THE ROLE OF TECHNOLOGY IN KNOWLEDGE MANAGEMENT IN SME'S

Bachelorarbeit

im Studiengang
Wirtschaftsinformatik

vorgelegt von

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am 24. August 2022
an der Universität Siegen

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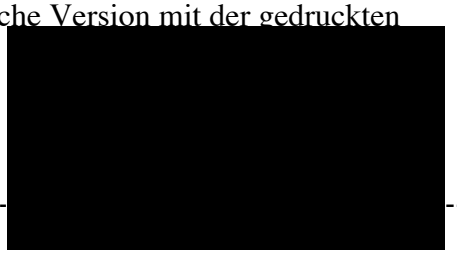

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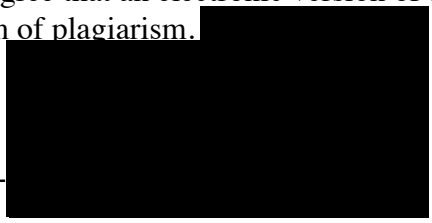

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(Date) (Signature)

Acknowledgement

I would like to take this opportunity to thank all those who supported and motivated me during the preparation of this bachelor thesis.

First, I would like to thank **Mr. Hussain Abid Syed** who supervised and reviewed my bachelor thesis. I would like to express my sincere gratitude for the helpful suggestions, the constructive criticism, and the many inspiring ideas during the preparation of this thesis.

I would like to thank my parents **Mr. Kamal Omar & Mrs. Perihan Battle Aref** as well as my **sisters Mrs. Vian Omar, Mrs. Shilan Omar & Lilan Omar**, and **Mr. Kadri Cabas, and Mrs. Bano Afandi**, who always supported me lovingly and always had an open ear for my worries and problems.

A special thank you to **Mr. Christian Gerhus** from the Student Advisory Service at the University of Siegen for his complete support during my studies.

Without them the study would have been impossible for me.

Table of Contents

List of Figures

List of tables

List of abbreviations.

KS Knowledge Sharing.

KM Knowledge Management.

1. Abstract

The research objective of this thesis is to : 1) Understanding the phenomena of knowledge sharing in organizations. 2) And to understand the role of information technologies for sharing knowledge in companies? The research design for this work is based on the design science research methodology introduced by Vaishnavi and Kuechler (2008).

Awareness of the problem was done by by doing ethnography in a software company. Data was collected using ethnomethodology through shadowing and doing semi-structured interviews with the 8 employees from the consulting, sales, and Support and quality departments. Data was analyzed by thematic analysis after recording the interviews and taking the observations notes, they were transcribed, including the breaks, reactions, and emotions. The analysis led to the suggestion and definition of different facets and caveats of the knowledge sharing phenomenon which resulted in the prototyping of an interactive solution for knowledge sharing based on the Game theory that aims to improve the way knowledge is shared within the company, intending to reduce the wasted time and costs for an organization and enhancing the motivation of new employees during training.

2. Introduction

The adoption of technology for sharing knowledge or expertise across members of an organization can bring a big value and improvement to enterprises. Knowledge sharing technologies can support and enable innovative work practices, enhance processes, and have an impact on efficiency and productivity. Knowledge sharing technology should be viewed as a tool for learning that can lead to effective change and improved business performance. (Pollard and Hayne, 1998).

Von Krogh (1998) phrased that knowledge management refers to identifying and leveraging the collective knowledge in an organization to help the organization compete with other organizations. To comprehend the concept of knowledge management, we should first define the essence of knowledge which can be explained as, a fluid mix of framed experience, values, contextual information, and expert insight (Davenport and Prusak, 1998), A part of knowledge management process is knowledge sharing and transferring it to others, according to a division of the knowledge management process as created by Wong and Aspinwall (2004) into creating and acquiring, organizing, storing, transferring, sharing, using and applying.

