Use of Wikis for Learning in a Call Center: A Case Study
ABSTRACT

Problem Area / Purpose
The purpose of this research is to study how agents learn and share knowledge in a call center after the implementation of a wiki. How they create new knowledge, and their perception of the knowledge conversion process. In call centers sharing knowledge is a common practice, changes are constant and agents need to have information available in order to learn.

Research Methodology
A qualitative case study was performed in a call center in a company named Telvista. We focused our case study in a project that Telvista has for technical support calls. Interviews were conducted with fifteen agents who were part of a pilot program that used a wiki for the first time. The questions were asked according to the knowledge conversion model of Nonaka and Takeuchi (1995) and the answers helped us to interpret the agents’ impressions about the wiki.

Findings / Conclusion
The findings from this study showed us that a wiki helped the agents in their learning process while they were performing their job. The way tacit and explicit knowledge was utilized and transformed during the four modes of knowledge conversion was useful for the agents to learn from others. A drawback of using the wiki was the impression that some of the agents had about the accuracy of the information it contained.

Research Limitation & Implications
The findings in this study were based in the pilot program of the wiki implementation. Fifteen agents were part of it, selected by their tenure and overall metrics. Agents with less than sixty days on the operation were not eligible for this pilot. The information presented in the interviews with the agents is merely their opinion and perception of the use of the wiki.

Outcomes
Our research showed how agents in a call center shared knowledge and learned in different ways through the socialization, externalization, combination and internalization modes of knowledge conversion model. This study can give acquaintance to organizations that are seeking to implement a knowledge management tool as a wiki is, in a changing and demanding industry.

Keywords
Learning, Knowledge, Knowledge Sharing, Call Center, Wiki, Web 2.0
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# Table of Contents

List of Figures and Tables........................................................................................................vi

1. Introduction .................................................................................................................................1
   1.1 Overview .................................................................................................................................1
   1.2 Problem Area .......................................................................................................................2
   1.3 Purpose ....................................................................................................................................2
   1.4 Research Questions ...............................................................................................................3
      How do wikis support knowledge process in a call center? ................................................3
      How does a wiki support learning? ..........................................................................................3
      How is new knowledge created using a wiki? .........................................................................3
      What are the limitations of using a wiki? ................................................................................3
   1.5 Justification ............................................................................................................................3
   1.6 Scope and Limitations ............................................................................................................4

2. Literature Review ........................................................................................................................5
   2.1 Web 2.0 ....................................................................................................................................5
   2.2 Social Software .....................................................................................................................5
   2.3 Wikis ........................................................................................................................................6
      2.3.1 Wiki Functions ...............................................................................................................7
      2.3.2 Wikis and Knowledge Management ..............................................................................8
      2.3.3 Wikis for Learning .........................................................................................................9
   2.4 Knowledge Management .......................................................................................................10
      2.4.1 Data and Information .................................................................................................10
      2.4.2 Knowledge ..................................................................................................................10
      2.4.3 Knowledge Management Definition ............................................................................10
      2.4.4 Knowledge Management Tools ..................................................................................11
      2.4.5 Communities of Practice ...........................................................................................12
   2.5 Organizational Knowledge Creation .......................................................................................12
      2.5.1 Knowledge Conversion Modes ....................................................................................13
      2.5.2 Knowledge Spiral .........................................................................................................15
   2.6 Call Center ..............................................................................................................................16

3 Research Methodology ...............................................................................................................17
   3.1 Research Method ....................................................................................................................17
   3.2 Research Strategy ....................................................................................................................17
   3.3 Data Collection ......................................................................................................................18
      3.3.1 Primary Data ...............................................................................................................18
      3.3.2 Secondary Data ............................................................................................................19
   3.4 Research Setting ....................................................................................................................19
      3.4.1 Project Background .......................................................................................................19
   3.5 Agent Selection Process ........................................................................................................20
3.6 Interviews .............................................................................................................. 21
  3.6.1 Interview Structure ......................................................................................... 22
  3.6.2 Selection of Questions ..................................................................................... 22
3.7 Data Analysis....................................................................................................... 23
3.8 Role of the Researcher ......................................................................................... 25
3.9 Ethical Issues ....................................................................................................... 26
3.10 Validity and Reliability ...................................................................................... 26
  3.10.1 Validity ......................................................................................................... 26
  3.10.2 Reliability ..................................................................................................... 27
4. Empirical Findings ................................................................................................. 28
  4.1 Case Description ................................................................................................ 28
  4.2 Interviews ........................................................................................................... 28
    4.2.1 Socialization ................................................................................................. 29
    4.2.2 Externalization ............................................................................................. 30
    4.2.3 Combination ................................................................................................. 31
    4.2.4 Internalization ............................................................................................... 33
  4.3 Articles Uploaded ................................................................................................. 35
5. Empirical Findings Details .................................................................................... 36
  5.1 Socialization Questions ...................................................................................... 36
  5.2 Externalization Questions ................................................................................... 39
  5.3 Combination Questions ...................................................................................... 41
  5.4 Internalization Questions ................................................................................... 44
  5.5 Articles Uploaded ................................................................................................. 47
6. Analysis & Discussion ............................................................................................ 49
  6.1 Knowledge in Call Centers ................................................................................ 49
  6.2 Knowledge Management Strategies in Call Centers .......................................... 49
  6.3 Knowledge Management Tools ......................................................................... 49
  6.4 Communities of Practice ................................................................................... 49
  6.5 Knowledge Conversion Modes .......................................................................... 50
7. Conclusions ............................................................................................................ 53
  7.1 Results ................................................................................................................. 53
  7.2 Outcomes ........................................................................................................... 57
  7.3 Further Research ................................................................................................. 57
References ................................................................................................................ 59
Appendices ............................................................................................................... 64
  Appendix 1 - Interview Questions ......................................................................... 64
  Appendix 2 - Interview Answers ........................................................................... 65
  Appendix 3 - Coding ............................................................................................... 73
  Appendix 4 - Ranking ............................................................................................. 74
LIST OF FIGURES AND TABLES

Figures

Figure 1.1 Traditional VS Social Software................................................................. 6
Figure 2.1 Four Modes of Knowledge Conversion..................................................... 13
Figure 2.2 Knowledge Spiral...................................................................................... 15
Figure 3.1 Matrix Example.......................................................................................... 24
Figure 3.2 Coding Example......................................................................................... 25
Figure 5.1 Learning of Processes Needed to Perform Tasks......................................... 36
Figure 5.2 Learning From Co-workers....................................................................... 37
Figure 5.3 Sharing Knowledge with Co-workers........................................................ 38
Figure 5.4 Motivation to Upload Articles..................................................................... 39
Figure 5.5 Ensuring Articles’ Accuracy....................................................................... 40
Figure 5.6 Ensuring Articles’ Understandability......................................................... 41
Figure 5.7 Reasons for Discussion and Editing of Articles......................................... 42
Figure 5.8 Actions Performed for Inaccurate Articles............................................... 43
Figure 5.9 Wiki Discussion and Collaboration: Easier or Difficult?............................. 44
Figure 5.10 Solving Processes and Troubleshooting Doubts....................................... 45
Figure 5.11 Learning New Processes......................................................................... 46
Figure 5.12 Use of Wiki or TechHelp......................................................................... 46

Tables

Table 3.1 Agents Eligible.............................................................................................. 21
Table 3.2 Agent Selection........................................................................................... 21
Table 4.1 Articles Uploaded........................................................................................ 35
Table 5.1 Articles Uploaded per Agent........................................................................ 47
1. INTRODUCTION

The first chapter of this dissertation starts with an overall view about our topic. It introduces the reader to the general concepts used, such as knowledge, call center, and wiki. The introduction also presents the purpose, research questions, justification and limitations of our study.

1.1 Overview

The collaboration of information with web technologies is growing rapidly. Sharing information and learning through communities with the same interest can take place if there is infrastructure, mindset and the tools required for it (Burton, 2005). The utilization of web technologies can let information that is centralized to be shared between different users no matter their location, allowing them to use this information to acquire new knowledge (Leuf & Cunningham, 2001). Web 2.0 technologies are part of information sharing tools, they are described as the second generation of Internet technology, its recognition began due to the development of blogs or social networks (Mader, 2007) that allow several users to have a meeting point, share their interests and learn from each other.

According to Fisher (1984) and Wellman and Leighton (1979) cited in Wellman (1996, p. 10): ‘Many computer-supported social networks are a continuation of the long-term shift to communities and work groups that are organized by mutual interests rather than by shared neighborhood or work site’. A common example of its use is in organizations, where informal networks are more and more important for those that are competing on knowledge and an ability to innovate and adapt (Cross, et al., 2002).

A growing interest in web-based collaboration tools has been seen in recent years with tools as wikis or blogs (Anon., 2005 cited in Kamel, 2006). A wiki allows the viewers of a page to edit its content. Wikis are easy to use platforms to cooperate on the work of texts (Ebersbach, et al., 2006).

The growth of wikis relies on the community that uses them. The application can be from social groups, public or private companies, or even education groups (Ebersbach, et al., 2006). The implementation of a wiki can bring several benefits to organizations that need to provide immediate information to its members. According to Ebersbach, et al. (2006, p.11) a wiki can serve as a ‘knowledge management tool in planning and documentation’.

Organizations, independently of their corporate purpose or objective, need to share information. A call center is an example of organization that handles large amounts of data in a fast pace. Call centers usually operate 24 hours a day, 7 days a week, the 365 days of the year (Rasooli, 2006, p.3). They establish communication through telephone or web
based services, as chats or emails. With this background it is important that call centers have the right knowledge to provide to their customers when they require it.

The amount of information handled in a call center may vary according to the type of service offered. Inbound calls are received or outbound calls are done to make sales, give support or establish business transactions (Timbrell, 2004 cited in Peyravi & Keshavarzi, 2009), in this case, employees, also known as agents, handle large amounts of information which they need to learn quickly.

Knowledge repositories are useful but not as a summarized or updated as an agent will require them. Most of the times they lack input from agents and their knowledge acquired through experience and practice (Bordoloi, 2004). This means that tacit knowledge cannot be transformed into explicit knowledge (Nonaka, 1994) while using a knowledge repository. A second problem that call centres face is the high turnover in this industry (Barnes, 2001; Dawson 2003; Smith, 2001; Weitzman, 2000 cited in Downing, 2004). This makes it difficult for employees to learn from more experienced ones, since they tend to leave the organization before sharing their knowledge with others.

1.2 Problem Area

The creation of knowledge in an organization cannot be possible without individuals (Nonaka, 1994). In a technical support call center technicians face stressful working conditions (Dercy et al., 2002 cited in Downing 2004), pressure to resolve customers issues, constant changes in procedures and the possibility of being monitored at any time for quality assurance purposes. Moreover, call centers face high turnover (Barnes, 2001; Dawson 2003; Smith, 2001; Weitzman, 2000 cited in Downing, 2004), and employees may not be able to share their acquired knowledge before leaving the organization (Payne 2008).

Sharing knowledge is a common practice in call centers used by agent to learn, if a technician does not know the answer for a customer’s issue, it is typical for them to turn for help to a nearby co-worker (Downing, 2004). The use of a knowledge tool can help to distribute information to employees (Dwoning, 2004), for example, the use of a wiki as a knowledge tool can help in the collaboration and sharing of ideas (Gralla, 2007). The way agents learn, share their knowledge and transform it from tacit to explicit with the use of a wiki, may be of relevance to this study.

1.3 Purpose

The purpose of this research is to study how agents learn and create knowledge in a call center after the implementation of a wiki. We aim to analyze how the wiki allows for the
improvement of existing knowledge, as well as the processes followed for the creation of new one, and the ramifications of using it.

1.4 Research Questions

This study explores the use of wikis for learning and creating new knowledge between gents in a call center. Our research is based on the knowledge conversion model by Nonaka and Takeuchi (1995). For our study our research questions are:

*How do wikis support knowledge process in a call center?*

*How does a wiki support learning?*

*How is new knowledge created using a wiki?*

*What are the limitations of using a wiki?*

1.5 Justification

In a call center agents need to provide solutions to the customer in a fast and efficient way, this involves the use of ‘multiple knowledge management tools, knowledge scattered across disparate sources and implicit know-how’ (Clarke, 2009, p.78). Due to its complexity and constant change, acquiring this type of knowledge and sharing it represents a challenge in this type of organizations (Clark, 2009). Another important factor to consider is the high turnover that call centers have (Barnes, 2001; Dawson 2003; Smith, 2001; Weitzman, 2000 cited in Downing, 2004). The demands in this type of job can be quite stressful, resulting in agents leaving rapidly and not sharing the knowledge obtained during their time of employment (Payne, 2008; Clarke, 2009).

Organization can influence knowledge creation and sharing (Payne, 2008); to do so they need to provide the appropriate tools and foster the right environment. A lot of money is spent by organizations trying to find the adequate tools to enable knowledge sharing (Gordon, 2006). An effective tool for knowledge sharing will result in a more efficient way of learning, better practices being shared and not losing the experience and knowledge of employees once they leave (Payne, 2008).

Little research has been done regarding call center agent’s use of knowledge management tools (Downing, 2004). There are few studies that analyze the effects resulting from the introduction of new tools in collaborative learning environment, how these tools are used, and the motivations to use them (Perez-Mateo & Guitert, 2009).
This research will explore the use of wikis as knowledge management tool for sharing knowledge between agents in a call center. The results will contribute by giving an insight on how a wiki affects the agents’ way of learning and whether this tool is an appropriate one or not for this type of organization.

1.6 Scope and Limitations

This project will focus on a small group of agents who will start using the wiki. We will begin by doing a pilot with 15 agents. The agents will be selected according to their tenure and overall metrics. The population will be broken down into different segments, after this, agents will be selected at random from each one. Agents with less than 60 days on the operation will not be eligible for this pilot, since they are still in their learning curve and will not have enough knowledge and experience to contribute to the wiki.

We will not focus on the technical aspects of the wiki implementation. The IT department will handle this, as well as any technical issue related with the wiki. The implementation of the wiki will be finished by the IT department during the last week of February 2010.

The start of the wiki pilot will be on March 1st, 2010. According to Mader (2007) the recommended time frame to test a wiki pilot is 3 months, due to the time constrains we will only be able to test it for 6 weeks. Mader (2007, p.65) also states that the time frame may be shorter depending on several factors ‘...including the size of [the] organization and general attitudes toward using new tools’. We believe these factors will contribute for a shorter time frame for our research; having a technical support background will allow the agents to familiarize with the wiki faster. Moreover, agents are used to new tools being implemented on a regular basis which will allow for a better reception and use of the wiki.

Another important limitation will be the lack of observation due to our geographical location. We will not be able to observe the agents interaction with the wiki, this is why we will rely on our interviews to obtain a better insight on the agents’ behavior towards the wiki. Finally, due to the nature of the business and confidentiality policies, we will not be able to include information about certain processes.
2. Literature Review

The second chapter presents the different theories and the model that are of concern for this dissertation. These topics will be used in further chapters for the analysis and discussion of our study.

2.1 Web 2.0

Web development has created an interactive platform in which publications have changed from static to interactive; this has led to a social-oriented development of the Internet. Web 2.0 has been an initiator for online publishing, where everyone can communicate and share information (Toma et al., 2009). The accumulation of big scale social networks is what started to add value to it.

A definition of web 2.0 was introduced by O’Reilly Media (2004 cited in Wever et al., 2007, p.511) as: ‘a newer version of the world wide web’. This new generation of websites has an emphasis on interactivity of users.

2.2 Social Software

Social software incorporates structures of computer mediated communications that let people collaborate or connect through communities (Kosonen & Kianto, 2009). Social software according to Boyd (2005 cited in Wever et al., 2007, p.512): ‘is based on supporting the desire of individuals to affiliate, their desire to be pulled into groups to achieve their personal goals’. The value of social software is present due to the support of a multitude of knowledge processes performed simultaneously (Röll, 2004 cited in Kosonen & Kianto, 2009).

Software tools can be divided in two categories: traditional and social (Payne, 2008); both are collaborative but differ in the way they function and relate between users.

Social software can be a bottom up collaborative tool, having a flexible structure, quick response, and a starting point of collaboration performed by users (Payne, 2008). On the other hand, traditional collaborative tools have a slower response, they tend to work in a top down structure, putting the organization or project first and respecting a hierarchy between members (Payne, 2008).

Figure 1.1 shows the differences between social and traditional software hierarchies. Traditional software has a start point with the project or organization with a defined structure before use. Whereas, social software has a start point from the users and the structure emerges from the use of the software.
Traditional software has a top down hierarchy, there is a central control, and from that point a formal way of communicating to the rest of the users. Knowledge belongs to experts and they share it in a formal way. While social has a bottom up hierarchy. Knowledge is shared through all users and is done in an informal way.

