Article

Design Principles of Wiki System for Knowledge Transfer and Sharing in Organizational Education and Training

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Abstract: Due to rapid technological advancements, firms are paying more attention to the importance of knowledge creation and sharing. Effective knowledge management can be utilized to enhance employee performance, as well as an organization's competitiveness. Staff training is crucial to the internal knowledge transfer within an organization. Through education and training, an organization can transfer its internal knowledge to its employees. Furthermore, the use of information systems to assist in training and management has been widely adopted by organizations. This study, through action research, attempted to understand how organizations can build a Wiki system to assist in the training of new staff. When employees can obtain work knowledge from more sources, it is easier for the knowledge to be shared and transferred during training. The results show that in the process of implementing Wiki system, providing support for Wiki software design, management skill, and a knowledge sharing environment can enable employees to create and exchange knowledge. The organization itself can rapidly accumulate knowledge capital and enhance the quality of staff through such system in order to enhance its competitiveness.

1. Introduction

Due to rapid technological changes, short product life cycles, and fiercely competitive environments, enterprises attach great importance to the generation and sharing of knowledge [1]. In addition to talent recruitment, the training of existing employees is also the focus of an organization's talent development strategy. The most rapid and effective way to improve employee performance is to equip employees with job skills through education and training [2]. The education and training of employees can be regarded as the transfer of knowledge within an enterprise. Through the implementation of education and training, enterprises can transfer explicit knowledge to the employees who need it. For organizations, education and training not only can improve productivity but also contribute to continuous competitiveness [3]. Enterprises' investment in employee education and training, combined with performance appraisal and incentive mechanisms, can reduce employee turnover rates, improve productivity, and increase profits [4].

The recent rise of social networks has affected training management systems and supported e-learning. Social networks can serve as a hub for interaction and sharing. Moreover, these networks are also used as a platform for two-way interaction rather than one-way communication, user sharing rather than monopolies, and collective wisdom rather than individual wisdom [5–7]. Wikipedia is representative of the creation of collective intelligence. Knowledge transfer via a Wiki system has the following features: (1) The rapidity of quickly establishing access and modification in the form of

hypertext; (2) the simplicity of using a simple markup scheme to edit web pages; (3) the convenience of creating links to other networks, external websites, or images through keywords [8]; (4) the usage of open resources, in which each member can create, modify, and delete web pages; and (5) the maintainability, as the database can keep records of content that has been added or modified in the past to facilitate maintenance [9,10].

It is believed that Wiki is innovative and has user-friendly tools for organizational training and learning. By virtue of the features of Wiki (ease of use, interactivity, and sharing), enterprises can quickly transfer knowledge within an organization and accumulate knowledge capital within the enterprise to enhance its competitiveness and overall national competitiveness. Setting up an organization's own Wiki enables related experts of the organization to audit and edit the contents. By specializing the knowledge, employees can extract useful information more efficiently.

The purpose of this study is to understand how enterprises should build a Wiki system to assist in the education and training of new employees, so that new employees can have more opportunities to acquire the knowledge they need at work and achieve the sharing and transfer of knowledge related to enterprise training. Thus, this study specifically attempted to explore and understand how enterprises can use Wiki in virtual communities to enhance knowledge sharing and transfer in the training of new employees. As there has been scarce literature on this topic in past studies, this study aimed to answer the following questions:

1. What is the meaning of knowledge transfer using Wiki in the informal learning environment of an organization? How does it form?
2. What factors will affect the formation of a knowledge transfer climate?
3. How can organizations use Wiki to assist informal learning in order to share and transfer knowledge?

So as to answer these research questions, this study firstly includes a literature review on knowledge transfer, Wiki system and informal learning before planning an original prototype for designing the Wiki system. Secondly, it presents the research methods and stages for data collection and analysis. Thirdly, the overall results are presented. Finally, the conclusion is made along with the limitations and future research.

2. Literature Review

2.1. Knowledge Transfer and Sharing Climate

Knowledge is the collection of useful information which was structured and verbalized from valuable data. Information is more factual while knowledge is more about perspectives, beliefs, experiences, and methodologies. Further, knowledge could be the ability to assign meaning to information, and it is always about action and experiences which is used to some end [11]. Hence, knowledge is not only about information itself, but also includes insights and experiences.