Cummings (2004) stated "Knowledge sharing refers to the task to help others with knowledge, and to collaborate with others to solve problems, develop new ideas, or implement processes". Knowledge sharing is a process of exchanging knowledge and experience between employees and teams in an organization to supplement employees' knowledge with new, valuable, and useful knowledge in order to achieve personal and organizational goals (Yao, J.; Crupi, A.; Di Minin, A.; Zhang, X, 2020; Mirzaee, S.; Ghaffari, A 2018, Le, P.B.; Lei, H. 2019). Knowledge is shared using various channels, including discussions, conference networks, mentoring and training sessions, and databases (Yang, J.-T.2009; Michna, A. 2018; Kmieciak, R. 2019).

We can distinguish the importance of knowledge sharing technologies and how valuable they can be to enterprises, especially when the tools are used as knowledge management enablers. They are also the necessary building blocks in the improvement of the effectiveness of activities for knowledge management. (Ichijo et al., 1998; Stonehouse and Pemberton, 1999).

knowledge management enablers include the methods of knowledge management, organizational structure, corporate culture, information technology, people, and strategies, etc. (Bennett and Gabriel, 1999; Earl, 1997; Arthur Anderson Business Consulting, 1999; Arthur Anderson and APQC, 1996; Zack, 1999; Davenport, 1997; Long, 1997; Bose, 2004).

As Lee, S.M. and S. Hong (2002) said, when knowledge sharing is performed using a consistent knowledge management approach, it can help organizations achieve their strategy of enhancing their performance and capabilities effectively. Kowitlawakul et al. (2015), defined knowledge sharing impact in an organization also depends on specific factors and introducing new technology in the organizations also passes through the knowledge sharing system to penetrate the organization.

In this thesis we try to understand the phenomenon of KS in business organization, The following chapters of the thesis will lay the foundation of the relevant concepts in the literature review chapter, followed by the method chapter which introduces how the research was conducted empirically, then the result chapter presenting a design of an interactive system as a solution, followed by the conclusion chapter where the findings of this thesis are discussed.

3.1 Literature review

3.1 Knowledge sharing

Knowledge sharing is the act of making information accessible to others within the organization. Individuals in enterprises have always created and shared knowledge, therefore knowledge sharing was seen to be a natural function of the workplace, something that occurred by itself (Chakravarthy, Zaheer, and Zaheer, 1999). Making information available to others within the organization is also a form of knowledge sharing between individuals, where the process begins by transforming knowledge held by one person into a form that can be understood, absorbed, and used by others who receive that information.

As knowledge sharing enables the exchange of relevant experience and information among organizational members (Siemsen et al. 2007), we can see the important role that

KS plays on this level. According to Veber (2000) when he defined knowledge as a changing system with interactions among experience, skills, facts, relations, values, thinking processes and meanings. Knowledge sharing is as part of the knowledge management process, in which knowledge such as information, experience, and skills can be transferred from a person to another by learning.

As Hendriks (1999) confirmed knowledge sharing is important because it creates a bond between the individual and the organization by passing knowledge that exists in individuals to the organizational level, where it is transformed into economic and competitive value for the organization. Tiwana (2002) showed that knowledge sharing improves "orientation to tasks, vision and values, and strategy, collaborative team responsibility, process focus, stronger awareness of customer and competition, and decentralized decision making but consistent with corporate direction".

Nonaka and Takeuchi (1995) argued that firms cannot build knowledge without individuals. The ability of an organization to use its knowledge effectively depends to a large extent on its employees who actually create, share and use the knowledge, when people are ready to share their expertise and help others to build improve their knowledge only then knowledge can be leveraged. Eby (1997) phrased, companies depend on their experienced employees to import their knowledge to inexperienced employees. Cohen and Levinthal (1990) proposed that collaborations between individuals who own different types of knowledge enhance an organization's ability to innovate far beyond what any individual can achieve. This is because it allows them to discuss and think about certain topics, which can enhance the creation of new knowledge (Fernie, et al. 2003).

Knowledge can be shared in organizations by doing training or mentoring programs. Nonaka and Toyama (2003) said, training programs help increase exchanging of knowledge; however, team members generally felt that meeting more frequently and regularly could improve knowledge sharing. Mentoring programs enable senior members to assist juniors. However, the senior employees must be motivated to provide their knowledge and experience to the junior employees and newcomers (Von Krogh,1998).