![Diagram comparing Traditional and Social Software](image)

**Figure 1.1 Traditional VS Social Software (Payne, 2008, p.7)**

Examples of traditional software are tools as Lotus Notes or Blackboard. While wikis and blogs are examples of social software.

### 2.3 Wikis

The word wiki comes from Hawaiian language and means “fast” (Bell, 2009, p.143). WikiWikiWeb was the first wiki created by Ward Cunningham in 1995; he created it in order to collaborate with other programmers in a more efficient way.

A wiki combines both, a web site and a Word document. At its simplest form a wiki is just a regular web page that can be viewed from any web browser. Their real use comes from the option to edit its contents; wikis can be edited by anyone who has access to them using the same web browser. This allows for a collaborative work and sharing of knowledge. (Bell, 2009; Ebersbach, et al., 2006). Wikis are simple to use and they store documents as they change, so a history of it can be viewed and the changes tracked.
Wikis are a result of the different ideas and collaborations made by people (Bell, 2009). They are edited continually and their content expands and benefits from different points of view. This collective knowledge is greater than the knowledge from one individual. The information provided by a wiki does not come from a single individual; it is the combination of the expertise of different individuals. (Lyn Grace, 2009).

Wikis have two modes, read and edit (Bell, 2009). The default mode is read, where the wiki is viewed like a normal webpage, which has an edit tab. If this tab is accessed the edit mode starts and changes can be made to the wiki.

Wikis are used in a variety of ways and for different purposes (Gralla, 2007); they can be used by anyone on the WWW, like Wikipedia or Wiktionary, or in closed groups or organizations.

The application of wikis in organizations are several, they are designed to support particular functions by allowing their employees to put in information (O’Leary, 2008). Some of those functions are:

- **Meeting setup.** This lets moderate overloads of information (Spira, 2007 cited in O’Leary, 2008). One example is to put in advance the information from attendees so that the rest of the team can review that information and they can save time.
- **Project management.** Organizations can upload progress reports, messages, or even documents related to a specific project.
- **Best practices.** Uploading best practices can be made to facilitate sharing of ideas between individuals.
- **Taxonomy development.** The use of wiki can facilitate the taxonomy development in an organization. Users can recommend parts of the taxonomy and its explanation.
- **Competitive intelligence.** A group within the organization can work in gathering competitive intelligence. This means, having better and timelier collective intelligence that could reach more people and be of benefit for the organization.

### 2.3.1 Wiki Functions

According to Ebersbach, et al. (2006, pp.19-20) wikis have the following common characteristics:

- **Editing.** This is the main characteristic of wikis, and with very rare exceptions, the edit option will be present in all wiki pages.
- **Discussion.** The contests of the articles can be discussed using this function. Discussing articles allows for debate and clarification of their information.
- **Links.** Articles can be linked with other articles.
- **History.** This option allows seeing previous versions of a wiki’s page. It allows tracking changes and seeing how the page changed through time. Saved history can also be used to restore a wiki to its previous state.

- **Recent Changes.** A list of all the recent edits made to a page can be seen here. When a page was edited and by whom can be tracked here.

- **Sandbox.** This is a testing page where users can experiment with the different features of a wiki and learn how to use them properly without making any real changes to the wiki itself.

- **Search Function.** This is a common feature in most wikis, which allows users to search for articles and find the information they need in quick and easy manner.

### 2.3.2 Wikis and Knowledge Management

Collaboration and knowledge sharing are key elements for a successful business (Payne, 2008; Lyn Grace, 2009); they allow for a more efficient way of working where good practices are shared, innovation is encouraged and experience is not lost when employees leave (Payne 2008).

Wikis represent a viable option as a knowledge management tool (Payne, 2008; Lyn Grace, 2009), they are easy to use and inexpensive (Mader, 2007). People are familiar with wikis since they use them in their regular life; making them more receptive to this type of tool and prone to collaborate and contribute to it (Payne, 2008). Wikis are the result of the collaboration and ideas of different people (Bell, 2009); they work as a knowledge management tool since they allow its users to create and share knowledge in a collaborative way.

Wikis are not a quick fix for an organization (Lyn Grace, 2009), they need to be implemented and monitored closely for them to be successful. If done correctly, the usage of wikis as knowledge management tools will give intangible value to the users and foster a collaborative environment (Lyn Grace, 2009).

For some organizations it has been difficult to facilitate knowledge management. Much tacit knowledge can remain inaccessible (O’Leary, 2008). The use of wikis can assure four knowledge managements needs, according to O’Leary (2008, p.36) those are:

- Capturing knowledge from those who have it.
- Converting knowledge into an explicit available format.
- Connecting those who want knowledge with those who have it.
- Linking knowledge to knowledge.
2.3.3 Wikis for Learning

Collaboration and cooperation are common tasks found in learning environments. Traditional forms of collaboration and cooperation methods have changed with the use of technology. Wikis are one of the major technologies that allow implementing collaboration in virtual environments (Coutinho & Bottentuit, 2007). Wikis have been increasing their popularity in education, as a useful tool to amplify collaboration and engagement among students (Lytras, et al., 2009).

Studies made have demonstrated that collaborative learning strategies end up with a majority of students implicated in courses (Harasim, 2000 cited in Coutinho & Bottentuit, 2007). Information and communication technologies used in learning allow to have a fast-changing knowledge-based society, since it enables learning anywhere, anytime and anyhow (Punie & Cabrera, 2006 cited in Coutinho & Bottentuit, 2007). However, learning environments have had little research on this matter (Leuf & Cunningham, 2001 cited in Coutinho & Bottentuit, 2007; Perez-Mateo & Guitert, 2009).

Perez-Mateo and Guitert (2009) conducted a study at the Universitat Oberta de Catalunya where a wiki was introduced to a group of students. Their objective was to analyze how the wiki facilitated the collaboration and learning process. The study showed that three main factors affect the use of the wiki:

1. **Degree of knowledge of the tool.** This refers to ‘what a wiki is and what possibilities it has for collaboration in a virtual environment’ (Perez-Mateo & Guitert, 2009, p.406).
2. **Degree of difficulty, in terms of usability.** The study showed that participants value tools that are easier to use and will prefer them over complex ones. In this case, the participants found the wiki difficult to use and overly complicated.
3. **Availability of time.** The participants who were unable to use the wiki or used for less time than others mentioned the lack of time as the main reason for this.

Another study conducted at the UK Open University explored the use of wikis to facilitate learning. The study showed that one of the drawbacks of using the wiki was the lack of online socialization. Ice-breakers were introduced so students could overcome the difficulty of working with a new group. However, they found difficult working with people that they previously did not know (Thomas & Minocha, 2007). Völkel and Oren (2006, p.3) mentioned that through socializations tacit knowledge could be transferred, even without language, it could be with imitation, practice or observation. They state: ‘Socialization is often not an option in online environments’.
2.4 Knowledge Management

2.4.1 Data and Information

Information and knowledge are two terms that have a similar understanding. The concepts that are involved in the definitions are information and data. Beynon-Davies (2002, p.449) defines data as a unit or symbols, and he states: ‘Information is data placed within a meaningful context’.

2.4.2 Knowledge

The definitions of knowledge might vary according to the context in which they are found or even the classification they have. In an organizational context, knowledge can be classified in explicit, implicit and tacit (Liebowits, 1999 cited in Beynon-Davies, 2002). A definition that Beynon-Davies (2002, p.449) gives for knowledge is: ‘Knowledge is derived from information by integrating information with existing knowledge’.

It is important to mention that there are different types of knowledge, Bocij, et al. (1999, p. 29) state that there is ‘explicit (details of processes and procedures) and tacit (less tangible)’. The difference between both is that explicit can be stored in an information system and tacit is the information that as human beings we have. The distinction then will be the procedural (knowing how) and the knowledge declarative (knowing what). A second definition is the one by Little and Ray (2002, p.2) stating that: ‘explicit knowledge can be expressed in a formal and systematic language and shared in the form of data, scientific formulae, specifications, manuals and suchlike. It can be processed, transmitted and stored relatively easily. In distinction, tacit knowledge is highly personal and hard to formalize’. The authors define tacit knowledge as procedures, ideas, values and routines, as knowledge that human beings have in mind and body cognitively.

2.4.3 Knowledge Management Definition

The term knowledge management (KM) according to Turban, et al. (2008, p.390): ‘Is a process that helps organizations identify, select, organize, disseminate and transfer important information and expertise that are part of the organization’s memory and that typically reside within the organization in an unstructured manner, this structuring of knowledge enables effective and efficient problem solving, dynamic learning, strategic planning, and decision making’. In organizations knowledge management can be considered as way to increase assets (Pirro, et al., 2009), or even as a process or lifecycle that they follow to increase the value of it.
A different concept is presented by Bocij, et al. (1999, p.28) as they state: ‘Knowledge management has an important role within any organization, but particularly for the e-business since success is critically dependent on staff knowledge about all aspects of the micro-environment such as customers, suppliers, intermediaries, competitors and how to shape internal processes to best deliver customer value’.

Velasquez, et al. (2009) made an investigation on knowledge management systems and the success they can have in system administration. They said that knowledge management systems can take two forms: knowledge sourcing and knowledge sharing.

Jashapara (2004, p.309) attempting to integrate different magnitudes of knowledge management defines knowledge management from an interdisciplinary field as:

‘The effective learning process associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriately technology and cultural environments to enhance organization’s intellectual capital and performance’

In a call center a knowledge management system organizes both structured and unstructured information, after that it gives the relevant responses to the agents. (Bellman, 2007). Furthermore, information may be stored as text files, databases or other formats, which can be considered as knowledge management tools.

2.4.4 Knowledge Management Tools

Knowledge management tools according to Walsh & Ungson (1991) cited in Downing (2004, p.167) are ‘information and communication technologies that gather, index and structure the “corporate memory” of an organization’s employees’.

In a study made by Davenport, de Long, and Beers (1998) cited in Downing (2004) they explain that information technology professionals collected two types of knowledge: ‘structured internal knowledge and informal internal knowledge’. The former usually refers to sales, production, reports, or memos; the latter refers to electronic boards, email messages, instant messages, or chat rooms. The importance of knowledge management tools resides in the use of technology as the main system for communication. Ruggles (1997, p.3) states that knowledge management tools are ‘technologies which enhance and enable knowledge generation, codification and transfer’. These tools allow for more efficient work and help allocating resources to the tasks where they are needed the most.

Organizations can only influence in the creation and sharing of knowledge (Payne, 2008); this is why it is crucial for them to provide the appropriate tools to their employees. The
proper knowledge management tools will make possible for employees to benefit form the intellect and potential of the people working around them (Payne, 2008).

2.4.5 Communities of Practice

Knowledge in a community approach is seen as the creation of learning groups and social interaction. This type of community is not only based on a geographical area or a certain interest but on practice. It involves an activity in which others may also take part in (Newell, et al., 2002). Becoming a member of that community helps individuals to develop their practice, ideas, or even share experiences with others that try to reach the same objective.

For organizations it has been difficult to develop a community approach. According to Newell, et al. (2002, p.119) ‘a cognitive approach tends to fit more neatly with established management practices’. A community approach is not as predictable as with individuals that use technology to capture knowledge. The term communities of practice as stated by Brown and Duguid (2000 cited in Newell et al., 2002, p.119) ‘does not appear in organization charts or in the different business processes designed by management’ from that point managers may think of them of unshaped quality.

In communities of practice, individuals enroll in a voluntary way because they have something to learn or contribute. Those communities do not recognize a boss (Newell, et al., 2002). They are different from teams since those are recognized as part of a formal system and will be accountable of certain goals or activities.

A member of a community of practice is part of an informal network usually based in friendship or a certain informal affiliation (Newell, et al., 2002). These communities differ from other social networks because they allow individuals to share experience about their job and have a better understanding of it. The authors Newell, et al. (2002) mention that one important feature of communities of practice has to do with the way in which knowledge is shared. Barriers that are regular to knowledge sharing are lowered. Members build up a group of shared meanings obtained from their common experience.

2.5 Organizational Knowledge Creation

Nonaka and Takeuchi (1995) present a knowledge creation model based on the interaction between tacit and explicit knowledge and the “spiral” that emerges from such interaction. This interaction between tacit and explicit knowledge results in the creation of new knowledge. Nonaka and Takeuchi’s model consists of four knowledge conversion modes: socialization, externalization, combination, and internalization. These modes are the engine of the knowledge creation process (Nonaka & Takeuchi, 1995, p.57). The modes
encompass the experiences of the individuals and the mechanisms by which individual knowledge is transformed and shared throughout the organization (Nonaka & Takeuchi, 1995).

For Nonaka and Takeuchi (1995, p.61) tacit and explicit knowledge are ‘mutually complementary’ and interact with each other, they are not separate entities. Nonaka and Takeuchi’s knowledge creation model is based on the assumption that ‘human knowledge is created and expanded through social interaction between tacit knowledge and explicit knowledge’ (Nonaka & Takeuchi, 1995, p.61). This interaction is called “knowledge conversion”; a social process not confined to a single individual which expands the quality and quantity of the tacit and explicit knowledge (Nonaka & Takeuchi, 1995).

2.5.1 Knowledge Conversion Modes

Nonaka and Takeuchi (1995) state that knowledge is created through the interaction between tacit and explicit knowledge; based on this premise they established four knowledge conversion modes:

1. **Socialization.** From tacit knowledge to tacit knowledge.
2. **Externalization.** From tacit knowledge to explicit knowledge.
3. **Combination.** From explicit knowledge to explicit knowledge.
4. **Internalization.** From explicit knowledge to tacit knowledge.

Figure 2.1 shows Nonaka and Takeuchi’s knowledge conversion model, in which we can see the four modes and how knowledge is transformed from during each stage.

![Figure 2.1 Four Modes of Knowledge Conversion (Nonaka & Takeuchi, 1995, p.62)](image-url)
Socialization involves interacting with other individuals and sharing experiences, and it is through this process that tacit knowledge is created (Nonaka & Takeuchi, 1995). Tacit knowledge can be acquired without language, individuals can learn from other individuals by observing them. Apprentices learn from their masters by observation, imitation, and practice (Nonaka & Takeuchi, 1995, p.63).

Experience is key to acquiring tacit knowledge. Tacit knowledge is obtained and shared from having joint activities, individuals need to spend time together to learn from each other. Interaction with people is fundamental for acquiring this type of knowledge (Nonaka & Takeuchi, 1995).

The ‘process of articulating tacit knowledge into explicit concepts’ (Nonaka & Takeuchi, 1995, p.64) is known as externalization. During this process tacit knowledge becomes explicit by means of analogies, metaphors, hypotheses or models (Nonaka & Takeuchi, 1995). Externalization requires tacit knowledge to be transformed into a comprehensible from so other individuals are able to understand it.

Externalization involves the creation of concepts and ‘is triggered by dialogue or collective reflection’ (Nonaka & Takeuchi, 1995, p.64). Deduction and induction are methods commonly used to create these concepts (Nonaka & Takeuchi, 1995); they help in translating tacit knowledge into a form that is comprehensible and understandable for other individuals.

Nonaka and Takeuchi (1995, p.66) state that ‘externalization holds the key to knowledge creation, because it creates new, explicit concepts from tacit knowledge’. Metaphors, analogies and models are essential tools to convert tacit knowledge into explicit knowledge efficiently.

The conversion of explicit knowledge into more complex sets of explicit knowledge is known as combination (Nonaka & Takeuchi, 1995). Explicit knowledge held by different individuals is combined through different ways, such as documents, meetings, email, etc. This combination of explicit knowledge can be reconfigured into new explicit knowledge. Sorting, adding, combining and categorizing knowledge previously acquired can lead to new knowledge (Nonaka & Takeuchi, 1995).

During the combination mode explicit knowledge is collected from different sources and then it is captured and integrated (Nonaka & Takeuchi, 1995). After this, the new tacit knowledge is spread among organization, where it is edited to make it more usable.

Finally, internalization is the ‘process of embodying explicit knowledge into tacit knowledge’ (Nonaka & Takeuchi, 1995, p.69), and it is related to “learning by doing”. Internalization refers to applying theory to practice. It is the conversion of explicit
knowledge created in the combination mode into tacit knowledge. Internalization requires for an individual to identify the knowledge that is relevant to him or her within the organizational knowledge.