Knowledge transfer is the process of transmitting knowledge from the knowledge source so that the receiver can understand and apply it [12]. It includes a variety of interactions between, within or across individuals, groups and organizations. Unlike knowledge sharing, knowledge transfer often has a clear prior objective: it makes up the deficiency of lacking the usage of received knowledge in knowledge sharing [13]. The process of knowledge sharing is completed when the knowledge sharer provides the knowledge and confirms that the receiver has indeed received the knowledge [14]. Previous studies suggested that the difference between knowledge transfer and knowledge sharing lies in that typical knowledge transfer focuses on transferring knowledge between different units, departments, or organizations rather than between individuals [15]. Furthermore, while knowledge sharing only involves the actions of providing or exchanging knowledge, knowledge transfer includes the process of knowledge identifying, recognizing, sharing, absorbing, assimilating and utilizing [16].

Climate refers to the context at a certain point in time and its relation to the thoughts, emotions, and behaviors of the participants. Knowledge sharing and organizational climate change will affect

individuals' intention to share knowledge through organizational norms [17]. Organizational climate is a behavioral pattern based on the current values and atmosphere of an organization, as well as the interaction between internal personnel and the organizational environment [18]. Therefore, organizational climate plays a role in shaping employees' behavior and influencing their views on knowledge sharing [19,20], which can further influence the generation of a knowledge transfer climate [21].

In the knowledge transfer climate, message is shared by the sender to receiver while receiver gives feedbacks on certain messages based on their existing knowledge and experience. This cycle continues and forms the sender-receiver framework. The process of knowledge transfer is composed of the knowledge sender transmitting information and the knowledge receiver receiving information. By analyzing the interaction between sender and receiver, this study explored the key factors for the formation of a knowledge transfer climate. According to the sender-receiver framework [22], there must be a sender and receiver in the process of knowledge transfer [23]. The sender and the receiver transfer and absorb knowledge for knowledge sharing. While the completion of knowledge transfer requires the knowledge sharing of the sender and the absorption of the receiver, it is only the receiver who uses the received knowledge [24,25]. The complete model is shown in Figure 1.
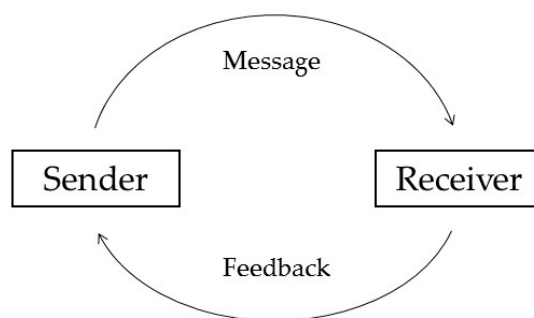

Figure 1. The sender-receiver framework.

2.2. Wiki and Knowledge Transfer

In 1995, the first Wiki system (WikiWikiWeb) was created by Cunningham, an American programmer [26]. A Wiki is defined as a set of linked web pages that is created and edited by a group of users, in which every edit of the Wiki page is recorded in a history page. Unlike other widely-used collaborative technologies, Wiki supports open editing, enabling their content to be improved to a certain extent each time [9]. Wiki can be used as a platform to provide information and knowledge or as a tool for collaborative creation, allowing viewers to provide information and knowledge sharing on the platform or as a collaborative environment for learning [8,27,28].

Nonaka and Takeuchi [29] believed that knowledge can be categorized into explicit or tacit. Explicit knowledge can be systematized and transferred in formal or systematic language; while tacit knowledge is usually informal and difficult to convey. As tacit knowledge is hard to capture and exploit, it resides inside people [30] and is hard to transfer among members in an organization. The collaborative nature of Wiki helps to create a more suitable and special learning environment that increases mutual communication, teamwork, and knowledge creation and sharing [31]. Through Wiki system, tacit knowledge of the users can be transformed into explicit knowledge.

Wiki technology enables higher degrees of collaboration and facilitates more influential knowledge transfer processes [32,33]. Such synergy can enable all employees in an organization to effectively create a useful knowledge base [34]. Creating a Wiki system especially for a certain organization can extend the scope of knowledge by adding hands-on experience of the employees to vocational information. In the Wiki environment, knowledge providers and receivers communicate asynchronously and learn cooperatively rather than competing with each other [9]. This kind of conversational technology solves the obstacle of transferring tacit knowledge in organizations [32].

Compared to traditional knowledge transfer, Wiki system has its sustainable feature in many aspects such as community, economics and ecology. According to Arazy et al. [35], when a technology is used continuously to support work processes, it is sustainable. Arazy and Croitoru [36] also proposed that to ensure Wiki's sustainability, it is important for managers and IT administrators to provide a reliable system infrastructure, promote a sense of community within users, develop quality control mechanisms, and integrate Wiki within work process to achieve productivity gains [36]. Past study also concluded that companies appeared to be more successful when they integrated a sustainable Wiki system in their work processes [37]. Hence, Wiki contributes towards building a sustainable community.

