was experienced by the researchers as an important part of the action research design and a fruitful personal and collaborative process.

**Acknowledgments** The work presented in this paper has been funded by the National Science Council, Taiwan, NSC 95-2627-E-008-002-.

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