Manuals, documents and oral stories are items that help individuals transform explicit knowledge into a tacit one and absorb it (Nonaka & Takeuchi, 1995). These items aid in transferring explicit knowledge to other people, by allowing them to indirectly experience the experiences of others (Nonaka & Takeuchi, 1995)

2.5.2 Knowledge Spiral

According to Nonaka and Takeuchi (1995, p.70) ‘organizational knowledge creation is a continuous and dynamic interaction between tacit and explicit knowledge’. This interaction occurs through the different modes of the knowledge conversion model and is known as the knowledge spiral. Figure 2.2 shows the knowledge spiral and how it is a continuous process involving the four modes of the knowledge conversion model.

Nonaka and Takeuchi (1995) describe the knowledge spiral process as follows: First, during the socialization mode interactions are built and experiences shared between individuals. After this, dialogue and collective reflection are initiated. During the externalization mode individuals use metaphors to help them ‘articulate hidden tacit knowledge that otherwise is hard to communicate’ (Nonaka & Takeuchi, 1995, p.71). Then comes the combination mode, in which newly created knowledge is combined with existing knowledge from different units resulting in a new product or service. Finally, the internalization mode is generated by learning by doing.

![Figure 2.2 Knowledge Spiral (Nonaka & Takeuchi, 1995, p.71)](image)
2.6 Call Center

A call center allows delivering services via telephone or some extra multi-media channels as email, fax, Internet or chat, usually in a room with endless terminals of phones, computers and trained personnel (Koole & Mandelbaum, 2002). A call center can also be defined as Merhotra and Fama (2003 cited in De Freitas, 2007, p.2247) state: ‘A receiving and transmitting office with large volume of requests by telephone, which can be as inbound or outbound calls’. An inbound call center may be a physical facility located in different time zones and countries, which has intensive operations with large staff personnel (Aksin, et al., 2007). Outbound call centers may have the same settings, with the main difference being that calls are made to customers rather than received.

Regarding the type of business of the call center, Mital (1997 cited in Bristow & Gripaios, 2000, p.523) defined them as ‘a business unit within an organization in which its role is to make or receive calls for customer service on different fields as: billing enquires, technical support or telemarketing’. A call center will have measurable objectives and will rely on the use of IT for telecommunications, service integration, and communication.

Sharing knowledge in a call center is a common process that employees face to get particular information (Downing, 2004). Furthermore, to achieve success in call centers technicians have to deliver solutions to the customer; as Pentland (1995 cited Shah & Bandi, 2003, p.419) state: ‘Technical support specialists repair problems and repair relationships’. In technical support call centers employees share information and they usually do it by knowledge management tools (Downing, 2004). Moreover, those employees are evaluated by metrics that include: talk time (the time a technician speaks with a customer), average talk time (the average time a technician speaks with a customer), after call work (time spent after a call by a technician), quality assurance, among many others.

When agents of a call center have to respond to an inquiry they require and efficient access to data, information, and knowledge (Peyravi & Keshavarzi, 2009). In that way they can give correct and consistent answers to their customers in the timeframe required by the organization.
3 Research Methodology

In the third chapter of this dissertation we discuss the methodology used to conduct our research and analyze the empirical data. The data we used, and how we collected it, is also explained, as well as the interview process, and how we selected the questions for it. Moreover, an overview of the company where we conducted our study is included. Finally, ethical issues are discussed and the timetable for our research is presented.

3.1 Research Method

According to Creswell (2009) there are three types of research approaches: qualitative, quantitative and mixed methods. For this study we will use a qualitative approach. We will be studying how agents use wikis for knowledge sharing in their natural setting, which in this case will be the call center. Qualitative research attempts to interpret phenomena in terms of the meaning people bring to them (Denzin & Lincoln, 2005), and understanding what it means for the participants, not the researcher (Creswell, 2009). For these reasons we selected this type of approach, we will be studying people on their real life settings and we will seek to understand how they use the wiki for knowledge sharing.

Qualitative research involves the use of empirical material, such as interviews, observation and personal experience (Denzin & Lincoln, 2005). For our study, our main source of information are the interviews with the agents, which fall under qualitative data. These type of interviews are useful for obtaining a better understanding of the agents and their perspectives.

Quantitative research focus on measuring and analyzing the relationship among variables (Denzin & Lincoln, 2005; Creswell, 2009), while qualitative research seeks to understand the meaning the participants ‘ascribe to a social or human problem’ (Creswell, 2009, p. 232). A qualitative approach allows for a deeper understanding of the situation within the call center. Since we are studying wikis and how they are used to share knowledge, we need to comprehend how the agents are working with the wiki and how it affects their work.

Since wikis are a social software (Payne, 2008) it is important for us to understand how it evolves and is used by the agents. We need to study the interaction between the wiki and the agents and for this a qualitative research is helpful. With the use of interviews we will be able to obtain the qualitative data needed for our research.

3.2 Research Strategy

The research strategy used in our dissertation is a case study. Usually, a case study method is selected when a research question of “how” or “why” is being used, there is small control
over events and there is a real life context in a contemporary phenomenon (Yin, 2009, p.2). A case study is suitable for our research because it will help us explore in depth the activity or process that a group of agents follow to share knowledge (Cresswell, 2009). In case studies three distinctions exist between the type of use of cases (Yin, 1994 cited in Gummesson, 2000, p.85): exploratory, descriptive and explanatory. Sen (1980, cited in Gummesson, 2000, p.85) states: ‘There is no description without analysis and interpretation’. In our case we will do a description of the process agents follow to share information and we will make interpretations of the interviews that we perform to them.

The selection of a case study has to do in a big extent to the result we want to obtain. Sharman (1971 cited in Yin, 2009, p.17) states that the ‘fundamentals of a case study, is that it tries to illuminate a decision or set of decisions: why they were taken how they were implemented, and with what result’. The interviews will contribute in a big extent to understand the process that the group of agents followed to share information and if the use of the wiki helped to that purpose.

### 3.3 Data Collection

The data collection process was done from March to April, 2010. The data collected during those two months included interviews with the agents (using Skype due to different locations), who have been using the wiki; as well as other sources of information, such as documents.

#### 3.3.1 Primary Data

The primary data collected in our research were interviews; these are helpful when the participants cannot be observed directly. Furthermore, the researcher can have control over the line of inquiry and the participants can give information that is historical (Cresswell, 2009). According to Burnett (2009, p.123) interviews are: ‘ideal for gathering sensitive information or exploring complicated issues’ in a qualitative study. The selection of interviews as the primary collection method helped us identify the opinions of a number of representatives who used the wiki.

In each interview questions can take different dimensions, going from unstructured to structured (Gillham, 2000). The interviews conducted were structured; they had a defined and planned set of questions for the interviewees and were performed one-on-one with each agent. The interviewees expressed their opinions freely and a transcript of those interviews is included in the appendix section of the dissertation.
3.3.2 Secondary Data

The secondary sources of data used in our research were documents provided by the company for analysis. A ranking was given to us to help us during the agent selection process. Furthermore, we were given a description of each of the metrics used by Telvista and Verizon to measure performance. Emails were exchanged with the supervisors for quick doubts or whenever we needed some clarification.

3.4 Research Setting

Our research setting is a call center in Mexico City named Telvista. Telvista has presence in Mexico and the United States and it provides customer care solutions for organizations. Telvista handles different accounts for an array of companies; for our research we will focus on the Verizon account.

Telvista’s call center for Verizon handles technical support calls for Internet related issues (connection problems, modem configurations, email, etc). It has over 300 employees, including agents, supervisors, quality analysts, etc.

3.4.1 Project Background

Due to its technical nature, the information handled by the agents in the Verizon account changes constantly. New products (modems, routers, wifi adapters, etc) are offered regularly and most of the times there is no time for the agents to keep up with all the new processes and procedures. Agents are able to look the information up in the system given by Verizon, called Tech Help, but this tool only provides a one-way communication. Agents are unable to ask questions through the system, make suggestions, or give their opinions.

Telvista’s main concern is with their agents’ performance, which is measured according to their metrics. Agent’s metrics consists of different indicators, some examples of the metrics used by Verizon are:

- **Average Handling Time (AHT)**. Average time agents spend on each call
- **First Contact Resolution (FCR)**. Percentage of times the agent solves a customer issue on the first contact. FCR is impacted negatively when a customer calls again with the same problem.
- **Quality Assurance evaluations (QA)**. Agents need to comply with a set of guidelines whenever handling calls. Calls are scored according to these guidelines and rules.
Telvista has tried several strategies to improve their agent’s metrics and overall performance. New ways of training, bonuses, prizes, and different motivational activities have been used in the past. Some strategies have been proved more successful than others, while some had failed completely. Handling calls can be a repetitive job and become tedious really fast; this is why Telvista is always looking for new strategies and ways of working.

Another important area of concern for Telvista is their employees’ turnover and high level of attrition. Telvista is looking for ways to retain their personnel, but in the meantime they need to replace the people that leave. Training agents is a very expensive and time consuming task. The training period for new agents lasts 5 weeks and after that it takes around 2 months for them to reach the end of their learning curve. New agents tend to have metrics below target, since they lack experience and are still learning. Supervisors and quality assurance analysts usually spend a great deal of time with newer agents assisting them and answering their questions.

Knowledge and experience are key factors in agent’s performance. Agents need to have tools available for them where they can find all the information they need. Once they have the information, they need to put it into practice so they can learn and gain experience. On Tech Help, the tool provided by Verizon, agents can look up information regarding troubleshooting and Verizon’s products. Tech Help is the main tool used by the agents and the principal source of information. There have been concerns from Telvista’s part regarding Tech Help, since sometimes it is not updated with the latest information and certain articles may not be clear or easy to follow.

3.5 Agent Selection Process

For our pilot 15 participants were selected out of the 264 agents (as of February 2010) in the Verizon account. A decision was made to exclude agents with less than 60 days on the operation. Even though Telvista wants to improve the learning process and performance of newer agents, it was decided to exclude them from the pilot since they do not have enough knowledge to upload articles and participate in discussions. Furthermore, being this a new process, we were still unsure about how reliable the information uploaded to the wiki would be. If new agents had access to the articles in the wiki right away it may end up causing confusion or generating misinformation.

Out of the 264 agents on the Verizon account, 94 had less than 60 days on the operation, leaving us with a total of 170 agents from which to select our participants.

Verizon has a ranking system in which agents are categorized according to their performance and metrics. The categories used to rate the agents are: leading, performing and developing.
Agents who are in the *leading* category are the ones who comply with their metrics and are on, or above target. *Performing* agents are the ones who have not reached their goal but are close to the target and above the minimum requirements. Finally, the *developing* category consists of underperforming agents whose metrics are below the minimum requirements.

For the month of February 2010, out of the 170 agents, 37 were in the leading category, 94 performing and 39 developing. Translating these numbers into percentages shows us that 27% of the agents were in the leading category, 48% performing and 25% developing.

For our pilot, we decided to select participants from each category to ensure a sample that represents the whole population of agents. For the 15 slots available for the pilot, we chose to distribute them accordingly to the percentage of agents in each category. Resulting in 4 slots for the leading category, 7 for performing and 4 for developing.

Once we had the number of agents required per category, we divided them per shit and selected randomly 8 agents from the morning shift and 7 from the afternoon shift. Tables 3.1 and 3.2 show the number of agents selected to participate in the pilot.

### Table 3.1 Agents Eligible

<table>
<thead>
<tr>
<th>Total Agents</th>
<th>264</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agents with &lt; 60 days</td>
<td>94</td>
</tr>
<tr>
<td>Agents Eligible</td>
<td>170</td>
</tr>
</tbody>
</table>

### Table 3.2 Agent Selection

<table>
<thead>
<tr>
<th>Category</th>
<th>Agents</th>
<th>%</th>
<th>Agents per Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leading</td>
<td>46</td>
<td>27%</td>
<td>4</td>
</tr>
<tr>
<td>Performing</td>
<td>81</td>
<td>48%</td>
<td>7</td>
</tr>
<tr>
<td>Developing</td>
<td>43</td>
<td>25%</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>170</strong></td>
<td><strong>100%</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

### 3.6 Interviews

Interviews were conducted with the 15 agents selected for the pilot. Since agents are taking calls most of the time, they cannot be taken out of the operation without authorization. We
contacted their supervisor via email first, and then they informed us when the agents were available for our one-on-one interviews via Skype. We began by introducing ourselves, explaining the purpose of the interview and then continued with the questions.

3.6.1 Interview Structure

The interviews allowed us to get a better understanding of the knowledge sharing and learning processes of the agents, especially with the use of the wiki as a new tool. First we asked how the learning process of their jobs was. Secondly, how they transfer information they know into the wiki; then how the use of the wiki allowed for collaboration between users. Finally, we asked them for the advantages and disadvantages of using the wiki.

3.6.2 Selection of Questions

We created a series of questions based on the knowledge conversion model by Nonaka & Takeuchi (1995). The questions had the purpose of leading us to insights of each of the four modes of the knowledge conversion model. We created 14 questions for our interviews with the agents, which covered the four modes.

For the socialization mode we created the following questions:

1. When you started in this job how did you learn the processes needed to perform your tasks?
2. Do you learn from your co-workers? If so, how?
3. Do you share your knowledge with your co-workers? If so, how?

Socialization has to do with how individuals interact with each other and how they learn from this interaction. With these questions we sought to understand how the agents learned when they first started working in Telvista. These questions allowed us to know how they acquired tacit knowledge from their co-workers and also how they share it with others.

We came up with the following questions for the externalization mode:

4. Have you uploaded articles to the wiki? If so, what has motivated you to do so?
5. How do you make sure that the articles that you upload to the wiki are accurate?
6. What do you do to ensure that the articles that you upload are understandable for others?

Externalization is the process of transforming tacit knowledge into an explicit one. With these questions we wanted to learn about the process the agents followed to create new
articles for the wiki. This provided us with an insight on how the agents transformed their tacit knowledge into explicit knowledge and their motivation to do so.

**Combination** consists in transforming explicit knowledge into a more complex explicit knowledge by combining different sources. For this mode we created the following questions:

7. Do you discuss or edit the articles in the wiki? If so, why?
8. Do you find the articles in the wiki accurate? If not, what do you do?
9. Does the discussion and collaboration in the wiki help creating easier processes or does it make it more complex and harder to understand? Explain

With these questions we wanted to explore how the discussion and editing of the articles helped in creating new knowledge. We aimed to analyze how the combination of different points of view affected the articles and their complexity.

Finally, for the **internalization** mode we created these questions:

10. When you have doubts about certain processes or troubleshooting steps, what do you do?
11. How do you learn new processes?
12. Do you find the wiki useful for acquiring information and following processes or would you rather get the information as you did before (Tech Help)? Why?
13. What advantages do you find in using the wiki?
14. What difficulties do you find in using the wiki?

Internalization is the process of transforming explicit knowledge into tacit knowledge; it is putting theory into practice. With this set of questions we wanted to understand how agents assimilated new knowledge with the use of the wiki, and what they do when they need to learn new processes. We also wanted to know whether they found the wiki useful or not once it was put into practice. Finally, we wanted to obtain their general impressions regarding the advantages and difficulties of using the wiki.

### 3.7 Data Analysis

The data analysis started once we finished the transcripts of agent’s interviews. For our analysis we used the knowledge conversion model by Nonaka and Takeuchi (1995). We used the four modes of the model to analyze the interaction between tacit and explicit knowledge and how it transforms from one type to the other.

We decided to create a matrix with all the information gathered from our interviews. The matrix allowed us to analyze and compare all the answers we had. For this purpose the use
of a spreadsheet was necessary. In the first column we placed the questions asked to the agents, and in the subsequent columns we placed the transcript of the answers given to us.

Figure 3.1 displays a section of the matrix we created; it shows how we placed the questions and answers for each of the agents. The complete matrix is included in the appendix section of this dissertation.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Agent 1</th>
<th>Agent 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you started in this job how did you learn the processes needed to perform your tasks?</td>
<td>I learned during my training and while on the calls, basically through experience</td>
<td>I basically didn’t learn until it</td>
</tr>
<tr>
<td>Do you learn from your co-workers? If so, how?</td>
<td>Yes, I learn by asking them during or after a call what should be done</td>
<td>My co-workers are concerned that I may</td>
</tr>
<tr>
<td>Do you share your knowledge with your co-workers? If so, how?</td>
<td>Yes, I usually share my knowledge verbally or through the wiki</td>
<td>Whenever they ask the</td>
</tr>
</tbody>
</table>

**Figure 3.1 Matrix Example**

After we filled out the spreadsheet, we continued with our analysis and used coding to simplify the answers. We created a second spreadsheet which followed the same format as the previous one; the only difference was that instead of transcripts, we filled it out with keywords. We analyzed each answer and simplified them to their basic idea using common keywords. We removed unnecessary information and just kept the main idea behind the answer.