2.3. Organizational Training and Informal Learning

The popularization of computers and networks has had a certain impact on the education and training modes of enterprises. In the past, lecturers were required to impart knowledge at a specific time and place, but now it can be conducted in a digital form. E-learning, a new form of training, has gradually become valued and accepted by enterprises [38]. Compared with traditional education and training in enterprises, e-learning has the advantages of reducing learning costs, strengthening business response-ability, producing consistent or customized teaching content according to needs, updating teaching material in a timely fashion, providing 24-h learning, and constructing a knowledge community [39,40].

E-learning has become the fastest growing form of education. It is defined as a virtual learning environment, such as Wiki, Google Classroom and Blackboard Learn, in which learners interact with learning materials, peers, and tutors through information technology [41]. E-learning includes two aspects, namely, learning courses and knowledge management. Learning courses refers to online learning courses, while knowledge management refers to the effective extraction, creation, storage, sharing, and application of information through technology [42]. Enterprises store all kinds of courses and relevant information in a database for their employees. Accordingly, employees can search for required information or courses through the network to acquire knowledge and even create new knowledge. This kind of knowledge is conducive to the competitiveness of the company through continuous digestion and thinking [43]. Therefore, e-learning is also a component of knowledge management [42]. In this way, formal learning in the classroom can gradually be transferred to informal learning.

Informal learning, which is relative to formal learning, is a learning behavior encouraged by an organization or a type of spontaneous learning behavior [44]. This kind of learning does not necessarily need to occur in the classroom. It is not limited by time, does not have to be achieved through a structured design, and is learner-centered [45]. Knowledge was known to be situated [46] and sticky [47] in the past. Traditional educational processes often infuse knowledge in designated practices. Learners, as passive information receivers, are restricted to the experience of constructors and cannot participate in the process of exploring, retrieving and using new information, or to construct new knowledge [48].

In informal learning, however, students have the opportunities to actively engage in acquiring skills or knowledge [49]. Constructors create the process of learning instead of the product of that, and a constructivist approach in teaching and learning is then built [50]. In this case, knowledge transfer could be more flexible, adaptable and rapid since it happens intentionally and is not highly structured [51].

The workplace has become a site to not only optimize the production, effectiveness and innovation of an enterprise itself, but also to develop associated individuals' knowledge, skills and the capacity [52]. Previous studies have indicated that both experts and organizational employees agree that learning in an informal environment is more effective and can help employees get a sense of achievement [45,53,54]. Informal learning, such as Wiki, can create a better workplace environment and organizational atmosphere for employees, thereby enhancing their positive working attitude and confidence which

increases their job efficiency and accuracy [54,55]. Therefore, informal learning can not only increase the internal capacity of an organization but also create a climate for knowledge sharing and transmission among employees [56,57].

3. Research Methods

In this study, the factor of forming a knowledge transfer climate in organizations was discussed. Through the use of action research, this study intended to understand how management and system interface designs could be adopted in a Wiki learning and training environment to create an organization's knowledge transfer climate. Within the action research process, 150 recruits of Company P, a comprehensive retail business in Taiwan, were assigned to five action research cycles with 30 subjects in each. The way this study collects and analyzes data are reviewed in this chapter so as to clarify the methods applied. For example, semi-structured interviews were conducted with newly-recruited trainees to gather their thoughts of each action plan, and content analysis was then applied to acquaint the key cognitions of their feedbacks. Subsequently, the results were triangulated using abundant data sources for detailed revisions of the original plans. The details of stages and the implementation of action research are discussed in the following sections.

3.1. Research Stages and Cycles

The research process of this study was divided into two stages. The first stage included literature collection and analysis, development of the prototype, and expert interviews. The researchers first reviewed and sorted out relevant literature from Web of Science database and the Internet resources. Literature related to Wiki, virtual communities' informal learning, knowledge transfer and sharing, and education and training were included, and was used to develop the original prototype. As shown in Figure 2, in addition to the general cognitive prototype system, the prototype also included institutional supporting measures, such as the management elements of Wiki and the coordination of an enterprise's environmental system. Preliminary modifications of the prototype were then made through two expert interviews with head of a human resource department, which served as the basis for the action research in the second stage. In the second stage, the prototype from the first stage was used for improvement using action research. In the action research, the prototype was applied to the education and training environment of an organization and the action plan was amended to solve the problems encountered during the process, so as to adjust the applicable model to promote the improvement of the knowledge sharing and transfer of the organization. In the process of implementing the action plan, new discoveries, the development of the functions of the Wiki system, the Wiki business model, and the way to improve knowledge sharing through the Wiki were taken as the basis for organizations to promote the use of Wiki. The complete research process is shown in Figure 3.
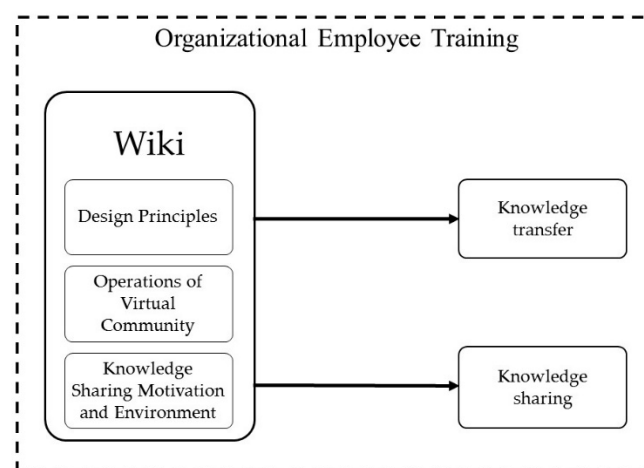