Jeed (2008) argues that using Web 2.0 tools or social software within an organization increases knowledge sharing, innovation, and collaboration between the employees. As Levy (2009) the latest knowledge sharing technologies such as blogs, wikis, and other social media, collectively referred to as Web 2.0 technologies or Web 2.0 platforms. One

of these technologies, wikis have been reported in a wide range of fields such as software development, project management, technical support, sales and marketing, and research and development to effectively knowledge management (Kussmaul and Jack 2008).

These methods which were used, are strongly attached to the motivation of the trainee or trainer as Colquitt et, al. (2000) said „training motivation plays a vital role in determining the effectiveness of a training program ". According to Stenmark (2001), individuals are unlikely to share their knowledge without strong personal motivation.

Therefore, knowledge sharing between members of an organization may have some difficulties and automatically affect the organization's efficiency, there are barriers that may distort the knowledge exchange between individuals. These barriers can be relatively basic, such as barriers of space and time. But they can also be deeper, such as barriers of social distance, culture, and language, as well as differences in mental or conceptual frameworks (Vriens, 1998).

3.2 Game Theory

This thesis proposes that game theory can be used for knowledge sharing within organizations. To demonstrate the concepts behind this, following is first an introduction of the concept of game theory.

The game theory focuses on the outcome of people's strategies and analyzes situations in which the outcome of the individuals is mutually related (Brandenburger, Nalebuff, 1996). In game theory, individuals in a game compete and choose their strategies and courses of action without knowing the strategies chosen by the other players. (Anderson et al., 2012). This behavior is called rational behavior, in which a person thinks carefully before taking an action, considers the goals, context, and limits of his actions, and takes final action according to personal criteria to do what is best (Dixit and Skeath, 2004). The game theory was defined by Dixit and Skeath (1999), as the science of rational behavior in interactive situations.

To achieve knowledge sharing (KS), the process of KS must contain at least two main characters, a knowledge giver, and a knowledge receiver. Under the lens of game theory, the result of the KS process can take three scenarios; a win-win: when the knowledge giver successfully shares his knowledge and the knowledge receiver obtain it, win-lose: when the knowledge giver fully shares his knowledge, and the knowledge receiver

doesn't get the knowledge that he wants, or lose-lose situation: where knowledge receiver doesn't get the requested knowledge and the knowledge giver hides it. A game is played to win or lose which has the same three mentioned above scenarios. Some characteristics of knowledge sharing such as payoff can also be found in the structure of game theory according to Loebecke, Fenema, and Powell (1999).

In the knowledge sharing process, the knowledge giver must think of a strategy to give maximum knowledge to the other person, and the knowledge receiver must think of a strategy to get maximum knowledge from the other person. Dixit and Skeath (1999), have declared that the game theory provides a methodology to analyze games of strategy and to predict the outcomes. Also, the game theory has been used to analyze knowledge sharing among rival organizations (von Hippel, 1994; Schrader, 1990; Loebecke *et al*., 1999).

The concept of the game theory proposed by Loebbecke and Van Fenema extend Van Hippel's (1999) is that game theory can be used to approach knowledge sharing within organizations. Analysis of the sharing knowledge by introducing three additional dimensions: Synergy, Leverage, Use of 'received' knowledge may have a 'negative reverse-impact' (NRI) on the knowledge receiver.

Synergy is basically, the first needed step to apply the game theory in sharing knowledge, which is the cooperation between the knowledge giver and knowledge receiver to exchange knowledge.

Leverage is the knowledge receiver usage of the shared knowledge on an individual basis to add more value into it.

Use of 'received' knowledge may have a 'negative reverse-impact' (NRI) on the 'sending' party. NRI is the extent to which a receiver's use of the knowledge lowers the sender's original value. The exchanged knowledge may be used by competitors and thus weakens its value to the original owner.

3.3 Ethnography for data collection

To approach a wider understanding of workarounds in the lived everyday working praxis, the present study applied ethnographic methods of data collection.