The keywords allowed us to discern patterns and tendencies of the participants in our study. We were able to obtain a general picture from all the different answers and identify the most common keywords for each question.
Figure 3.2 shows a part of this matrix, displaying how the answers were substituted with keywords which convey the general idea of the whole response.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Agent 1</th>
<th>Agent 2</th>
<th>Agent 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you started in this job how did you learn the processes needed to perform your tasks?</td>
<td>Training / Practice</td>
<td>Training</td>
<td>Training / Tech Help</td>
</tr>
<tr>
<td>Do you learn from your co-workers? If so, how?</td>
<td>Asking for help</td>
<td>Asking for help / Observation</td>
<td>Asking for help</td>
</tr>
<tr>
<td>Do you share your knowledge with your co-workers? If so, how?</td>
<td>Wiki</td>
<td>When asked</td>
<td>Informal conversations</td>
</tr>
<tr>
<td>Have you uploaded articles to the wiki?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>If so, what has motivated you to do so?</td>
<td>Share knowledge / Optimize troubleshooting</td>
<td>Use the wiki</td>
<td>Lack of information</td>
</tr>
<tr>
<td>How do you make sure that the articles that you upload to the wiki are accurate?</td>
<td>Based on experience</td>
<td>Verify with co-workers</td>
<td>Tech Help / Verify with co-workers</td>
</tr>
</tbody>
</table>

**FIGURE 3.2 CODING EXAMPLE**

Once the matrix and coding were ready we were able to analyze the information according to the characteristics of the four knowledge conversion modes by Nonaka and Takeuchi (1995) and make interpretations. This analysis allowed us to study how the knowledge conversion process changed since the implementation of the wiki.

### 3.8 Role of the Researcher

In this study we have the role of researchers. Our professional experience has provided us with a better understanding of the call center industry and our academic background started the interest to apply technological tools in this type of organizations. The professional and academic experience we have made us select this type of organization.
Due to the bias that we can produce as researchers during the study, we are committed to avoid it as much as possible throughout the whole research, and consider validity procedures. The validation of our findings will be by a member checking procedure in which some of the participants will determine the accuracy of the descriptions that we have provided in our work.

3.9 Ethical Issues

In this type of study ethical issues have to be considered. The first one is regarding the identities of the agents interviewed. No names will be revealed of the agents who will take part in the interviews. Their participation will be optional and no agent will be forced by the researcher, peers or immediate boss to take part in the pilot.

Regarding the interviews, the participants will have the freedom to answer our questions with no prejudice or force to obtain specific answers. They will be able to abstain from answering if they feel the need to do so.

The description or names of specific procedures will not be given to avoid violating confidentiality policies followed by the call center. Even though we had access to the wiki and tools used by Telvista, we were not allowed to include screenshots of them to avoid infringing their policies.

3.10 Validity and Reliability

In qualitative research the term validity means obtaining useful and meaningful inferences from particular instruments (Creswell, 2009). The term reliability refers to the consistency of the results among different projects and different researchers (Gibbs, 1997 cited in Creswell, 2009).

3.10.1 Validity

In this research, once we interviewed the agents, we organized a spreadsheet with all the questions and answers. The following step was to interpret the results of those interviews by obtaining keywords of each of the answers. We decided to use member checking procedure to validate the results. Member checking is used to determine the accuracy of the findings, taking them back to the participants and them concluding if they feel those are accurate (Creswell, 2009). We decided to send the spreadsheet and the interpretation of the results to the quality assurance analyst. He is in charge or reviewing the accuracy of the articles in the wiki and knows the processes that agents need to follow in the company.
3.10.2 Reliability

To ensure reliability procedures in our work we documented all the questions made to the agents. Moreover, we made transcripts for all of the answers they gave us, and finally those were sent to the supervisors and quality assurance analyst to verify that there were no mistakes. Reliability in this type of study can be a challenging since the data collected comes from the agents’ perceptions and may change among different projects and participants.
4. **Empirical Findings**

The fourth chapter of this dissertation shows the findings of the data collected in our study. We present the description of the interviews conducted with the participants of the wiki pilot.

4.1 **Case Description**

As discussed previously, the main concern for Telvista is the performance of their agents. Telvista needed a new strategy to improve their overall metrics and help new agents learn easily. This is where the wiki comes in to play. A wiki pilot was started to see how it impacted the agents’ performance and the sharing of knowledge. A wiki was chosen because of its collaborative nature, and low cost. A wiki allows agents to participate in its development and be in control of its contents.

We decided to start a pilot in which 15 agents started using and contributing to the wiki. Two teams were formed, one in the morning shift and another in the afternoon shift. Each team was assigned a supervisor who observed and provided assistance when needed. A quality assurance analyst (QA) was also assigned to the project, having the task of verifying the accuracy and reliability of the articles uploaded.

The pilot was launched on March 1st 2010, from that date on the agents selected began using the wiki, being able to upload, edit, discuss and read articles. The frequency in which the agents upload articles or update information depended entirely on them, they were not forced to do it, but they were asked to collaborate in the extent they could to ensure participation.

4.2 **Interviews**

We conducted structured interviews with the agents. The questions we asked them covered the four modes of the knowledge conversion model by Nonaka and Takeuchi (1995). The interviews were conducted with the 15 agents who participated in the pilot.

Our interview process was the following: we introduced ourselves, then we explained the purpose of each interview to the agents, and finally we asked the questions.

In the following sections we present a description of the answers we obtained from interviewing the agents.
4.2.1 Socialization

For the socialization conversion mode we asked 3 questions. We did so in order to know the process agents followed to share information from the start of their job. We also wanted to see if they shared information and how they learned from their co-workers.

The first question we asked the agents was how they learned the processes needed to perform their tasks. The answer that most of the agents gave us was that they learned during a training period they had with the company. It was a 5 week training in which a trainer gave them the insights about the tasks they had to perform. Some of the agents completed the answer by saying that they learned while they were taking calls; that the learning was by practicing and by the experience they acquired while taking calls. A few of them answered that another way of learning was by asking questions to their supervisor when they have doubts.

“... There was a training period where we were taught the basics. After that once we are answering calls for real is when we really started learning”

Moving on to the next question, we asked if the agents learn from their co-workers. We received a positive answer from all of our interviewees. They said that when they have doubts during calls they reach to their co-workers for help. They usually do this because they needed a quick response. Some of the agents said that they ask specific agents for help, because they have more experience or know easier or alternate ways to resolve certain issues.

Other agents told us that they also learn by observing their coworkers while they are taking calls. One of the agents told us the following:

“...Yes, getting information from [my co-worker’s] expertise on certain cases that I know don't happen very often and are hard to resolve. On those cases I usually ask help from people that I know have a lot of experience”

The last question from the socialization mode was, if they shared knowledge with their co-workers, and if so how they did it. The answer of all the agents was positive and they told us different ways in which they share knowledge with their co-workers. Most of the agents share their knowledge when they are asked for help by their co-workers to solve certain issues. Some of the agents just share it verbally; they talk to their co-workers before, during or after their shift. They talk about how they can improve in their job, giving tips or telling each other what they have learned. An agent with more tenure on the operation told us:

“...Yes, of course. Well I just tell [my co-workers] a little bit about when I started how I didn't understand anything, I tell them how they can get familiar with the tools we manage, where to find useful information and tips”
4.2.2 Externalization

For the externalization mode we also asked 3 questions. This was done to investigate how agents converted tacit knowledge into explicit knowledge. At the same time, we wanted to know how the wiki helped to that purpose.

First we asked if they have uploaded articles to the wiki, and if they had, what was their motivation to do so. All the agents interviewed, except for one, have uploaded articles to the wiki.

The agent’s motives for uploading articles were varied. Some told us that they did it because they wanted to share their experience with other agents. Another reason was because the information they uploaded to the wiki was of common doubts other agents asked them before. Trying to make the job of their co-workers easier was an additional reason given to us. One agent gave us the following answer:

“...Yes, training teaches you the basic things needed to perform your job, but the scenarios and situations require you to relearn some of the concepts; when I started answering calls, I imagined how cool it would’ve been if I’d had information on these kind of things beforehand and firsthand from the people who were already experienced at it”

Only one agent did not upload any article to the wiki, he explained to us why:

“...No I have not, I know I have a lot to share, but I haven't been able to put what I know into words. I need to take time to be able to organize my thoughts first so I can share an article”

We continued with the second question about externalization. We asked them how they make sure that the articles they uploaded to the wiki were accurate. The agents used different techniques to verify the accuracy of their articles. Some told us that they use Tech Help to verify all the information, while other relies on their own experience.

“...I know that [the articles] are correct since they are based on my own experience. After troubleshooting the same issue several times, I know what works and I’m sure that the information that I have is accurate, since I deal with it every day”

Another common way for the agents to ensure the accuracy of their articles is by asking their co-workers, supervisor or quality assurance analyst to verify them.

“...First I have to be 100% sure that the information I want to upload is correct based on my experience and then try to double check it with someone else such as a supervisor or a QA”
Following that question we wanted to know how the agents made sure that the articles they uploaded were understandable for others. The answers for this question were diverse, but they focus a lot on the language and troubleshooting steps.

Some agents explained that by using colloquial words and fewer technical terms they ensure that every one is able to understand the articles, including agents with less experience or no technical background.

“...By making [the articles] simple and trying to use less technical words in them so almost everyone with less technical level can understand them properly”

Another agent told us that he used very detailed steps; that way other agents are able to follow his articles without any problem. Some other agents considered that explaining the troubleshooting steps as if they were meant for agents who are new, is another way to make the articles understandable. One agent who told us about using detailed steps also said that he tries to explain things as if he was a new agent. He explains each step as he would have liked to have them explained to him when he was new to the operation.

“...First of all by explaining what the issue was, then by describing all the steps taken to resolve it. Like I told you before, this is my first time working as a tech support agent, so I try to explain things as I would like them to be explained to me when I was new”

4.2.3 Combination

The combination mode establishes the transformation of knowledge from explicit to explicit. For this mode we asked 3 questions to try to understand how the agents’ explicit knowledge transformed into a more complex one with the use of the wiki.

Our first question was if they edited or discussed articles in the wiki and if so why. We received both positive and negative answers. The people who answered negatively told us that they do not discuss the articles due to lack of time or interest.

“...I don’t have the time to [discuss the articles]. If I come across an article I don’t agree with I just leave it and check the information on Tech Help”

The rest of the answers were positive in combining discussion and edition of the articles in the wiki. The agents told us that based on their experience they could tell which articles needed to be discussed or edited. The process they usually followed was: reading the information, discussing it, and editing the parts of the articles that needed to be changed. They considered that parts needed to be edited because they were inaccurate or had troubleshooting steps that were not useful. Updates are another important factor, processes change constantly and the articles need to be edited to reflect the new information.
“...It is important to have accurate and updated information. Whenever there's an update I like to check that the article is updated also to ensure that everyone has the latest information”

The next question had to do with the accuracy of the articles. We asked the agents if they found them accurate and if they did not, what do they do about it. The majority of the agents told us that most of the times they found the articles in the wiki accurate. One of those agents believed that more than accuracy it was a matter of structure and edition.

“...Sometimes [the articles] are not easy to understand or are more complicated than they need to be. I believe that it's more a question of editing and structure rather than accuracy”

The agents told us that when articles are not accurate they discuss the content or edit the article. Some other times they look in another tool if they found that the information is incorrect.

“...If there's something not really clear I look somewhere else, like Tech Help or any other tool”

Other agents verify with their supervisor or co-workers about the accuracy of the information:

“...Yes almost all of [the articles] are accurate, in case something is wrong or I believe is wrong, I use the discussion section to raise my concerns”

The final question from the combination mode was if the discussion and collaboration in the wiki helped to create easier processes, or made it more complex and harder to understand. Most of the agents answered that the collaboration and discussion made the processes easier to understand. One of the agents told us:

“...It makes it easier because by discussing it all agents become more familiar with commands and terms that they did not know. Because everyone explains and discusses differently, by reading those discussions, it is very likely that someone’s specific wording or approach will be a lot easier to understand for a specific agent”

A couple of agents pointed out that it was more difficult; they said that the articles were complicated because they tend to get too long and have too much information.

“...It becomes more complex, you need to discuss the articles and ensure that they are correct. I think that it's easier when you get the information from official sources that you know are right...”
One agent told us that the processes themselves were not easier, but the understanding was much simpler, since the information was the same, it was just the way in which it was explained that changed. Another group of agents said that it depended on the situation; they said that it was easier for some agents and harder for others.

“...I think it is easier and harder at the same time, it really depends on the article or the subject, and it also depends on the agents since it can be easy for some people and harder some other, but it has definitely improves the way we work”

4.2.4 Internalization

The internalization mode considers the transformation of explicit knowledge into tacit knowledge. We wanted to understand how the agents incorporated new knowledge with the use of the wiki. For this model we created 5 questions.

Our first question was about uncertainty in the information; we asked the agents what they do when they have doubts about a certain process or troubleshooting steps. We found out that most of the agents go to their co-workers or supervisor to clear their doubts.

“...I usually ask my supervisor or look the information by myself. If I still have doubts will ask one of my co-workers”

Another source mentioned was their own knowledge; agents try to look information by their own means. Finally, the wiki or the tools that they have to perform their job are also used to resolve doubts.

“...I usually start trying new things based on my knowledge, when that doesn’t work I turn to any other type of source of information like Tech Help or the new wiki. When I can’t find anything useful in there either, I start asking co-workers, supervisors or QA’s...”

The next question was: How do you learn new processes? The answers for this question were varied. Agents mentioned that they learn from their co-workers, other times by asking to their supervisors, and in other occasions by training.

“...Usually our supervisor will tell us about them, or in some cases we get quick trainings”

Another common answer was by practicing each of the steps of the new processes while taking calls.

“...by understanding how it’s supposed to work step by step, then trying it on a call”
Reading and the use of tools were also mentioned by some agents; they said that they learned by reading documents and reviewing the tools they have available.

“...Generally by talking with my co-workers although at times, I like to check articles and tech news in order to learn new processes”

In the following question we asked if the wiki was useful for acquiring information, or if the agents rather get it as they did before with the tool they already had (Tech Help). More than half of the answers favored the wiki, pointing out its benefits for getting information and following processes.

“...I think it’s more useful with the wiki as it is made out by all of us, who live the situation and who really have enough experience acquired to share the information with everybody”

Some agents stated that both the wiki and Tech Help were helpful for acquiring new information.

“...Both of them are useful. The wiki explains how everything works and Tech Help tells you the steps to follow so both of them work together just fine”

Only a few agents stated that they preferred Tech Help, they found it more reliable and preferred going to the original source of information.

“...I rather get the info elsewhere in places like Tech Help, I think that the info is more reliable since the wiki can be tricky and the info found there is not always accurate”

The agents who gave us positive answers thought that the wiki was great for new agents and for experienced ones as well. It was helpful for them because it allowed them to find answers quickly.

“...The wiki is tremendously helpful for newer agents and really helpful for experienced users as well. Since it is a collaboration, some of us will not experience the same scenarios as others, and usually new things to learn will come up from one person to share with the rest of the group, sometimes leading to interesting ways of solving a problem or information that is not up-to-date on Tech Help”

Finally, one agent stated that she rather get the information from their co-workers instead of using the wiki or Tech Help

“...Wiki can be very useful... But for me, it will always be more specific and useful talking with co-workers that have experience in the subject”
For our next question we asked the agents what advantages they find in using the wiki. The answers from the agents were several, but the most common ones were the following:

- It is easy to use
- It is created by us
- It has more information
- It is updated and edited quickly
- It saves times
- It shows different points of view

The last question we asked to the agents was about the difficulties found when using the wiki. Opinions were different, and some agents said they did not find any difficulties at all. Nevertheless, some of the difficulties mentioned were:

- It shows different points of view
- It is difficult to understand
- It has similar articles
- Articles can have excessive information
- It lacks reliability
- It may get out of control when more agents start using it

### 4.3 Articles Uploaded

The total number of articles uploaded to the wiki during the 6 week pilot were 103. Table 4.1 shows the number of articles uploaded during each week.

<table>
<thead>
<tr>
<th>Week</th>
<th>Articles Uploaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>14</td>
</tr>
<tr>
<td>Week 2</td>
<td>29</td>
</tr>
<tr>
<td>Week 3</td>
<td>22</td>
</tr>
<tr>
<td>Week 4</td>
<td>16</td>
</tr>
<tr>
<td>Week 5</td>
<td>10</td>
</tr>
<tr>
<td>Week 6</td>
<td>12</td>
</tr>
</tbody>
</table>

103
5. **EMPIRICAL FINDINGS DETAILS**

The fifth chapter presents the detailed analysis of the interviews we performed. A coding process was done, with the intention of simplifying the answers of each of the questions that were part of the conversion modes from the Nonaka and Takeuchi (1995) model.