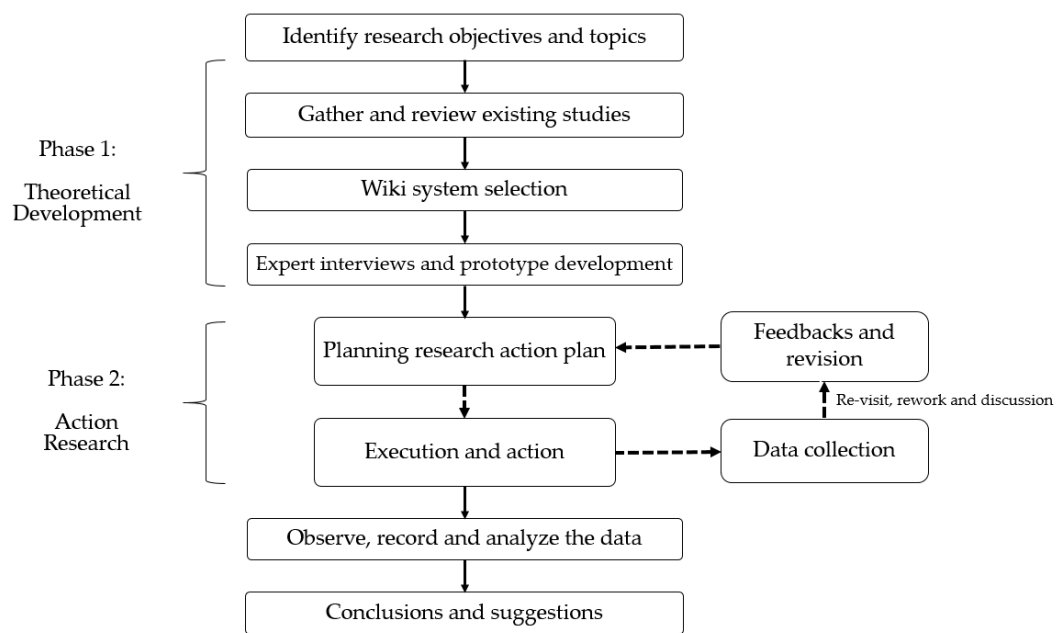**Figure 2.** The research model.

Figure 3. The research process.

In this study, the newly-recruited associate trainees of Company P were taken as the subjects, and the interview data were collected and analyzed in the experimental field for reflection and discussion in the action research. Modifications were made based on the results of the reflection, evaluation, and feedback, and the original action plan was constantly revised and new action plans were formulated, thereby exploring how to improve knowledge sharing and transfer through the Wiki platform.

According to the spiral cycle model (planning, action, observation, and reflection) of action research, shown in Figure 4, proposed by Lewin [58], the best solution can be found gradually through the intervention and adjustment of the action plan. Action research is a kind of research that is jointly participated in by researchers and subjects. The main characteristic of action research is that it is possible to verify the problem solving in the actual situation, so that the result of the action research is exactly the solution to the problem. Therefore, the greatest value of this study was exploring the extent to which an actual situation could be improved, as well as how (or whether) the problem has been solved [59]. In addition to organizational members, other consultants are required to participate in the action research process, and organizational data needs to be collected through interviews, observations, questionnaires, and records. Action research enables consultants to be independent of the views of the top management of an organization and enables members of the organization to understand the importance of their views [60].
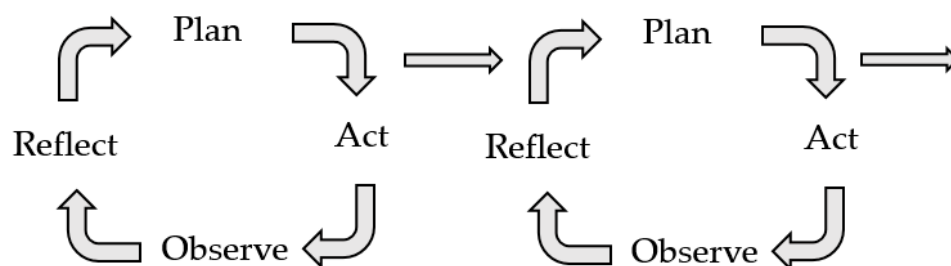

Figure 4. The models of action research.