Ethnography, emerging from anthropology, and adopted by sociologists, is a qualitative methodology that lends itself to the study of the beliefs, social interactions, and behaviors of small societies, involving participation and observation over a while, and the interpretation of the data collected (Denzin and Lincoln, 2011; Reeves, Kuper and Hodges, 2008; Berry, 2011). As a qualitative method ethnography makes for researchers to collect data related to social and cultural specialties of small groups with the way of observation, interview, and participation, and then interpret them (Naidoo, 2012). Therefore, the task of ethnographers is to document the culture, perspectives, and practices of the people in these settings. Hammersley (1985), or in (p152) The aim is to 'get inside the way each group of people sees the world.

Shadowing is a form of structured observation that aims to capture both behaviors and opinions (Mintzberg, 1970, 1999). It is mostly applied to get into the daily routine of the co-worker and to learn the process of work as soon as possible. Shadowing is not only sitting next to an employee at their desks and maybe looking and taking notes of how the work is getting done or attending meetings but taking every single step that the employee takes, moving around with him in the company to talk or catch up with other colleagues. Another ethnographic method besides shadowing that is used to collect data are formal and informal interviews. formal interviews follow a fixed format of set questions, Informal interviews can be by taking notes from a small conversation in between breaks like a coffee break or a lunch break or even in-between work tasks.

During the empirical phase of this thesis shadowing and interviews were conducted, due to my student job at the company the opportunity of shadowing the co-workers was possible in the working hours, but soon there were troubles continuing shadowing the co-workers, due to the covid pandemic so a different method to collect the data was adopted by doing semi-structured inter-views. Some of the interviews were done face-to-face others were done digital via Microsoft-Teams. In total, 8 employees were interviewed they were selected based on their role in the company (half of them shared their knowledge, and the other half were receiving it).

4. Method

4.1 Description of requirements according to DSR

The research design, which has been used in this bachelor thesis is based on the general methodology of design science research (DSR) by Vaishnavi and Kuechler (2008). The implementation of DSR has five steps, we used only the first three steps concerning the objectives of this research on the role of technology in knowledge management in a software company.

The following figure.1 shows the general design cycle of DSR by Vaishnavi and Kuechler (2008).