5.1 **Socialization Questions**

The first set of questions helped us understand the socialization mode, which deals with how individuals interact with each other and how they learn from this interaction.

The first question we asked was about how agents learned the processes needed to perform their tasks. From the answers received we concluded that agents learned the basics through the initial training. After that they reaffirmed and expanded their knowledge once they started taking calls on the operations floor; practice is crucial for their learning process.

Once we had all the answers for this question we started with the coding process. We were able to abstract 5 main keywords from all the answers, with *training* being the most common one, followed by *practice*. Figure 5.1 shows the final coding and total answers for this question.

![Figure 5.1 Learning of Processes Needed to Perform Tasks](image)

It should be noticed that the answer of one agent can result in more than one keyword. For example:

“...*I learned during my training and while on the calls*...”
From this answer we obtained the keyword *training*, and we interpreted “while on the calls” as *practice*. We chose practice as the keyword after analyzing all the answers and observing that most of the agents refer to a process where they learn while taking calls, once they put their knowledge into practice.

When we asked the second question about learning from their co-workers, we could see that the answer was affirmative from all the agents. The answers showed us that agents ask their co-workers for help all the time; especially when they are taking calls and need a quick answer.

For the coding, we focused on the different ways the agents learn from their co-workers. We ended up with 3 main categories, as shown in Figure 5.2, with *asking for help* being the most common one.

![Figure 5.2 Learning from Co-workers](image)

We were also able to detect that some of the agents learn by observing their co-workers while taking calls.

“...I did [learn from my co-workers], by observing the way they performed and listening to what they said”

Again, we obtained two keywords from some of the answers, as in the following one:

“...Yes, by sitting next to [my co-workers] and asking questions about any doubt I have”
From this answer we obtained *asking for help* and we interpreted “sitting next to them” as *observation*, since this is the main idea behind sitting next to an experienced agent. It is a way of learning by observing how co-workers behave during their calls and how they use all the different tools.

The third and last question form the socialization mode was if they shared information with their co-workers, and if so, how do they do it. The answer was positive in the majority. However, we detected that sharing of information mostly happens when the agents were asked for help by their co-workers; they did not shared their knowledge proactively and only did it when asked. Few agents stated that they shared information by their own motivation; this happened when they were in an informal environment discussing work related issues. The sharing of information also related with the level of experience the agents have. The higher their experience the more they try to share information and are asked for help from their co-workers.

The coding for the answers of this question resulted in 4 different keywords as shown in Figure 5.3.

We were able to detect that some of the agents are now using the wiki as a way to share their knowledge:

“…Yes, I do it with the wiki. I like it because it allows me to share my knowledge in a more easy way”

The answers of the socialization questions let us conclude that by training and then by experience, are usually how agents learn the processes needed to perform their daily tasks.
On the other hand, the agents agreed that collaborating with their co-workers is important, they learn from each other, and they also share information. Experience is one of the main factors they have mentioned to share information, agents with more experience give pieces of information that agents with less tenure probably do not have.

5.2 Externalization Questions

The second mode we analyzed was the externalization mode. With this set of questions we wanted to understand the process of converting tacit knowledge into explicit knowledge with the use of the wiki.

We began by asking the agents if they have uploaded articles to the wiki, and if so, what was their motivation to do so. The answers showed us that all of the agents except for one, uploaded articles to the wiki. Sharing their knowledge and helping to resolve issues in an easier manner was their main motivation. Only one agent said that he had not uploaded any articles, stating that he lacked the time to do so.

Regarding the coding, we divided this question in two parts. The first one being about whether they have uploaded or not any articles to the wiki and the second part about their reason to do so.

For the second part of the question we ended up with the keywords illustrated in Figure 5.4.

A couple of agents told us that their main reason to contribute to the wiki was just to use it, since it is a tool that they would have liked to have when they were new.
“...I have uploaded a few articles... I have been motivated since I would have liked to have something like the wiki when I first started working here”

The second question gave us an insight about the accuracy of the articles uploaded and the processes the agents followed to ensure it. Experience was the main factor for ensuring accuracy. Agents who have enough experience know which processes work and which do not. They are confident in their knowledge and believe that the experience they have allows them to create accurate articles. Agents who were not sure about the accuracy of the information would verify it with their co-workers or in Tech Help.

With the coding we were able to identify the most common ways for the agents to make sure that their articles are accurate, being *based on experience*, *verify with co-workers*, and *Tech Help* the main ones. We also detected that some agents try to use more than one method to ensure accuracy.

“...I use Tech Help to get the basic information and using this information I can complement it with my own personal experience and share it with others in the articles, being sure that it comes from an accurate documented source...”

Once we finished the coding for this question, we ended up with 5 main keywords (Fig. 5.5).

![Question 5: Ensuring Articles’ Accuracy](image)

**Figure 5.5 Ensuring Articles’ Accuracy**

The third question we asked was about how the agents make sure that articles they upload are understandable for others. Experience was an important factor considered by the agents. Most of the agents said that they try to explain the information as if it was directed towards
newer agents who lack the necessary experience. Furthermore, the vocabulary used by the agents, has as little technical words as possible, and clearly explained troubleshooting steps.

Once we analyzed all the answers, we came up with several keywords for this question, illustrated in Figure 5.6.

![Figure 5.6 Ensuring Articles’ Understandability](image)

Most of the agents fell under the *explain as if you were new* category, since they know that the lack of experience can make articles difficult to understand.

With these answers we could see that agents had the opportunity with the wiki to transform the tacit knowledge they had into an explicit one. They gave detailed information to their co-workers, they used their own experiences, and tried to make all the information as easy as possible to understand. A good example of these answers was the one given by an agent who stated:

“...I try to make [the articles] as simple as possible and in a language that is understandable for everyone, even new agents. I make sure that the article has only the necessary information and nothing else. And I try to explain all the troubleshooting steps as if I was explaining them to a new agent that doesn’t have a lot of experience yet”

### 5.3 Combination Questions

Next we analyzed the third mode, combination. Our purpose with these questions was to understand how explicit knowledge is transformed into a more complex one with the use of the wiki.
With the first question we wanted to know the agents’ reasons for editing or discussing the articles in the wiki. Again, experience played a key factor here. Out of the 15 agents, 13 said that they do edited or discussed the articles. The agents who answered affirmatively said they did it because they knew, based on their experience, that the information was inaccurate. They also edited or discussed articles when they knew a better process or when it had excessive information which was not needed. The agents that did not edit or discuss the articles said that they lacked the time to do so.

For the coding, we divided this question in two parts, the first part was just to know whether the agents edited and discussed the articles or not. Only two agents told us that they did not do it.

For the second part of the question we focused on the reasons why agents edit or discuss the articles. Figure 5.7 shows the 6 different keywords obtained for this question.

![Figure 5.7 Reasons for Discussion and Editing of Articles](image)

**Accuracy** was the main reason for the discussion and editing of articles. **Difficult to understand** and **grammatical errors** were factors that only few agents considered.

“...I think that all of the articles have correct information, but sometimes they are not easy to understand or are more complicated than they need to be...”

“...there can be spelling or grammatical errors since not everyone has English as a first language...”

The next question we asked was about the accuracy of the articles. Agents told us that most of the times they found the articles accurate. However, when they were not, they would edit
or discuss them. We also detected that few agents rather use Tech Help or other resources when they came across articles they found inaccurate instead of discussing or editing them in the wiki.

For the coding of this question, we again broke it down in two parts. The first one regarding whether the agents found the articles accurate or not, and the second one, as shown as in Figure 5.8, regarding what they do once they found out that the articles were not accurate.

![Figure 5.8 Actions Performed for Inaccurate Articles](image)

With the coding we found out that **edit the article** and **discuss the article**, were the categories where most of the answers fell. Seldom times they will **verify with a co-worker** or **verify with a supervisor**.

“...Most of the information [in the articles] appears to be accurate... Otherwise I would talk to a supervisor about that to ensure it’s not accurate and go ahead and correct it...”

The last question was about the collaboration the wiki created, we wanted to know if it made the processes easier or more complex and harder to understand. The answer was positive from most of the agents; they believed that the collaboration in the wiki helped in creating better and more understandable articles.

The agents who answered negatively stated that with all the discussion and different points of view the articles were more confusing and had unnecessary information.

Figure 5.9 shows the overall results we obtained for this question once we finished the coding process.
The answers for this conversion mode tell us that explicit knowledge is held by agents and structured in the wiki so the rest of their co-workers can have access to it. Most of them collaborate in the wiki and try to update information to help other users find fast and efficient solutions for their work. It is by this discussion and collaboration that the articles take form and become new and updated sources of information.

### 5.4 Internalization Questions

The questions for the internalization mode were asked to understand how agents incorporated new knowledge with the use of the wiki. Furthermore, we wanted to get the agents’ overall perspective about the wiki, so we asked them about the advantages and disadvantages they found in using it.

The first question was about the uncertainty of the information; we asked the agents what they do when they have doubts about troubleshooting steps or processes. The majority of the agents answered that they ask their co-workers for help. Asking their supervisor and checking the wiki were the second and third most common answers.

Once we simplified all the answers for this question, we ended up with the keywords illustrated in Figure 5.10
From these results we can see how the wiki, while being still a relatively new tool, is now being used as a source for clarifying troubleshooting and processes doubts.

“No I usually go to the wiki, before I used to ask more experienced agents or my supervisor. If no one is available I will review Tech Help”

For the second question, we wanted to know how the agents’ learning process worked. The answers were varied, but we detected, as with the previous question, that agents rely mostly on their co-workers when it comes to learning. Agents usually turn to their peers for help when it comes to learning new processes.

Experience also played an important role when it comes to learning new processes, since practicing them over and over again is another way in which agents learn and gain more experience. Some of the other answers given by the agents were: reading articles, training and learning from their supervisor.

The coding for this question showed us that co-workers and practice were the main ways in which agents learn new processes. Figure 5.11 shows the keywords we created once we finished coding all the answers.

This showed us that the wiki, while being used to clarify doubts about troubleshooting and processes that are not new, it is not favored by many when it comes to learning new processes.
With the third question we intended to know if the agents found the wiki useful for acquiring information, or if they rather use their previous tool (Tech Help). Figure 5.12 illustrates the agents' preferences.

As we can see, the results were favorable for the use of the wiki; the agents said that they preferred it due to its collaborative nature and easy usage. On the other hand, some agents stated that they like using both, the wiki and Tech Help, since they complement each other. Three agents preferred using Tech Help, since it is the official source of information, while one agent said that she rather get all the information from her co-workers.
The fourth and fifth questions helped us understand the advantages and disadvantages that the wiki had according to the agents. The answers of the agents showed their different points of views and we were able to detect that the easy usage of the wiki was the main reason why the agents liked the wiki. The fact that the agents were in control of the wiki and were able to create articles based on their experience and with their point of view was another important advantage they found.

Regarding the wiki disadvantages, the main concern the agents had was with the lack of reliability it may have. Even though the agents stated that most of the times they find the articles in the wiki accurate, they still had concerns about them. Having articles with excessive information, the lack of control when more people started editing the wiki and the lack of updates, were other disadvantages found by the agents.

The answers to the questions for this conversion mode allowed us to understand that most of the agents use the wiki, and that they are taking advantage of the information in it. Their general impression has been positive. However, there are concerns, especially regarding quality and accuracy of the articles.

### 5.5 Articles Uploaded

Based on the analysis of the articles we found that on average each agent uploaded almost 7 articles during the 6 week pilot (Table 5.1).

<table>
<thead>
<tr>
<th>Week</th>
<th>Articles Uploaded</th>
<th>Average Articles per Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>14</td>
<td>0.93</td>
</tr>
<tr>
<td>Week 2</td>
<td>29</td>
<td>1.93</td>
</tr>
<tr>
<td>Week 3</td>
<td>22</td>
<td>1.47</td>
</tr>
<tr>
<td>Week 4</td>
<td>16</td>
<td>1.07</td>
</tr>
<tr>
<td>Week 5</td>
<td>10</td>
<td>0.67</td>
</tr>
<tr>
<td>Week 6</td>
<td>12</td>
<td>0.80</td>
</tr>
</tbody>
</table>

|       | 103                | 6.87                      |

In the course of the first week the agents were introduced to the wiki and had a quick training were all the features were explained to them. During this week the number of
articles uploaded were 14. Out of the 15 agents only one did not uploaded an article, the other 14 uploaded one each. On the second week the number of articles increased significantly, 29 articles were uploaded, equivalent to almost 2 articles per agent.

Throughout the next weeks the number of articles uploaded began to decrease. Analyzing the wiki we could see that the articles with the most common issues were already uploaded. Once we review them we could see that most of the agents were focusing on discussing and editing articles, rather than uploading new ones. This is the main reason why the number of articles decreased and stabilized during the following weeks.
6. ANALYSIS & DISCUSSION

In the sixth chapter of this dissertation we analyzed and discussed the findings from our interviews aided by the literature presented in the second chapter. This chapter will help us answer our research questions and integrate the data raised in the empirical findings.

6.1 Knowledge in Call Centers

The research that we have performed in the knowledge management area has given us the insight of how tacit knowledge and explicit knowledge have taken important roles in the call center industry. These types of industries need to be competitive and have great customer service; they do it by having informed and prepared personnel that have the tools and information to develop it.

6.2 Knowledge Management Strategies in Call Centers

Call centers, due to the industry they belong to, have to work constantly to have knowledge management strategies that let them be more powerful and competitive. A call center has measurable objectives and their employees also have metrics to be measured with, such as time, quality, or first call resolution (Downing, 2004). The company in which we developed our research was looking for a research strategy to improve the performance of their agents. Telvista was looking for a strategy that would allow their agents to learn in a more easy and efficient way.

6.3 Knowledge Management Tools

The strategy developed by Telvista was based in the use of a knowledge management tool. They decided to use a wiki because it would enable knowledge generation, codification and transfer (Ruggles, 1997). The wiki allowed agents to upload and edit articles so they could share them with their co-workers and learn from each other. Agents were in control of the wiki and the project relied heavily on them and their contributions.

6.4 Communities of Practice

The affiliation made by some of the agents in Telvista was considered as a community of practice. Members of the group of agents that were selected for the pilot program of the use of the wiki could share information and other members could learn from it. However, when this information was not available, or was not accessible for some of them, they will call in co-workers that were part of their community of practice that was formed for the Verizon
The agents voluntarily enrolled (Newell, et al., 2002) with the only purpose of sharing experiences and making the information easier to understand and remember for others. From our interviews we could see that some of the agents got together during lunch or at the end of the day to discuss the different issues they faced during their shift. This way they could share what they learned, and hear different opinions and advices from their co-workers.

6.5 Knowledge Conversion Modes

The research we performed showed interesting results regarding how knowledge was generated, shared and then learned by the agents while using the wiki. Our analysis was based on the knowledge conversion model by Nonaka and Takeuchi (1995). The model explains how agents transformed knowledge form tacit to explicit, explicit to explicit, explicit to tacit, and tacit to tacit while using the wiki. With the use of the model we were able to identify how the wiki influenced in certain modes and how agents interact with the tool.

In the socialization mode tacit knowledge is created from other tacit knowledge (Nonaka & Takeuchi, 1995). We found out that agents tend to socialize during the practice they have on the operations floor. Agents have a training period in which tacit information is given to them. However, it is until they start taking calls when they began interacting with other individuals and they have the opportunity to share experiences and learn. The authors Völkel and Oren (2006) confirm the previous statement, since they say that in socialization tacit knowledge could be transferred, with language, observation, imitation or even practice. With the answers we received from the agents we were able to understand the collaboration between them, especially those with more experience, was crucial for their learning process. Agents rely heavily on their co-workers for help; they observe each other’s way of working, and share better practices. From the interviews we conducted we could see how some agents observe how their co-workers perform their job and learn from them. Practice is also crucial and was mentioned constantly by all agents. Practice is what allows them to learn and gain experience.

The wiki did not play an important role during this mode, according to Völkel and Oren (2006, p.3): ‘socialization is often not an option in online environments’. Socialization, as explained in the model of Nonaka and Takeuchi (1995) occurs when individuals interact with each other and share experiences. One of the reasons why a wiki was not used during socialization was because there was a low degree of knowledge of the tool (Perez-Mateo & Guitert, 2009). This means, the possibilities that the wiki had for collaboration in a virtual environments. In this case the possibilities were low, since agents in their training period did not have access to the wiki. A second reason was the way the pilot study was conducted; agents with more than 60 days in the operation were selected, so when those agents started taking calls they interacted by asking to their supervisors and co-workers.
The externalization mode consists in transforming tacit knowledge into explicit knowledge (Nonaka & Takeuchi, 1995). The wiki was helpful for this mode since it gave the agents the platform to share their knowledge. With the wiki they were able to externalize their knowledge and share it with others. The articles created by the agents contained their tacit knowledge in an explicit way; this being extremely useful for Telvista, since the wiki will help them in keeping the knowledge from their employees even after they leave.