In each cycle of the action research, this study focused on new employees in the regional departments of Company P. After the implementation of each action plan, the researchers observed and reviewed the process of the plan, revised the content of the plan, and then carried out the revised

plan. A continuous cycle was implemented until the core concept emerged. When the emergence of new data did not help supplement the existing concepts, categories, and relationships (that is, they reached theoretical saturation), or when there were no new data or findings in each cycle of reflection, the action research cycle was terminated [61]. In this study, abundant data were used in content analysis and triangulation methods, which were used during data processing and analysis in each cycle of action research.

Company P is a comprehensive retail business in Taiwan and has 230 branches with a total of 4000 employees, and 300 new employees join the training sessions each year. As the staff turnover rate is about 20%, the training of new staff takes up a large proportion of its education and training budget. In 2007, e-learning was introduced to solve the problems of personnel dispersion and insufficient training. The research subjects included 150 recruits who were assigned to five action research cycles, with 30 subjects at each cycle (10 associate trainees and 20 recruits). The 10 associate trainees were forced to use the Wiki system during each cycle. The recruits were notified of the system simultaneously but were not forced to use it. At the end of each cycle, the 10 associate trainees were interviewed in depth to obtain more views and suggestions. In addition, before starting the action research, the researchers interviewed two experts in the field of human resources to verify the original prototype. They were contacted via e-mail, and the interview transcripts were sent together to validate the credibility of the questions. Semi-structured interviews were then conducted with them before implementing the Wiki system into Company P, in the hope that the opinions and suggestions of the experts could help create a more complete plan for the subsequent research.

3.2. Data Collection

(1) In-depth interview records

At the end of each new staff training session, the 10 associate trainees were interviewed in depth. The interview lasted about 60 min and occurred after the new staff returned to the head office for examinations on the final day of training. A semi-structured small group interview was conducted to guide them to present their ideas, so as to obtain more diverse opinions and suggestions. Finally, the interview content was recorded using a handheld recorder, photos, and other tools.

(2) Reflective journal

After the in-depth interview with the new employees, the researchers discussed and evaluated the process with the human resources department, so as to review the implementation process. Key points and observations were recorded in a journal for revision and future improvement.

(3) System records

The Wiki platform contained basic system records, including the number of people in the system, number of employee logins, number of entries, number of edited entries, and number of articles. Google Analytics was used to monitor the community flow, including visitor overview, flow source overview, content overview, and visitor trends, for diffusion and growth analysis.

3.3. Data Analysis

In this study, content analysis, triangulation, and abundant data were used for data processing and analysis. Content analysis refers to the process of analyzing, identifying, decoding, and classifying a large amount of transcribed information obtained from observations or interviews. The steps of content analysis used for in-depth interviews in current study were as follows: (1) For each keyword or key cognition obtained from the transcribed text data or observed phenomena on each page, we used a conceptual term to name and express it; (2) writing the specific conceptual term and its simple meaning on a sample label and pasting it on the page to establish an index; (3) categorizing the keywords or key cognitions and clarifying their correlations for analysis; and (4) finding out the generic principles for creating knowledge transfer climate in the Wiki environment.

Next, the above interview data was triangulated with system records, more in-depth interview data, and reflective journals in the system operations. All the data helped the researchers make detailed revisions of specific events for the next action research cycle. The action cycle was ended when all ambiguity was cleared.

4. Results and Discussion

4.1. Design Principles of the Wiki Platform

Based on the interviews with two experts and the newly-recruited associate trainees, this study found that the design principles of the Wiki platform were as follows:

Firstly, as for the functional design of the Wiki software, the experts believed that anonymous means could be used to let employees express their real thoughts and suggestions without any burden, so as to get real opinions. Enterprise knowledge may be the business secret of an enterprise, but if it is knowledge that employees need to have, the enterprise should set permissions and provide information to specific departments for employees, while preventing users from outside the company to browse at will. The reporting system can calculate the use of knowledge in the Wiki, quickly provide reading statuses, reading records, publishing records, and other report statistics, and perform calculations in combination with performance appraisals. In addition, an audit mechanism should be established to ensure that the information is correct. Since all information is shared on the platform, all employees can browse it. If the information is not reviewed by experts, employees may see error messages and make mistakes in their learning.
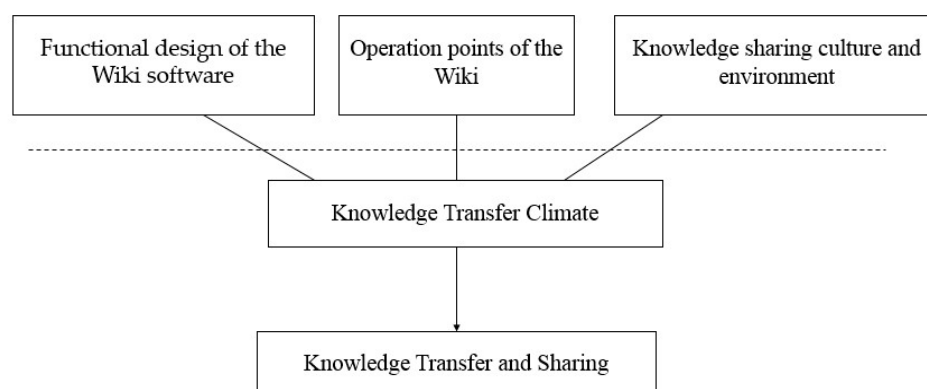
Secondly, in terms of the operation of a Wiki, it is necessary to clearly explain and convey the purpose of system implementation to employees, so as to enhance their acceptance of the system. At the same time, appropriate education and training should be combined so that employees can become familiar with the system, thereby preventing employees from not using the system because they do not understand its operation. Before the system promotion, some of the knowledge content should be set on the platform, so that employees can browse it and experience how the system can help them solve problems smoothly, in order to improve their willingness to use the system. The company's experts should take the lead in contributing knowledge or raising questions for discussion, so as to activate the willingness to use the system and avoid reducing the utilization rate of the system. Wiki focuses on sharing, which is an active activity. Therefore, the use of the Wiki platform should not be imposed by the system or combined with performance appraisals, so as to avoid reducing employees' willingness to share or use the platform, or increasing their resistance to the system. The company can use existing internal resources to publicize the platform, such as electronic newspapers and internal publications, so as to let employees know about the platform. Through publicity, more employees will know about the use of the platform, thus improving the utilization rate of the platform. In addition, the company can increase the amount of content and produce valuable information through sharing among employees.

Lastly, in terms of creating a knowledge sharing culture and environment, rewards can be provided to encourage employees to use the platform online in the early stage of implementation. Although rewards are an incentive factor for employees, they should not be used excessively. In addition, if the rewards provided are not attractive to employees, they will not have a substantial effect. The Wiki system involves knowledge accumulation and knowledge transfer. It is more effective and lasting to let employees understand the benefits and be willing to use them than to offer rewards. In addition, the enterprise should invite experts in various fields to regularly post articles and add content in various fields, so that employees can strengthen their professional knowledge and receive new knowledge. The moderators can exchange experiences and practices through forums, as well as provide successful cases of external businesses to enhance the employees' practical experience. Relevant design points are summarized in Table 1.

Table 1. Design principles of the Wiki system.

Functional design of Wiki software	1. Support registration. 2. Permissions can be set for entries, which can only be read by users who have permission. 3. Report function: understanding the reading status of each entry, reading records, published records and other report statistics. 4. E-mail notification mechanism. 5. Review mechanism: articles without reviews shall not be published. 6. Knowledge classification: the classification function should be clear and easy to understand.
Operation points of Wiki	1. Organize explanation sessions and education and training courses of the system before use. 2. Find content experts and let them take the lead in contributing knowledge. 3. Prepare basic content in the Wiki before launch. 4. No mandatory requirement or combination of performance appraisal. 5. Formulate publicity strategies based on Wiki's positioning in the enterprise. 6. Use existing channels in the enterprise, such as e-newspapers and e-mail for publicity. 7. Designate experts to act as reviewers to confirm that the content of the articles is correct.
Knowledge sharing culture and environment	1. In the early stage of implementation, rewards can be provided to encourage employees to use the platform online. 2. Rewards are more effective at providing fame than profit. 3. Cultivate employees' sense of mission and sense of identity, and promote their willingness to share knowledge. 4. Look for experts in various fields to publish articles regularly to promote employees' willingness to share knowledge. 5. Hold departmental contests occasionally to stimulate willingness to share. 6. Remind and explain the importance of knowledge sharing from time to time. 7. Hold forums for moderators to exchange management status and techniques.

Based on the above analysis, it was found that in the process of promoting and applying the Wiki system, appropriate supportive measures should be adopted for the above three key points, which is conducive for internal staff to use the Wiki system to exchange knowledge. The concepts of a knowledge transfer climate, as compiled by this study, are illustrated in Figure 5.