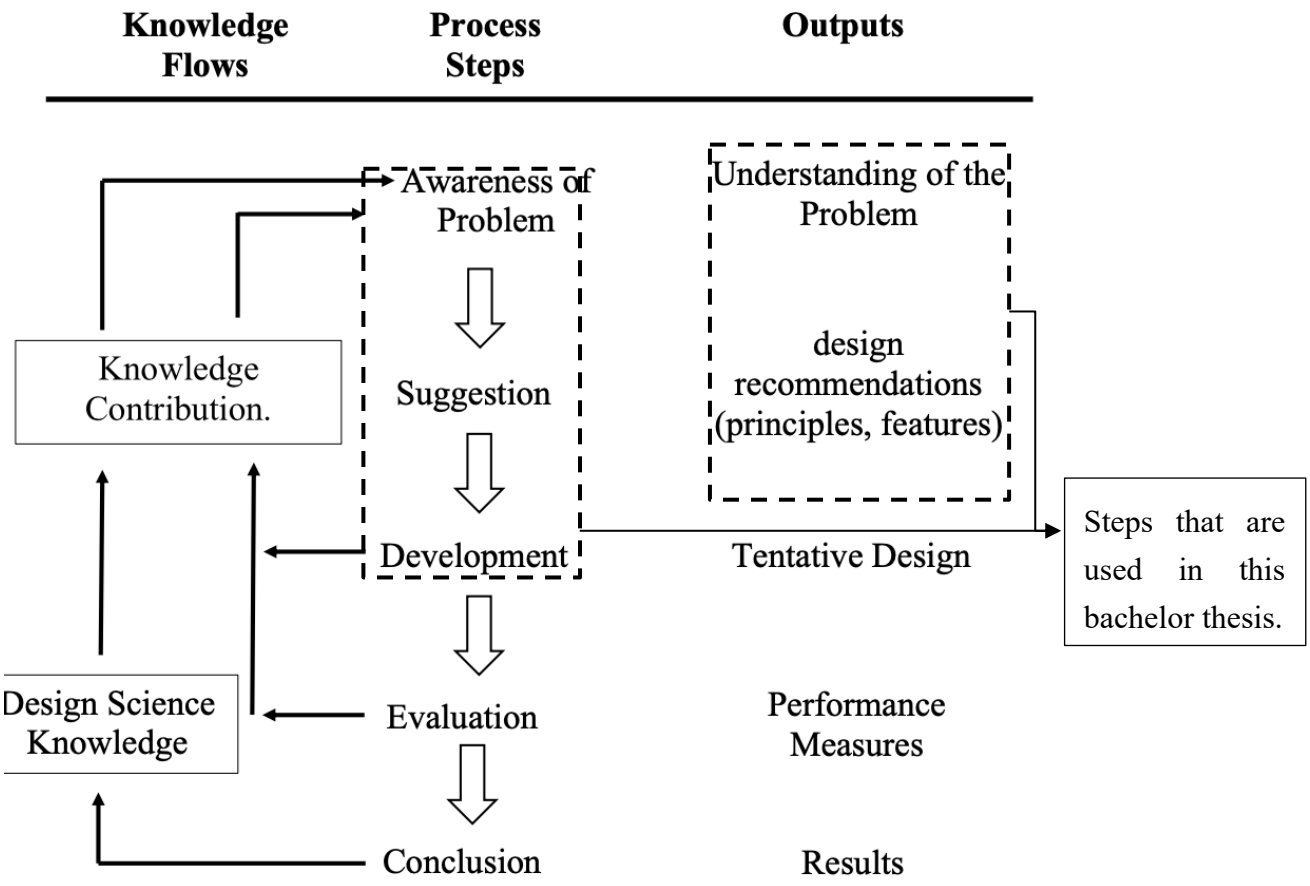


Figure 1. Design Science Research Process (Kuechler and Vaishnavi 2008)

The first process step of the research was done by collecting data from literature reviews and using ethnomethodlogies in a software company to understand the phenomena of knowledge sharing (KS) in organizations. Next, we reviewed the theory that should guide the design of an interactive solution that aims to improve the way knowledge is shared within the company, aiming to reduce the time waste and costs for an organization and enhance the motivation of new employees during training.

Following, the third step of the research process the "developing" section, we created guidelines for a prototype for an interactive solution which utilize the design principles and features guided by game theory and empirical analysis. This interactive solution contains a 3D figure which guides the KS process for the user as a gamified assistant.

4.2 Designing Interactive 3D Figure

4.2.1 Awareness of Problem

The process of knowledge sharing in the SME:

The collected data showed that the employees are currently using the following methods in the company to share their knowledge with the new employees: Mentoring and e-learning platform, in which the process of knowledge sharing (KS) takes several steps, and the new employee gets to learn the basics about the product by reading documentation about it from the company's e-learning platform and then getting a small quiz with some basic questions about it, next they join several meetings where their mentor is doing the presentations or consulting hours with the customers, to learn how to properly present the product. In case they come across some difficulties or has questions during their learning phase they should get back to their mentor to get the answers, first checking the availability of their mentor, if they have a customer meeting or if they are free.

Data collection and analysis:

The information collected in the first phase is used to define the problem, its scope, and boundaries. The data for this study was collected over almost 3 months in a software-based German company, with 85 employees. During the data-collection phase observation as Madden (2017) defined, requires researchers to take an active role in the tasks performed by interlocutors and to immerse themselves in the group or social setting under

investigation over a long period, and semi-structured interviews. Bryman and Bell, (2007); Saunders et al., (2009) suggest the flexibility and comparability of semi-structured interviews can help the interviewer to concentrate on the main objectives of the interview, these methods were used with several employees from different work departments from the company, in which knowledge was frequently being shared to new employees.