We found out that agents with more experience were eager to share what they knew. These agents usually know faster ways to troubleshoot and workarounds that save crucial time during calls. The wiki was helpful for them, allowing them to share their knowledge in a way that is understandable and accessible for others. Moreover, less experienced agents also were participants of the wiki pilot and shared their knowledge in the wiki. This showed us that everyone was motivated to contribute with their knowledge, no matter their level of experience.

With our interviews we also found out that the majority of the agents contributed to the wiki out of their own motivation. They did not need an order from a supervisor or manager to start using it; they did it because they wanted to share with others what they knew. When the wiki was implemented the agents were only shown how to use it; the rest of the work was theirs, including the motivation behind its use, and the uploading and updating of articles.

During the combination mode explicit knowledge is converted into more complex sets of explicit knowledge (Nonaka and Takeuchi 1995). The interviews helped us understand how the explicit knowledge from different agents was combined with the use of the wiki. The wiki was crucial for the combination mode since it provided the platform for discussing and editing the articles. Agents that had been working with the wiki were reading and editing its contents as well as discussing the articles, creating new explicit knowledge.

The wiki allowed for the combination of different points of view and experiences creating new knowledge and making it available for others. Our interviews showed us that almost all of the agents edited and discussed the articles. Based on their experience, the agents wanted to add their own perspective to the articles; they wanted to make them better and easier to understand. The wiki proved to be a helpful tool for this mode. The majority of the agents used it to discuss and edit articles from others, adding and combing their knowledge.

The internalization mode involves converting explicit knowledge into tacit knowledge. Internalization requires for an individual to identify the knowledge that is of relevance for him or her (Nonaka and Takeuchi, 1995). In this case, agents used the wiki as their source of information to gather whichever knowledge they needed.

During this conversion mode the agents used the information in the wiki and put it into practice. By doing this they were able to internalize the explicit knowledge from the articles
by following its steps and practicing. Again, the wiki was crucial for the internalization process; it was the tool that allowed the agents to look up the theory needed for troubleshooting and allowed them to put that theory into practice.

The agents stated several advantages of the wiki, saying that it was easy to use, it saved time, and since it was created by the agents, it helped to present different points of views and perspectives.

Knowledge conversion is a collaborative process that expands the quality and quantity of tacit and explicit knowledge (Nonaka and Takeuchi, 1995). Agents confirmed this statement with the answers they gave us, saying that information was simpler, and easier to share and learn. On the other hand, the main disadvantage found was in the lack of reliability; agents said that when they find information that is not reliable they prefer asking someone else for help, or review the information in Tech Help.
7. CONCLUSIONS

The final chapter of this dissertation presents the conclusion of our research and we give a response to our research questions. We continue this section with a list of recommendations for the organization where our study was conducted. Finally, we give a description of further research that can be made in the same field of study.

7.1 Results

Our research helped us understand and discuss the process agents followed in their everyday job to learn and share knowledge. We have discussed learning process through the socialization, externalization, combination, and internalization modes of knowledge conversion. With our interviews we have seen how the wiki was useful for the agents, and allowed them to externalize their knowledge and made it available for others to learn from it. Most of the agents agreed that the wiki was helpful in creating better processes and combining different points of view.

In this research we stated a main research question that was the starting point of our study. The question was:

How do wikis support knowledge process in a call center?

To answer our question we used the knowledge conversion model by Nonaka and Takeuchi (1995), this way we were able to analyze each mode and understand how the wiki supported the knowledge process in each one. We were able to determine that the wiki supports the knowledge process during the externalization, combination and internalization modes, and that it is not integral during the socialization mode.

The wiki does not support the knowledge process during the socialization mode. It was not perceived as useful by the agents, since most of the learning and knowledge sharing during this mode is carried out by the social interaction between them. Agents learn from their training and interactions on the operation floor with their co-workers. They observe how other agents perform their tasks and practice what they are taught while answering calls.

When it comes to externalization, the agents perceive the wiki as a useful tool that supports the knowledge process by allowing them to create and upload articles in an easy way. The wiki is seen by the agents as a helpful instrument to share their knowledge. In this instance the wiki is fundamental, since it is the tool that allows the agents to externalize their knowledge and transform it into an explicit one.

Regarding the combination mode, the wiki is perceived as a tool that enhances the knowledge process by allowing them to discuss and edit articles. The explicit knowledge
from the articles is combined, edited and processed to create new explicit knowledge using the wiki. However, the agents also perceived the wiki as inaccurate in some cases, having concerns about the veracity of some of the articles.

Finally, for the **internalization** mode, the agents also considered the wiki helpful since it provides them with the necessary information to solve their customers’ issues. Agents use the articles in the wiki to resolve doubts or follow instructions; following the steps in the articles, the agents put into practice the explicit knowledge stated in there, and transform it into a tacit one. Furthermore, most of the agents see the wiki as useful tool for learning new processes, since it has all the information needed and provides the steps to follow, allowing them to “learn by doing”.

For our second question we asked “**How does a wiki support learning?**” the use of the wiki helped the agents to learn while they were creating, editing, discussing or even following the information that each of the articles contained. The transformation of knowledge between tacit to explicit, explicit to explicit, and explicit to tacit supported the ways agents learned in the call center.

To support learning, we can mention that three out of the four knowledge conversion modes were used. The **externalization** mode allowed the creation of articles in the wiki; agents transformed their tacit knowledge into explicit. The next mode was **combination**; this one allowed the agents to edit and discuss articles, allowing explicit knowledge of the wiki to be transformed or reconfigured into a new explicit one. The last mode was **internalization**; this mode was the most important in supporting learning. Knowledge that was explicit in the wiki had been learned by individuals and they were transforming it into tacit knowledge that they could put into practice. The **socialization** mode was not used to support learning with the use of the wiki. This mode involved the interaction of individuals that shared their tacit knowledge. Agents tended to ask their co-workers before, during and after their working shifts. They were a community that voluntarily shared their tacit knowledge between its members.

With our interviews we were able to realize that learning occurred with the use of the wiki especially during the **internalization** mode. This is when the agents put into practice the articles in the wiki, following their steps and learning form them. When we analyzed the other three modes, we understood that the **externalization** and **combination** modes helped in acquiring and transferring knowledge; agents were learning while updating and discussing the articles. In the **socialization** mode the wiki did not support learning, it was mostly done through practice, while the agents took calls in the operations floor, and before and after the agent’s shifts.

In our third question we asked “**How is new knowledge created using a wiki?**” and based on our analysis of Nonaka and Takeuchi’s (1995) model, we determined that new knowledge was created during the **externalization** and **combination** modes.
The creation of new knowledge occurs when the agents use the wiki to generate articles, transforming their tacit knowledge into an explicit one, which happens during the *externalization* mode. By uploading articles, the agents share their knowledge with their co-workers, and in some instances, agents share information that is new to others, thus generating new knowledge. Whenever an agent externalizes a new process or troubleshooting steps using the wiki, he or she is generating new knowledge that is spread easily with the tool.

Another way in which new knowledge is created using the wiki is with the discussion and editing of articles. This falls under the combination mode, in which explicit knowledge from different sources is combined to create new knowledge. In our case, with the combined input and experiences of the agents involved, the articles were edited and discussed, taking the most important points of each contribution and enhancing the articles in a way that new and improved knowledge was generated. The wiki was the main tool for the creation of new knowledge in this mode, since it was the platform used to combine the knowledge of different individuals to create new one.

*What are the limitations of using a wiki?* was our final research question and the main ones that came up during our study were: *experience, time, understandability and accuracy.*

Agents who lack *experience* do not update the wiki, since they do not have the necessary knowledge to do so. The lack of *time* also limits the use of the wiki; if agents do not have enough time they will not utilize it. Regarding the *understandability* limitation, whenever an agent finds an article that is not easy to understand they will skip it or will not follow the steps that are unclear to them. Finally, *accuracy* is one of the most important limitations when it comes to the use of the wiki. Whenever articles were perceived as inaccurate by an agent, he or she will not use it at all will rather use other sources of information to resolve his or her doubts.

Based on the results of our research we would recommend the following actions in order to avoid these problems:

*Agents do not update the wiki because they lack experience*

Updating information in a wiki was a problem we found when we interviewed the agents. They told us they did not update the wiki because they were not sure if the information was correct. They had to consult their supervisor or quality assurance specialist to make sure that they had the correct information. The recommendation we want to make starts in the training period. Agents need to take a 5 week training period when they are new to the project. We recommend that during this time they have access to the wiki with limited functions. Having access to the wiki will let them read articles and become familiar with its
use. The only functions they would not have access to are edit and discuss; instead they can use the search, history, and sandbox functions.

**Agents do not update the wiki because they lack time**

Some of the agents mentioned that they did not update the wiki because they lacked the time to do it. When those agents came across information that was incorrect, instead of updating it, they looked for answers in another tool. Our recommendation is to give rewards to the agents that use and update the wiki. With this reward, they will be motivated to use wiki constantly. Furthermore, the rest of their co-workers can benefit from this, having updated information. We also recommend to select proactive agents to be involved in the use of the wiki. These type of agents are mostly self-motivated and will be willing to update the articles frequently.

**Agents do not follow the steps in the articles that are difficult to understand.**

We have two recommendations to avoid this kind of problem. The first one is to use a forum for discussion in the wiki. With this, we expect that the agents create an environment of virtual socialization, which could get clarification when they found information that is difficult to understand. The second is to continue with the reward system; this will motivate the agents to use the wiki constantly and familiarize with its use when reading or updating it.

**Agents do not use the wiki when they think the information is inaccurate**

The accuracy of information was seen both as a disadvantage and an advantage. Agents said that most of the time they found the articles in the wiki accurate. When agents found inaccurate information in the wiki they said that they edit or discussed the information. A few agents said that instead of editing or discussing they looked for other sources of information. The first recommendation we would like to make is to keep the use of the wiki limited to a certain group of agents, for example experienced agents, or a reduced number of them, not the entire project. The second recommendation is to control the veracity of the information; this can be done with the help of a very experienced agent or a quality assurance analyst, who can review the posts and updates in the wiki.

We believe that these results will be useful for organizations that are looking for new tools for knowledge sharing, specially organizations in the call center industry, where knowledge needs to be updated constantly, and where tacit knowledge is not always transferred. There are very few studies regarding learning and sharing in call centers (Downing, 2004); we contribute to the body of knowledge by giving an insight on how the knowledge conversions process are perceived by agents in this type of industry when it comes to using a wiki for learning.
7.2 Outcomes

This study showed us that in the call center agents have an interest in sharing their knowledge in different ways. The knowledge they share in their work environment provides a continuous process for learning.

Wikis allow knowledge to be accessible to all agents who are using it. The people involved in the pilot perceived the wiki as a useful tool that allows them to access information in a fast and efficient way and learn easily. Moreover, it helps that it is created by the same agents, speaks to them in their own voice, and is based on their own experiences.

The wiki helped the agents to collaborate as a team; this has been possible because they were able to give feedback, discuss, and bring new ideas that motivated the rest of the agents to promote its use. In Telvista’s case, the agents showed that they are willing to collaborate and support the wiki; they are motivated to upload, edit and discuss articles, without anyone telling them to do so. The agents have assimilated that the use of the wiki helps them saving time and learning new processes and troubleshooting steps.

One drawback we found in the use of the wiki was in the amount and accuracy of the information. Some articles were not updated as frequently as they should. Moreover, certain agents did not play an active role in correcting information that had mistakes; they just skipped the article and used another tool. Agents preferred to discuss the information or use other sources.

7.3 Further Research

The completion of this study showed us results that are particular for Telvista and the Verizon account. These results, however, can be applied to other call centers that handle technical support calls, or large amounts of information with regular changes. The use of a wiki in a call center can be a fast and less expensive solution for this type of industry. We consider that further research can be made in the same type of industry but with other services offered, for example, with outbound calls, travel, or even billing services.

An additional research that may be performed is the study of wikis in call centers during a longer period. We consider that a longer investigation might bring different results. With those results, organizations can decide if they could use or not wikis as a knowledge management tool, and for what stages or departments. Moreover, our contributions to practice are based on our empirical findings and have not been tested; a research can be conducted to evaluate our suggestions.

A complementary research that can be performed is a similar study but with a larger group of agents using the wiki. Our study was a pilot with 15 participants, and Telvista could have
worked with all the eligible agents (170 of them), but at that time we decided to work with a smaller group to have a better control. In addition, it is important to consider more participants to verify if the wiki maintains the accuracy of the information. If more participants are using the wiki, it can lead to more people editing and updating the information. A research like this may yield different results as the ones we obtained.

Furthering the study of wikis for learning in call centers might represent a change of strategy for this type of industry. Decision maker could rethink their communication, information, or even training strategies. Moreover, they could expand or reduce the use of wikis to other areas of the company.
REFERENCES


APPENDICES

Appendix 1 - Interview Questions

Socialization

1. When you started in this job how did you learn the processes needed to perform your tasks?
2. Do you learn from your co-workers? If so, how?
3. Do you share your knowledge with your co-workers? If so, how?

Externalization

4. Have you uploaded articles to the wiki? If so, what has motivated you to do so?
5. How do you make sure that the articles that you upload to the wiki are accurate?
6. What do you do to ensure that the articles that you upload are understandable for others?

Combination

7. Do you discuss or edit the articles in the wiki? If so, why?
8. Do you find the articles in the wiki accurate? If not, what do you do?
9. Does the discussion and collaboration in the wiki help creating easier processes or does it make it more complex and harder to understand? Explain