Figure 5. The creation of a knowledge transfer climate.

4.2. Internal and External Factors of Knowledge Transfer

In the analysis framework of knowledge transfer, the key factors affecting knowledge senders and knowledge receivers were found to be internal factors and external factors, which are shown in Table 2.

Table 2. Knowledge transfer framework.

	Internal Factors	External Factors
Sender	Trust, expected return, reputation and status, sense of efficacy, personal interest, sense of belonging to a group, sense of accomplishment	Organizational norms, incentives, perceived ease of use, future obligations, reciprocity norms, review mechanisms
Receiver	Trust, knowledge growth, prerequisite knowledge, search effort, satisfaction	Organizational norms, incentives, cognitive ease of use, cognitive usefulness, education and training

In terms of the internal factors of the sender, when the sender shares knowledge, he or she will have a sense of accomplishment because he or she is believed by the receiver. Such a kind of sense of achievement comes from others' affirmation and recognition and can make the sender feel that he or she has gained after giving. It also makes the sender expect to be praised by peers or appreciated by supervisors, and to be able to get help quickly when seeking help from others. In a group, if the sender has a high sense of identity to the group and thinks that he or she is part of the group, he or she will be willing to share knowledge with other members of the group which enables everyone to improve their work efficiency. As far as the external factors of the sender are concerned, when a company makes rules requiring employees to share knowledge, more knowledge will be shared within Wiki. However, organizational norms will weaken the willingness to share and understand, since senders will think that knowledge sharing should be provided actively. Knowledge sharing can be increased through a salary increase, extra prizes, or announcements of rewards. The implementation of a review mechanism in the Wiki system can make knowledge sharing more meaningful for employees and contribute to the business of other people.

In terms of the receiver, he or she has to believe that the information and knowledge on the platform are correct. When encountering difficulties, the receiver can look for solutions through the platform and solve problems according to the standard operating procedure (SOP) on the platform or complete work more efficiently. The keyword search design enables the receiver to easily get the articles and data he or she needs. Knowledge shared by the sender requires others to discuss or give positive feedback. This can attract more people to participate in the discussion and form an atmosphere of knowledge sharing in the company. In addition, the receiver must believe that the knowledge on the platform can be internalized into his or her own intelligence and that he or she can learn solutions to problems in the future. As the experience grows, the receiver will also be more willing to share knowledge, in the hopes of transforming the organization into a learning organization for sustainable development.

5. Conclusions

The main purpose of this study was to explore how a Wiki system can assist the education and training of new employees in enterprises and enhance knowledge sharing. The promotion of a Wiki system as an education and training channel and the establishment of a virtual platform for knowledge transfer can not only provide the characteristics of ease of use, interactivity, and sharing, but also make the process of knowledge transfer within the organization faster. Wiki can replace most physical files and allow users to access resources whenever and wherever they need them on the Internet. It was found in this study that in the process of promotion and application of a Wiki system, the functional design of the Wiki software, the key points of operation, and a knowledge sharing

culture and environment should be appropriately supported, as they are all conducive to encouraging employees to use a Wiki system to exchange knowledge.

In terms of supporting measures for the design principles of the Wiki system software, the Wiki system should support naming, set viewing and modification permissions, and provide audit mechanisms and version control. In this way, content can be more tightly controlled. In addition, the system should support a classification function in order to classify knowledge. In terms of supporting measures for the operation of virtual communities, enterprises should hold explanation meetings and training courses to reduce employees' resistance to the system, and they should increase the information of system pages and search content before launching the system, so as to increase the utilization rate and willingness of new employees. Enterprises can also organize promotional events or appoint experts and managers to review content and take the lead in providing knowledge. Finally, enterprises should constantly upload the latest information to allow employees to trust the Wiki system. In terms of knowledge sharing motivation and environmental supporting measures, enterprises can provide appropriate incentives and measures to motivate employees to acquire or share knowledge through the Wiki. Articles should be reviewed by appropriate people and the content should be related to the employees' job requirements. Therefore, the employees can trust the Wiki system and be willing to use it. Finally, employees should provide responses in real time when they post questions, which will increase their willingness to continue to share and ask questions.

When introducing a Wiki, in addition to considering the internal and external factors of the sender and receiver, appropriate responses should be taken for each factor, and the acceptability of the sender and receiver to the Wiki system should be enhanced by establishing organizational norms, carrying out education and training, and providing performance rewards, etc. In addition, the enterprise should combine the characteristics of the system and the organization, and reduce the usage barriers for employees through the design of software functions, such as interactivity, organization, openness, ease of use, convenience, and recoverability. Therefore, they can transform their tacit knowledge into explicit knowledge in the knowledge sharing atmosphere, such as actively putting forward ideas, and improving the knowledge sharing efficiency of the organization, thereby transforming the organization into a learning organization for sustainable development.