This thesis is based on data collected during the field research, including 96 hours of shadowing and around 4 hours of recorded interview material. The following figure shows the methods that have been used in this thesis to collect data (Figure 2).

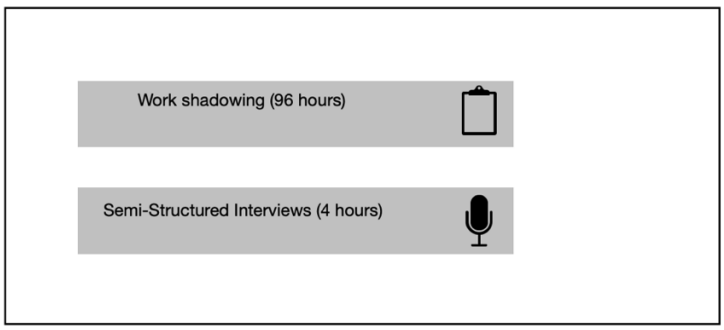


Figure 2. Data collecting methods.

The observation was done by shadowing an employee that was leaving the company from the consulting and support department. The employee was shadowed before and during his process of sharing knowledge with the new employee. I also shadowed employees from the sales and development department through their daily work routine, with a range of 6 hours a day and 4 days a week. During the process, notes were collected. As Pickering (1992) said, Shadowing entails a researcher closely following a subject over a while to investigate what people do during their everyday lives, not what their roles dictate of them.

The interviews were based on the following questions:

1) Interviewee introduction.

2) some general questions.

3) questions about the employee, their task, and their role in the company.

4) What is the current process of sharing knowledge?

5) What kind of knowledge is being shared?

6) What are the difficulties during the process of knowledge sharing?

7) What are the reasons for these difficulties?

8) What would help you avoid these difficulties?

9) Do you think technology would help you avoid these difficulties? When yes can you give maybe explain how?

The following table (1) shows the details about the participants in the interviews.

Interview partner	Role in the company	Experience	Role in the knowledge transfer process.	Gender	Age	Interview duration
Partner 1	Support and quality	8 years	Knowledge giver.	M	32	28 minutes
Partner 2	Support and quality	1 year	Knowledge receiver.	M	35	25 minutes
Partner 3	Field Sales	10 years	Knowledge giver.	M	30	30 minutes
Partner 4	Field Sales	6 months	Knowledge receiver.	M	27	30 minutes
Partner 5	Developer	12 years	Knowledge giver.	M	32	27 minutes
Partner 6	Developer	7 years	Knowledge receiver.	M	36	30 minutes
Partner 7	Consulting	8 years	Knowledge giver.	M	38	29 minutes
Partner 8	Consulting	2 years	Knowledge receiver.	M	29	26 minutes

Table 1: details about the interview Partners.

After recording the interviews, they were transcribed including the speech notations like pauses, reactions, and emotions, such as laughing and special intonations explicitly transcribed. The interview duration was on average 25-30 minutes and were transcribed after

that. Subsequently, the transcripts were analyzed to understand the difficulties that the employees are facing during the process of KS and the opportunities to suggest an interactive platform facilitating KS. A small discussion explaining the objective of this research was conducted with the interview partners, which was not recorded as a part of the interviews, and it was done shortly before or after it. Next, a software called "MAXQDA" was used to code the transcribed interviews and observation notes. The first step in data analysis was reading the transcribed data to get an overview of statements that were potentially appropriate for the theoretical questions (Locke 2001).

Following, the transcribed data was categorized to extract the most important data from it, to extract the requirements. The gathered data material gets structured and clustered in a three-step approach. First, in a first-order analysis based on the interviewers' ideas and statements three categories: (1) the way knowledge is being shared, (2) the difficulties in the process of sharing knowledge, (3) technological suggestions to improve the process of knowledge sharing in the company. Next, the goal was to identify similarities and relationships between first-order analysis, and so-called second-order themes. Finally, in the last step, the second-order themes were joined to define a solution to improve the current process of knowledge sharing in some departments. Subsequently, design principles based on current literature findings and followed the guidelines of the game-theoretic model.