Internalization

10. When you have doubts about certain processes or troubleshooting steps, what do you do?
11. How do you learn new processes?
12. Do you find the wiki useful for acquiring information and following processes or would you rather get the information as you did before (Tech Help)? Why?
13. What advantages do you find in using the wiki?
14. What difficulties do you find in using the wiki?
<table>
<thead>
<tr>
<th>Questions</th>
<th>Agent 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you started in this job how did you learn the processes needed to</td>
<td>I learned during my training and while on the calls, basically through</td>
</tr>
<tr>
<td>perform your tasks?</td>
<td>experience</td>
</tr>
<tr>
<td>Do you learn from your co-workers? If so, how?</td>
<td>Yes, I learn by asking them during or after a call what should be done</td>
</tr>
<tr>
<td>Do you share your knowledge with your co-workers? If so, how?</td>
<td>Yes, I usually share my knowledge verbally or through the wiki</td>
</tr>
<tr>
<td>Have you uploaded articles to the wiki? If so, what has motivated you to</td>
<td>Yes, to help spread knowledge and save everyone’s time and get as many</td>
</tr>
<tr>
<td>do so?</td>
<td>issues resolved on the first try as possible</td>
</tr>
<tr>
<td>How do you make sure that the articles that you upload to the wiki are</td>
<td>By repeating the process several times and ensuring it works properly.</td>
</tr>
<tr>
<td>accurate?</td>
<td>Then I explain all steps as accurately as I can to make it clear how it</td>
</tr>
<tr>
<td></td>
<td>should be done</td>
</tr>
<tr>
<td>What do you do to ensure that the articles that you upload are</td>
<td>I try to use common words and provide detailed steps. I assume that</td>
</tr>
<tr>
<td>understandable for others?</td>
<td>whoever is reading it will only know the terms described in the initial</td>
</tr>
<tr>
<td></td>
<td>training, so I try to use basic language as much as possible</td>
</tr>
<tr>
<td>Do you discuss or edit the articles in the wiki? If so, why?</td>
<td>Yes, there can be spelling or grammatical errors since not everyone has</td>
</tr>
<tr>
<td></td>
<td>English as a first language. Articles are usually discussed when a</td>
</tr>
<tr>
<td></td>
<td>process listed can be optimized, when they can be done in less time or</td>
</tr>
<tr>
<td></td>
<td>when less commands are needed</td>
</tr>
<tr>
<td>Do you find the articles in the wiki accurate? If not, what do you do?</td>
<td>Yes they are accurate. If not, a discussion is started about why it is</td>
</tr>
<tr>
<td></td>
<td>incorrect and how it was discovered to be incorrect and how to fix it</td>
</tr>
<tr>
<td>Does the discussion and collaboration in the wiki help creating easier</td>
<td>It makes it easier by discussing it all agents become more familiar with</td>
</tr>
<tr>
<td>processes or does it make it more complex and harder to understand?</td>
<td>commands and terms that they did not know. Because everyone explains and</td>
</tr>
<tr>
<td></td>
<td>discusses differently, by reading those discussions, it is very likely</td>
</tr>
<tr>
<td></td>
<td>that someone’s specific wording or approach will be a lot easier to</td>
</tr>
<tr>
<td></td>
<td>understand for a specific agent</td>
</tr>
<tr>
<td>When you have doubts about certain processes or troubleshooting steps,</td>
<td>Ask co-workers or look it up in the wiki to see if there are any solutions</td>
</tr>
<tr>
<td>what do you do?</td>
<td>or similar problems</td>
</tr>
<tr>
<td>How do you learn new processes?</td>
<td>By understanding how it’s supposed to work step by step, then trying it</td>
</tr>
<tr>
<td></td>
<td>on a call</td>
</tr>
<tr>
<td>Do you find the wiki useful for acquiring information and following</td>
<td>The wiki is useful because there are many people that have useful</td>
</tr>
<tr>
<td>processes or would you rather get the information as you did before</td>
<td>shortcuts or quicker solutions than the official ones in Tech Help. Tech</td>
</tr>
<tr>
<td>(Tech Help)?</td>
<td>Help was not updated very frequently at all, the wiki can be updated</td>
</tr>
<tr>
<td></td>
<td>immediately to report new processes, outages, etc</td>
</tr>
<tr>
<td>What advantages do you find in using the wiki?</td>
<td>It is friendlier and the information is more abundant. There are things</td>
</tr>
<tr>
<td></td>
<td>that are not covered in Tech Help since Tech Help almost always assumes</td>
</tr>
<tr>
<td></td>
<td>Verizon’s software, hardware and technicians work perfectly and provides</td>
</tr>
<tr>
<td></td>
<td>very little assistance when something does not go as it’s supposed to</td>
</tr>
<tr>
<td>What difficulties do you find in using the wiki?</td>
<td>Sometimes it is too opinionated or narrow-minded, depending on the author</td>
</tr>
<tr>
<td></td>
<td>Sometimes it's also difficult to manage who uploads what, how</td>
</tr>
<tr>
<td></td>
<td>understandable it is, and whether it is too redundant in relation to</td>
</tr>
<tr>
<td></td>
<td>other articles already posted.</td>
</tr>
<tr>
<td>Agent 2</td>
<td>Agent 3</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>I basically didn't know much about the matter until I received training</td>
<td>I learned by receiving training and consulting Tech Help</td>
</tr>
<tr>
<td>My co-workers are constantly helping with any concern that I may have. I try to see the process they use when it comes to solving an issue, at times we use different procedures to fix the same problem, therefore, this is the main reason why I always rely on my co-workers</td>
<td>Yes I do, by asking them different questions about processes and technical questions</td>
</tr>
<tr>
<td>Whenever they ask me and I know I can help them out, I do</td>
<td>Everyday we share different experiences based on what we find by solving all kinds of technical problems and how to follow internal processes. Sometimes we talk about different or difficult issues that we had during the day while having lunch or at the end of the day</td>
</tr>
<tr>
<td>I have uploaded a few articles and the reason why I have been motivated, is that I would have liked to have something like the wiki when I first started working here</td>
<td>Yes a few about how to solve issues related with technical problems for wireless connections. I was motivated by the lack of articles about proper support to for more specific and detailed problems when setting up wireless connections</td>
</tr>
<tr>
<td>Before uploading any information I checked with my co-workers and made sure that everything was correct. I always check it with the people that for me are the best doing troubleshooting</td>
<td>I base all the info uploaded to wiki by checking in Tech Help and asking my co-workers to help me verify everything before uploading it</td>
</tr>
<tr>
<td>I think that the articles that I have uploaded are not that easy to understand for newer agents. I wish I had more time to make them a little more understandable for other people that probably haven't had that much experience</td>
<td>By making them simple and trying to use less technical words in them so almost everyone with less technical level can understand them properly</td>
</tr>
<tr>
<td>I just discussed one and the reason why I did it was because there were several troubleshooting steps that were not needed for that particular issue. So I pinpointed all the things that from my experience were not needed</td>
<td>Yes, to make sure the articles remain accurate and up to date for every day needs</td>
</tr>
<tr>
<td>For my experience, the articles I have found, have been very useful though, like I previously mentioned, sometimes there are more steps than the actually needed</td>
<td>If there are not accurate enough I keep researching and discussing them with different people here at work</td>
</tr>
<tr>
<td>It depends on what you are looking for. Since I am not an engineer, some vocabulary and procedures may seem a little complex to me, at times, this can be a problem since it is not as friendly as some people would like it to be, on the other hand, it has useful information for basic problems, so, in my very personal point of view, depends on what you are looking for</td>
<td>I think that with all the collaboration and effort we take, we try to make it as simple and understandable as possible. So I think that the articles end up being more understandable at the end</td>
</tr>
<tr>
<td>First I talk to my co-workers and try to find out a possible solution, if there's no possible solution, we access the wiki for some articles regarding the issue that has to be solved.</td>
<td>I consult with my co-workers or with my supervisor</td>
</tr>
<tr>
<td>Generally by talking with my co-workers although at times, I like to check articles and tech news in order to learn new processes</td>
<td>Consulting with my co-workers and using Tech Help</td>
</tr>
<tr>
<td>Wiki can be very useful if you are currently working or even studying these kind of process but, for me, it will always be more specific and useful talking with co-workers that have experience in the subject</td>
<td>I rather get the info elsewhere in places like Tech Help, I think that the info is more reliable since the wiki can be tricky and the info found there is not always accurate</td>
</tr>
<tr>
<td>The discussion feature can be really useful in order to have different perspectives on the same matter, the articles found can be really interesting, and the tips that others provide are quite helpful</td>
<td>I think that the main advantage is that it can be updated real quickly and we don't have to wait for Verizon to updated it, like it happens with Tech Help</td>
</tr>
<tr>
<td>The wiki page doesn't have any inconveniences, it's easy to surf, very neat, though the information at times can be too much and irrelevant, since everybody can post whatever they think might be of interest for others.</td>
<td>Well so far none it's easy to access easy to use and anyone can add info as needed, but like I said before, I think that the information can not be as reliable as in Tech Help.</td>
</tr>
<tr>
<td>Agent 4</td>
<td>Agent 5</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Telvista provided the training when I started working here</td>
<td>I took a short training but that was not enough, most of the time I found myself learning things while on duty. I had a technical background so that helped me a lot</td>
</tr>
<tr>
<td>Yes, by sitting next to them and asking questions about any doubt that I have</td>
<td>I did, by observing the way they performed and listening to what they said</td>
</tr>
<tr>
<td>Yes, by answering my co worker’s questions when they ask me for help</td>
<td>Most of the times we gathered at the end of the day and we talked about what we learnt. I also had conversations about all that during lunch time</td>
</tr>
<tr>
<td>Yes, to share easier and more effective ways to get the job done.</td>
<td>I did it once; I uploaded some content to the wiki about a workaround I found when configuring routers. I wanted to spread the word about it</td>
</tr>
<tr>
<td>Because they are practices I’ve been improving with the time I’ve been working here and they work for me and my co-workers</td>
<td>By double checking facts and talking about it with my co-workers to make sure that I had the correct information</td>
</tr>
<tr>
<td>Try to be very specific in the way I describe the troubleshooting for a problem. I like to explain all the steps to make sure that you are able to follow them without any problem</td>
<td>I just uploaded a list of steps to follow. I think that it was simple and not difficult to follow at all</td>
</tr>
<tr>
<td>Yes, because is important to have accurate and updated information. Whenever there's an update I like to check that the article is updated also to ensure that everyone has the latest information</td>
<td>I don’t have the time to do it. If I come across an article I don’t agree with I just leave it and check the information on Tech Help</td>
</tr>
<tr>
<td>Yes, I find them accurate. I haven't had any issues yet</td>
<td>Most of them are, it’s easy to realize when they are not though. When they are inaccurate I just go search somewhere else</td>
</tr>
<tr>
<td>It makes it easier by simplifying the original instructions in a easy-to-understand words and terms</td>
<td>There should be certain discussion about the accuracy of the contents, but this has to take place professionally so something good can come out of it. Collaboration is a must</td>
</tr>
<tr>
<td>Most of the time I use the wiki to solve the doubts I have, but if can’t find the answer right away I will ask my supervisor, and if he's not available I will ask my co-workers</td>
<td>I talk about it with my team mates and discuss it. Most of the times we end up escalating the issues or proposing a different solution</td>
</tr>
<tr>
<td>Most of the times with the training they gave us. If there's no training, I usually learn by practicing and asking my supervisor for help when I don't understand</td>
<td>First of all I try to understand what they are really for and I tend to gather some background information about it. Then I review the new process and learn it</td>
</tr>
<tr>
<td>I find wiki useful because if I got stuck in a step I can take my time to understand and solve the issue while following the instructions on the wiki</td>
<td>It depends on the time I have. If I’m in a rush I do read the wiki, but I check other sources when possible.</td>
</tr>
<tr>
<td>That it's easy to use and easy to comprehend</td>
<td>Saves some time and most of the time articles have certain level of neutrality, in my opinion</td>
</tr>
<tr>
<td>None so far</td>
<td>There are no significant difficulties using it but trusting the source of its contents</td>
</tr>
<tr>
<td>Agent 6</td>
<td>Agent 7</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>With practice, training for me was not good since it was the first time for me working as a tech support agent, so it was difficult for me to understand most of the training. It was until I was on the floor taking tools that I started learning</td>
<td>I started working here on 2007, I did not learn too much on the training, most of the times I learned asking my supervisor, and looking for additional information myself</td>
</tr>
<tr>
<td>Yes I did by asking them whenever I had doubts. There are people that know a lot and they usually tell you easier ways to resolve issues</td>
<td>Yes, getting information from their expertise on certain cases that I know don't happen very often and are hard to resolve. On those cases I usually ask help from people that I know have a lot of experience</td>
</tr>
<tr>
<td>Yes, of course. Well I just tell them a little bit about when I started how I didn't understand anything, I tell them how they can get familiar with the tools we manage, where to find useful information and tips</td>
<td>Yes, that is one of the best ways to really help people instead solving their problem without explain the root cause. On every chance I had I took my time to explain what the issue was, how it started and what do.</td>
</tr>
<tr>
<td>Yes, I've uploaded articles when I get a weird issue and I come up with a resolution and the reason is so my co workers find this info handy if they have a similar situation</td>
<td>No I haven’t, I know I have a lot to share, but I haven't been able to put what I know into words. I need to take time to be able to organize my thoughts first so I can share an article</td>
</tr>
<tr>
<td>Because I only upload the ones I am able to resolve, I know for sure that what I did work and will be useful for others</td>
<td>Like I told you I haven't uploaded any articles, but I guess you need to look for many sources to make sure that the information is reliable. If the information has to be accurate then your article has become a real task you need to take it seriously and do research and information gathering to ensure that everything is correct</td>
</tr>
<tr>
<td>First of all by explaining what the issue was, then by describing all the steps taken to resolve it. Like I told you before, this is my first time working as a tech support agent, so I try to explain things as I would like them to be explained to me when I was new.</td>
<td>You always have to keep it simple and take in count that at the end the information you will upload has to be a summary and usable. You need to make sure that its clear and concise</td>
</tr>
<tr>
<td>Yes, if someone uploads info with an issue that I've had before and if the outcome was different, I add my experience or a different way to resolve it</td>
<td>No, I don't really have the time to review them and discuss them</td>
</tr>
<tr>
<td>Yes they are accurate</td>
<td>I don't use the wiki that much, but let say that I found something wrong I would probably make a comment</td>
</tr>
<tr>
<td>Actually is easy to understand and a good thing is that we can edit and upload useful information. But there should be someone really knowledgeable checking what is being uploaded to make sure there's only accurate information available for us</td>
<td>It becomes more complex, you need to discuss the articles and ensure that they are correct. I think that it's easier when you get the information from official sources that you know are right, and if they aren't it's something they need to fix and not you</td>
</tr>
<tr>
<td>I read the processes as if I still have doubts I ask people who I know are experts on the subject</td>
<td>First thing is look into my resources, on line documentation and tools, second I would ask for advice to my mentors or help desk in charge, and third form another person’s experience</td>
</tr>
<tr>
<td>By reading our service alerts, also I contact different departments depending on what the issue is and ask them, as the saying goes, there aren't stupid questions, there are stupid's that don't ask</td>
<td>First I have to see them on paper or documented someplace where I can consult at any time so I don’t have to memorize anything. Second, I have to put them on practice to understand the basics and that way I can gain practice and learn better</td>
</tr>
<tr>
<td>Both of them are useful. The Wiki explains how everything works and Tech Help tells you the steps to follow so both of them work together just fine</td>
<td>Probably not that useful to follow process and procedures, I like to look at the original source of information. That is because on the wiki the theme is wide open and exposed to many interpretations. Nothing like the original source</td>
</tr>
<tr>
<td>That is easy to find what you're looking for only by typing a word and you get all articles related to that word and choose what's best for you, also the tips given by others are very helpful</td>
<td>You are saving time, money and an extra effort. Very practical easy, friendly and always there. Is like your best friend. Is always there to give you any advice a consult at any time about any topic. But your friend is not a doctor, you better think twice if you are going to ask him about the best way to keep you healthy</td>
</tr>
<tr>
<td>It doesn't have virtual pages for the equipment we support, like modem simulators for the GUI. Other than that the tool is well organized</td>
<td>Same thing, the faster way to do thing is not always the best or the accurate.</td>
</tr>
</tbody>
</table>
First I have to be 100% sure that the information I want to upload is correct based on my experience and then try to double check with someone else such as a supervisor or a QA.

I usually start trying new things based on my knowledge, when that doesn’t work I turn to any other type of source of information like Tech Help or the new wiki. When I can’t find anything useful in there, I start asking co-workers, supervisors or QA’s about the situation.

I have. The reason is as simple as the satisfaction of helping other people to resolve problems they haven’t faced yet and that might take them a lot less time to do. Also because I would like other people as well to share situations I haven’t been through and get information on how they handled them.

Yes, I wanted to share what I know and I think that my way of working can help others and allow them to troubleshoot faster.

If I happen to find some information that I think is not accurate, I would discuss it with a supervisor or a QA to make sure that I’m right and then get into it and correct it.

Yes, I think that some articles have too much information that is not relevant for the issue at hand, and are not easy to understand for agents who are new.

Most of the information appears to be accurate, or at least helpful. Otherwise I would talk to a supervisor about that to ensure it’s not accurate and go ahead and correct it.

I think that all of the articles have correct information, but sometimes they are not easy to understand or are more complicated than they need to be. I believe that it’s more a question of editing and structure rather than accuracy, and I usually just edit the article.

I guess it makes it easier to understand as we all contribute with the information on it. As the people who face the situations we try to make it easy to understand ourselves without making it any more complicated or complex.

Like I said before, I think that sometimes the articles are more complicated than they need to be, and I think that with all the information from all the people the articles tend to get to be too big and have too much information that is not needed. Again, I think that editing is the main issue here. If the articles are edited correctly I think that they are better and it helps to get all the different points of view together to create a good solution, but it needs to be clear, brief and to the point.

I usually start trying new things based on my knowledge, when that doesn’t work I turn to any other type of source of information like Tech Help or the new wiki. When I can’t find anything useful in there, I start asking co-workers, supervisors or QA’s about the situation.

By reading about them and by practice. Our supervisor will usually explain things to us, but most of the times I do it by myself and end up learning on the go while taking calls.

I think it’s more useful with the wiki as it is made out by all of us, who live the situation and who really have enough experience acquired to share the information with everybody.

I think that the wiki is a good way to get information, because we have control over it and we are able to create articles based on our experience and on what really works for solving issues. I think that Tech Help has too much details that are not needed and tend to distract or make things more complicated. Also, you can troubleshoot in a different order and skip some steps that Tech Help tells you to and still get the same result and sometimes even faster.

The information contained in there I think is more useful and accurate as we all make it, the people who actually face the issues and resolve them.

I think that being able to edit the articles and make them more practical and based on our experiences is a huge advantage. This way we can help other agents to troubleshoot easily and faster, and we can learn different ways to troubleshoot from others. It also very simple to use.

There could be inaccurate information that could cause taking much more time to resolve an issue than expected.