The findings and suggestions of this study could provide a practical and effective reference for organizations when deciding to build internal Wiki systems. This could provide the organization with a referral practice in the selection of system software, the management of Wiki communities, or the construction of a knowledge sharing environment. Thus, it reduces the resistance of the organization toward introduce the Wiki and improving the application efficiency. This study suggested that before the introduction of the Wiki system in the future, enterprises should fully consider whether the central idea of the Wiki system is integrated with the existing corporate culture. Furthermore, they should establish supporting measures to reduce internal friction and make their corporate culture include a sharing culture through explanation meetings and publicity techniques, so as to reduce employee resistance and allow the platform to be smoothly implemented. A conceptual model for knowledge transfer and sharing in the Wiki system is shown in Figure 6.

As the Wiki system of this study was set using Microsoft open source software, the functions of the implemented Wiki systems were not in full compliance with the actual requirements of company P. Hence, future research can develop Wiki systems which meet the needs of the research objects. Furthermore, the main research method of this study is action research, which may cause the results to vary depending on the subject, field, and subjectivity. Taking only one company as subject, the research results may need cross-comparison in other cases to generate more valid principles. Therefore, studies in the future can focus on different types of industries so as to analyze and compare differences in the research results between them. Lastly, this study aimed to find out the principles of adopting Wiki system for the organizational education and training through action research. On that account, future research can investigate the efficacy of companies that applied Wiki systems. Topic like whether absorptive capacity, a firm's capacity of absorbing and internalizing knowledge, has been enhanced,

could be further discussed. Further, perception survey can be included to find out how employees perceive or feel how the Wiki system built in the organization facilitates their knowledge transfer and sharing in the further research.
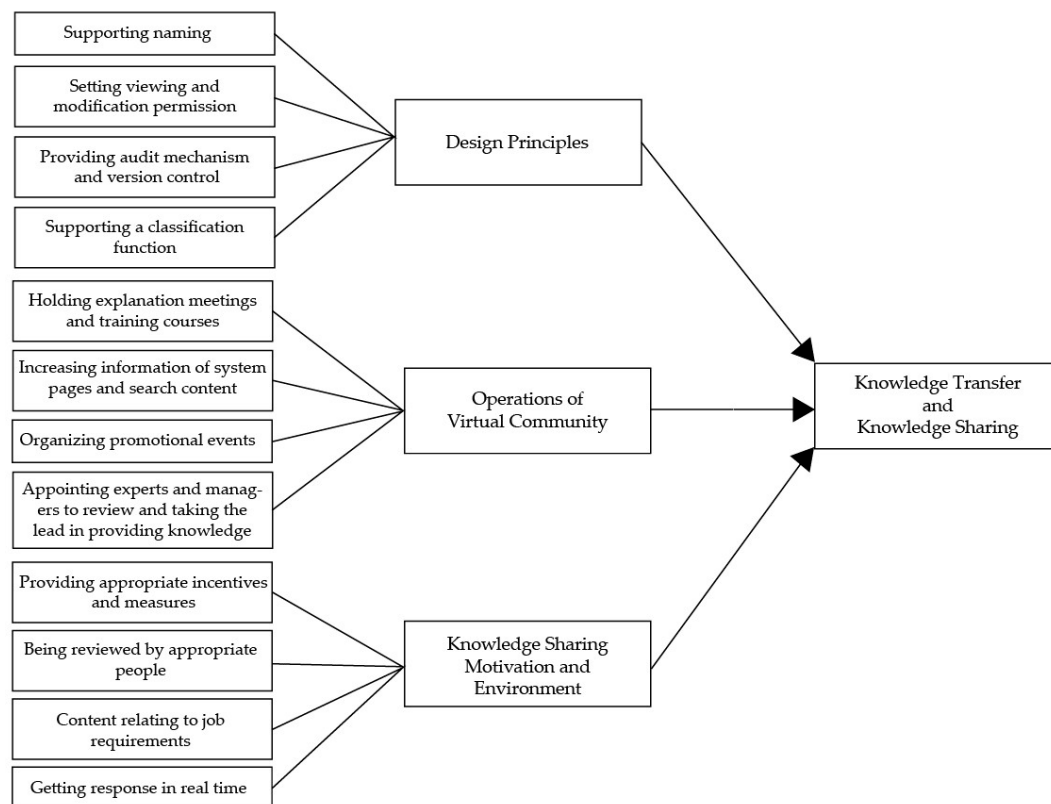

Figure 6. A conceptual model for knowledge transfer and sharing.

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