Categories	Subthemes	Description	Example
the way knowledge is being shared.	-joining meetings. -Awareness of the subject.	This code subsumes phrases that relate to a general awareness of how knowledge is being shared between co-workers in a certain department.	"I would say that the way we are using is an old method in which the new employee or the one how is getting the knowledge is shadowing the expert in the field during his working hours."

the difficulties in the process of sharing knowledge.	-lack of motivation. -time pressure on the seniors. -traditional knowledge sharing process.	This code subsumes phrases that relate to the fact that the current used method in the organization is causing waste of time.	"Often I need to repeat the same stuff over and over again to the guy how is receiving the knowledge and this cause waste of my and the company's time."
Technological suggestions to improve the process of knowledge sharing in the SME.	-improving the company's e-learning platform. - combining interactivity to the platform.	This code subsumes phrases that relate to a digital solution as a method of knowledge sharing.	"A solution that can combine both human and technologies at the same time to reach a better and more effective process of sharing knowledge is needed."

Table (2): Coding scheme with categories and examples.

4.2.2 Suggestion: Requirements, Design Principles, and Design Features

This thesis analyses the process of knowledge sharing (KS) between members in software-based company using a game-theoretic model (synergy, leverage and use of received knowledge) to identify the requirements and design principles for an interactive solution in the KS process. Based on game theory, individual rationality may lead to collective irrationality (Kollock, 1999).

As a beginning for our design, the analysis of the interviews and observation notes have shown that, new employees are facing lack of motivation to receive new knowledge with the used process of knowledge sharing, which means there is a weak synergy and strong leverage.

As interview partner 1 mentioned in the interview, see table (2):

"The motivation of new employees using their knowledge is usually higher than their motivation during the learning process, they just want to jump into the praxis"

Or as interview partner 4 said:

"I can't wait to use what I learned with our customers"

Therefore, the main requirements to improve the KS process in the company were identified based on those analysis: the need to improve the e-learning company's platform to enhance the willing of knowledge sharing and self-learning (REQ1), reducing expertise time-wasting by involving more technology in the process (REQ2).

As interview partner 3 mentioned in the interview:

"I think something should be done, the process of sharing knowledge should be improved, bringing the e-learning platform to the next level for example"

Or as interview partner 7 said:

"The company's e-learning platform should bring new employee's knowledge to a higher level, where a senior doesn't have to waste his time explaining about the simple things about the product."

Interactive systems can improve knowledge sharing and fasten the learning process. In this regard, interactive systems that enable information to pass from the user to the system and other ways around, have shown to have a positive impact on engagement (Amershi et al. 2014; Calma et al. 2016). As interactive technologies continue to transform the nature of communication by increasingly erasing the boundaries between source and receiver (Sundar et al., 2013).

the limitation of the current way knowledge is being shared among employees using the e-learning platform in the company, and the need to enhance the employee's willing of exchanging knowledge and learning. Therefore, the first design principle (DP1) was phrased: (DP1) integrating a 3D interactive figure to the e-learning platform, that interacts with the user to make the process of learning enthusiastic and incentive.

Reducing expertise time-wasting by involving more technology in the process (REQ2), This is another reason of weak synergy between the employees. Therefore, a second design principle (DP2) was articulated: (DP2) the 3D interactive figure should guide the users in the KS process by replacing the senior employee's task, bringing the user's knowledge to the required level. Responsive systems have shown to positively influence the user's perception of the system (Sundar et al. 2003).

Design Principles	**Design Features**

DP1: integrating a 3D interactive figure to the SME's e-learning platform, that interacts with the user to make the process enthusiastic and incentive.	DF1: the e-learning platform should support visualizing of 3D graphics on the web. DF2: varied levels of learning process. DF3: Physical actions to be led to the objects of interest.
DP2: the 3D interactive figure should guide the users in the KS process replacing the senior employee's task, bringing user's knowledge to the required level.	DF4: Fast operating system which is reversible to apply immediate visibility. DF5: Immediate system reactions to user input.