I think that if more people began to use it, it may get out of control, and it will be necessary to have someone verifying and making sure that the articles have the correct information.
<table>
<thead>
<tr>
<th><strong>Agent 10</strong></th>
<th><strong>Agent 11</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>I took a 5 week training with the company, although most processes are better learned once in the operation while taking calls.</td>
<td>Absolutely, most of the times it’s them that we get to learn the most, cause all the necessary info can’t be provided in a 5 week training, only the most relevant points, therefore my coworkers totally helped by playing the role of trainers, helping me, I would say for around 3 months when I started working there. I would ask them questions that I either didn’t know the answers for or just to confirm my actions in every call. Also with the usage of the tools</td>
</tr>
<tr>
<td>Yes, they show me how to resolve certain calls if I can’t find a solution for certain problem. I usually ask them for help during the call.</td>
<td>Definitely, just like I mentioned previously, I do answer most of their questions and doubts, helped them with the tools they need and give them tips to improve their performance, shorten calls without affecting the good service provided to each customers</td>
</tr>
<tr>
<td>Yes, they ask me during calls. Also, I usually tell my friends how I resolve certain issue that we all have found complicated or time consuming to resolve.</td>
<td>Yes, they are about the most common doubts from other co-workers, specially newer ones. I did it because I wanted to help others who doesn't have much experience. It also helps me and agent who are more experienced since we don't have to answer the same question all the time and we can tell them to check the wiki</td>
</tr>
<tr>
<td>I have updated some articles. What motivated me to do it was the common questions that other agents asked me when they were taking calls. The problems were very similar and I knew how to resolve them very easily. That is why I made an article that could help with common issues that I know I can solve quickly.</td>
<td>Yes, they are about the most common doubts from other co-workers, specially newer ones. I did it because I wanted to help agents who doesn't have much experience. It also helps me and agent who are more experienced since we don't have to answer the same question all the time and we can tell them to check the wiki</td>
</tr>
<tr>
<td>I usually ask my supervisor to read the article and if he understands it and tells me its ok then I upload the article. If the doesn't agree in the accuracy of the article I go back to Tech Help and review the information that is there. From that point I rewrite or modify the article I created.</td>
<td>I use Tech Help to get the basic information and using this information I can complement it with my own personal experience and share it with others in the articles being sure that it comes from an accurate documented source, but why my point of view</td>
</tr>
<tr>
<td>The times that I have updated it my supervisor has reviewed it. I also make sure that the steps are easy to follow, I like to make them thinking that the information is for a new agent that doesn't have that much experience.</td>
<td>I try to put every point in the simplest way and without unnecessary information and I like to think of when I didn’t know anything about the topic I’m doing the article about. It’s useful to think of questions like how would I have understood it the best way and in the shortest time possible? And how did I actually learn it?</td>
</tr>
<tr>
<td>I haven’t discussed articles recently, but I do edit some of them. Once I did it because the article was too long and a modem was not the right one.</td>
<td>Not really, usually the ones about our internal troubleshooting only and more than discussing them I like to, like I said before, complement them, correct them when it’s necessary and use important points for my own articles.</td>
</tr>
<tr>
<td>Most of them are accurate. Once one wasn’t and I did edit the information about the modem that was not the right one.</td>
<td>Most of them I do. It’s very seldom for me to find something I don’t think it’s accurate mainly because the information I’m looking for is about topics I ignore, so I can’t tell how accurate they are and they look good to me. But when I do find something that’s not quite accurate and I know that for sure I like to edit or post my observations on them.</td>
</tr>
<tr>
<td>It makes it much easier to understand. For example when there is a difficult or uncommon call it helps a lot. You find out that someone else faced the same problem and it makes it easier to reach a solution.</td>
<td>It doesn’t make the processes themselves easier, because it doesn’t change anything in them. But it does make the understanding much easier because it uses real situations along with the process explanations.</td>
</tr>
<tr>
<td>Now I usually go to the wiki, before I used to ask more experienced agents or my supervisor. If no one is available I will review Tech Help.</td>
<td>I would double check with my superior or try to find more information on Tech Help</td>
</tr>
<tr>
<td>I learn by hearing the calls of my teammates and I review Tech Help and the wiki during calls. The wiki has information that I use more frequently. For me it is a great tool for learning new information to do better in my calls.</td>
<td>They are posted for us on Tech Help and sometimes we get short trainings about the new processes as soon as they are posted.</td>
</tr>
<tr>
<td>I do find the wiki useful it gives me information based on experience and easier way than Tech Help. Now I rather get the information from the wiki because It makes my calls faster.</td>
<td>It’s much more useful to read a wiki article since it’s more understandable, but especially for new representatives it is a great way to get informed. Usually when an employee already has some knowledge about them it is better to use those from Tech Help due to the terms utilized there and usually avoided on wiki articles for simpler processing.</td>
</tr>
<tr>
<td>I think that saving time is the best advantage that I find in the wiki. I also like that the articles are created by my teammates and me. It makes it more personalized and friendly.</td>
<td>The less informed you are on the processes and the nature of our work itself, the better wiki will work for you. Explanations get to be more detailed and practical</td>
</tr>
<tr>
<td>I just found one difficulty, when information is no updated as fast as it should. It is important that all the articles are updated with the latest information.</td>
<td>It takes a little longer to read about a process on wiki than it does on Tech Help because its better explained. However not everyone can always go straight to a Tech Help article and understand it as easily.</td>
</tr>
<tr>
<td><strong>Agent 12</strong></td>
<td><strong>Agent 13</strong></td>
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</tr>
<tr>
<td>I took 5 weeks of training but being actually there taking the calls is what helped me the most.</td>
<td>There was a training period where we were taught the basics. After that once we are answering calls for real is when we really start learning</td>
</tr>
<tr>
<td>Of course I do, whenever I didn't know how to fix something I would ask some people around and they would always have an answer for me</td>
<td>A lot, most of the scenarios and situations presented to you are unique and you learn to solve them from co-workers who might have had similar experiences before or from your supervisors.</td>
</tr>
<tr>
<td>Yes I do everyday. I think that what we all do is share a little piece of information that complements the idea that we already have about something. But something that is also really helpful is helping new people to resolve their issues.</td>
<td>Yes, I do it with the wiki. I like it because it allows me to share my knowledge in a more easy way</td>
</tr>
<tr>
<td>I have uploaded some articles and the reason of why I like doing that is because it helps other agents that are not sure of how to troubleshoot or follow the correct process. The articles on the wiki are really helpful and useful</td>
<td>Yes, Training teaches you the basic things needed to perform your job, but the scenarios and situations require you to learn some of the concepts; when I started answering calls, I imagined how cool it would've been if I'd had information on these kind of things beforehand and found the people who were already experienced at it.</td>
</tr>
<tr>
<td>I know that they are because its something that I've been working all along for the past 2 years, plus before uploading them I verify with my co-workers that I have the correct information.</td>
<td>I always triple check them with co-workers and on Tech Help and other tools we have available</td>
</tr>
<tr>
<td>Sometimes I just upload the information and some others I just keep the drafts but either way I ask to 4 or 5 agents to read the article to see if they actually understand what I'm trying to say, that way I make sure the article can be used</td>
<td>I try to imagine how it was for me with no prior experience in this job and then try to explain it to someone using that criteria</td>
</tr>
<tr>
<td>I always discuss the articles because we always have something new, easier and faster that can help with the processes and that would be a reason for me to modify them</td>
<td>Yes. Whenever I find inaccurate information I will correct it and notify the person who wrote the article originally, to make sure he or she knows what was wrong and why we changed it</td>
</tr>
<tr>
<td>Most of the articles are accurate, the only thing that could make them not accurate is that they are not updated when there are new processes or new products, like if there's a new modem the articles needs to be updated to make sure that the information of the new modem is included.</td>
<td>Yes. Some of us are more experienced in using both the resources and technology as well as actually solving situations. The best of us check this information daily or as much as possible in order to prevent mistakes or inaccuracies to stay for long in the wiki.</td>
</tr>
<tr>
<td>I think it is easier and harder at the same time, it really depends on the article or the subject, and it also depends on the agents since it can be easy for some people and harder some other, but it has definitely improves the way we work.</td>
<td>Yes. The wiki has been tremendously helpful for newer agents and really helpful for experienced users as well. Since it is a collaboration, some of us will not experience the same scenarios as others, and usually new things to learn will come up from one person to share with the rest of the group, sometimes leading to interesting ways of solving a problem or information that is not up to-date on Tech Help.</td>
</tr>
<tr>
<td>I can either check the wiki or check with my co-workers and they are both helpful.</td>
<td>We ask as many people as possible, sometimes even supervisors who are not closely related to, though they are not involved and few know about the project.</td>
</tr>
<tr>
<td>It is usually when I get a new call or an agent asking me something that I don't know the answer to is when I start looking around and I have to find the way to resolve the problem, it is then when I learn something new but this happens pretty much everyday.</td>
<td>Usually our supervisor will tell us about them, or in some cases we get quick trainings</td>
</tr>
<tr>
<td>I think the wiki has a little bit of Tech Help too, but what I like the most of the wiki is that we can upload our own information, all the words written there are real, it's something that we all have gone through and that has worked for a lot of people. Something pretty good too is that we get to share our knowledge</td>
<td>The wiki is tremendously helpful for newer agents and really helpful for experienced users as well. Since it is a collaboration, some of us will not experience the same scenarios as others, and usually new things to learn will come up from one person to share with the rest of the group, sometimes leading to interesting ways of solving a problem or information that is not up to-date on Tech Help</td>
</tr>
<tr>
<td>There a lot of them, but I will only mention a couple, one of them is that all of the articles are helpful, the language is accurate and you can actually trust in the content and another one is that this page has been created by us by the people that is there dealing with the calls, customers and issues, so there is no one else that could provide better information because it is all in wiki!!</td>
<td>It's easy to use and it's all in one place and you are personally in touch with the people collaborating in it.</td>
</tr>
<tr>
<td>As I said before it could be perhaps that some of the articles, well the content in them could not be updated or there could be new ways of going through the troubleshooting but it is not big problem because we can always edit the articles</td>
<td>I believe the difficulties might arise when more people are using it and you are not able to know who is posting what. I personally do not have any difficulty using it.</td>
</tr>
<tr>
<td>Agent 14</td>
<td>Agent 15</td>
</tr>
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<td>------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Than training process was a first step, but the most important influence on the learning on the processes was through my supervisor and the agents who have more experience</td>
<td>By the trainers, but not everything, just the essential. Then with practice while taking calls</td>
</tr>
<tr>
<td>Of course, sometimes when my supervisor is not available I have to ask to a co-worker on the next station even though sometimes it was the first and last time I spoke with him or her</td>
<td>Yes, when I had a doubt I asked them, or when someone was looking at my screen they used to tell me that something was wrong.</td>
</tr>
<tr>
<td>Yes I did, actually I was the guy in the next station at least a couple times. I will always try to share with other what I know and help them</td>
<td>Yes, whenever I arrive early to job I like to go to the floor to see if any of my friends has any doubts, the have less time working here, so I like to help them whenever I can</td>
</tr>
<tr>
<td>Yes, I think everybody is an expert in at least one subject so part of the wiki is to share what we know better to the people interested in that subject. For me it's not a final source but definitively an excellent tool to get an essential idea and get some other sources to make my own judgment on how to work</td>
<td>Yes I did, the only motivation is to share knowledge with all co-workers, cause that is the best way to have better tools and improved. The information is not useful if you don't share it</td>
</tr>
<tr>
<td>I created my article with some other points of view and try to get as many sources as possible so the reader can get second opinion to shape their own judgment</td>
<td>I do it by verifying all the information in the different tools that we have</td>
</tr>
<tr>
<td>Ask someone else, my co-workers, supervisor or QA, I ask them what do they think about it</td>
<td>I try to use colloquial words to make it completely understandable and before uploading it I like to ask to my co-workers</td>
</tr>
<tr>
<td>Yes I do, because I believe that the feedback in the wiki is crucial for development in the information. Without discussion the articles can be incomplete or inaccurate</td>
<td>Yes, it helps to improve the accuracy on several articles, because if the information is wrong it can cause several problems</td>
</tr>
<tr>
<td>Most of the times they are ok, at least in my experience. If there's something not really clear I took somewhere else, like Tech Help or any other tool</td>
<td>Yes almost all of them are accurate, in case something is wrong or I believe is wrong, I use the discussion section to raise my concerns</td>
</tr>
<tr>
<td>Sometimes different points of view make the info more confusing but at the end of the day is part of the human nature to just take what is important of an article. So even though it could be confusing is nothing a couple of readings of the article cannot fix</td>
<td>It makes it better and easier, the only problem is that sometimes it may not be 100% accurate or easy to read</td>
</tr>
<tr>
<td>First I try to fragment the issue and the elements of the situation in as many small pieces I can so I can learn them easily. If I can't fix the issue I ask someone else but with all my own resources used first, so I won't make my colleague lose his or her time</td>
<td>First I check the wiki and if there is no answer I try to get answer from all the available personnel, the trainers, supervisors, and co-workers. Most of the times my co-workers have the right answer</td>
</tr>
<tr>
<td>by the notifications, but normally my boss is in charge to give me the info first If I don't understand I ask that simple</td>
<td>With trainings, when we have them because its not always and also with the wiki</td>
</tr>
<tr>
<td>The wiki is more personal but Tech Help will have the flat facts no more no less always 100% reliable. Those documents are created by the people who decides how things are done so if I follow this resource I can't get into any trouble and if I do, I can say that I was following the instructions I was given.</td>
<td>I think it's better with the wiki, there are a lot of geeks that love to share info. and processes than just following simple instructions. It's friendly and easy to use</td>
</tr>
<tr>
<td>That it has different points of view and it's the result of our own work</td>
<td>I think that it's easier and faster and it can be updated frequently</td>
</tr>
<tr>
<td>That it is not 100% reliable. Tech Help can be wrong also, but it's not our fault and it's provided by Verizon, so it's their responsibility to fix it and not ours, like with the wiki</td>
<td>That the info is not always 100% accurate</td>
</tr>
</tbody>
</table>
### Appendix 3 - Coding

<table>
<thead>
<tr>
<th>Questions</th>
<th>Agent 1</th>
<th>Agent 2</th>
<th>Agent 3</th>
<th>Agent 4</th>
<th>Agent 5</th>
<th>Agent 6</th>
<th>Agent 7</th>
<th>Agent 8</th>
<th>Agent 9</th>
<th>Agent 10</th>
<th>Agent 11</th>
<th>Agent 12</th>
<th>Agent 13</th>
<th>Agent 14</th>
<th>Agent 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you started in this job how did you learn the processes needed to perform your tasks?</td>
<td>Training Practice</td>
<td>Training Practice</td>
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<tr>
<td>Do you learn from your co-workers? If so, how?</td>
<td>Asking for help</td>
<td>Asking for help</td>
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<td>Asking for help</td>
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<tr>
<td>Do you share your knowledge with your co-workers? If so, how?</td>
<td>Wiki When asked</td>
<td>Informational paragraph</td>
<td>When asked</td>
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<td>Have you uploaded articles to the wiki?</td>
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<td>If so, what has motivated you to do so?</td>
<td>Share knowledge / Optimize troubleshooting</td>
<td>Optimize troubleshooting</td>
<td>Share knowledge</td>
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<td>How do you make sure that the articles you upload are understandable for others?</td>
<td>Based on experience</td>
<td>Verify with co-workers</td>
<td>Tech-Help Verify with co-workers</td>
<td>Based on experience</td>
<td>Tech-Help Based on experience</td>
<td>N/A</td>
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<td>Verify with QA</td>
<td>Based on experience / Verify with supervisor</td>
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<td>Tech-Help / Verify with supervisor</td>
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<td>What do you do to ensure that the articles you upload are understandable for others?</td>
<td>Explain as if new / Detailed steps / Use common language</td>
<td>Tech-Help Verify with co-workers</td>
<td>Detailed steps</td>
<td>Detailed steps / Explain as if new</td>
<td>Conclude</td>
<td>common language / Verify with QA / Verify with supervisor</td>
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<td>If so, why?</td>
<td>Grammar / Verbs / Unnecessary troubleshooting steps</td>
<td>Unnecessary troubleshooting steps</td>
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<td>Accuracy / Update information</td>
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<td>Lack of time</td>
<td>Accuracy</td>
<td>Difficult to understand / Unnecessary troubleshooting steps</td>
<td>Accuracy / Update information</td>
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<td>Sometimes</td>
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<td>Most of the times</td>
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<td>Most of the times</td>
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<td>Most of the times</td>
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<td>If not, what do you do?</td>
<td>Discuss the article</td>
<td>Research Verify with co-workers</td>
<td>Use Tech Help</td>
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<td>No</td>
<td>Verify with supervisor</td>
<td>Edit the article</td>
<td>Edit the article</td>
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<td>When you have doubts about certain processes or troubleshooting steps, what do you do?</td>
<td>Ask co-workers / Wiki</td>
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<td>Ask co-workers / Ask supervisor / Ask co-worker / Ask QA</td>
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<td>Easy to use Detailed information</td>
<td>Different points of view</td>
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