Table 3: Design Principles and Design Features

Finally, the design principles (DPs) were translated into design features (DF), which can be applied in a prototype. (DF1) the e-learning platform should support visualizing 3D graphics on the web. the platform should be able to realistic a 3D figure to make the learning process for the user more attractive. (DF2) diverse levels of the learning process. This means, that the platform should contain multiple learning ways such as (asking questions or taking a small quiz) through the different learning levels. (DF3) Physical actions to be led to the objects of interest. The SME's e-learning platform should support physical actions such as clicking, the 3D figure should show and accompany the user by showing him the next step in the learning phase based on where the user clicks.

In addition, (DF4) changes proposed by users should be immediately visible on the objects of interest. This means that the original 3D figure should be updated instantly to match the inserted user input. In addition, users should be able to undo their input at any time. In (DF5) The system should respond immediately to any user input to show him, that the system has successfully received the input. So, in our context, the 3D figure should respond directly to any click or any inserted chat response from the user.

4.2.3 Development

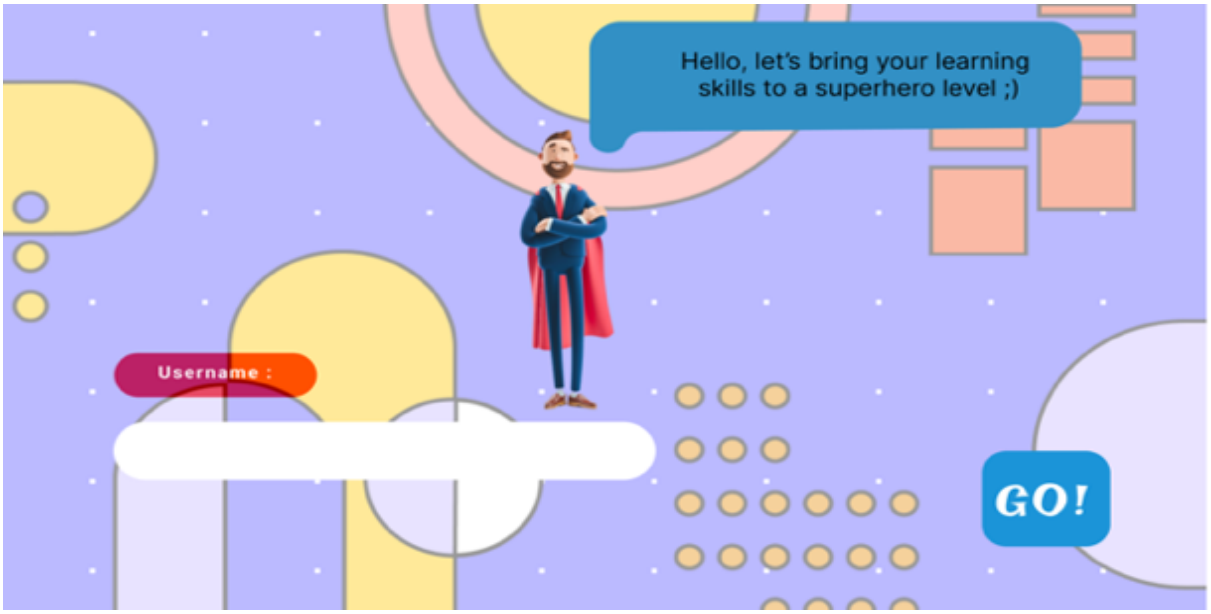
In this section, we wrote a simple guideline about the function of the system. The 3D-interactive figure-based solution was inspired after analyzing several interviews and observation notes with the employees that used the company's e-learning platform.

The system should be connected to the knowledge database and the learning system of the company. The user will have the ability to communicate with the system by chatting by clicking on the keyword suggestions from the system letting the user choose the learning topic, the 3D interactive figure will absorb and filter the information from the database and push it as a response to the user's input. The core functionality of the 3D figure is to accompany the user to show him where to click and what to do and ask him about the content, to improve and fasten his learning process. The learning process should contain several steps to make the process multifaceted.

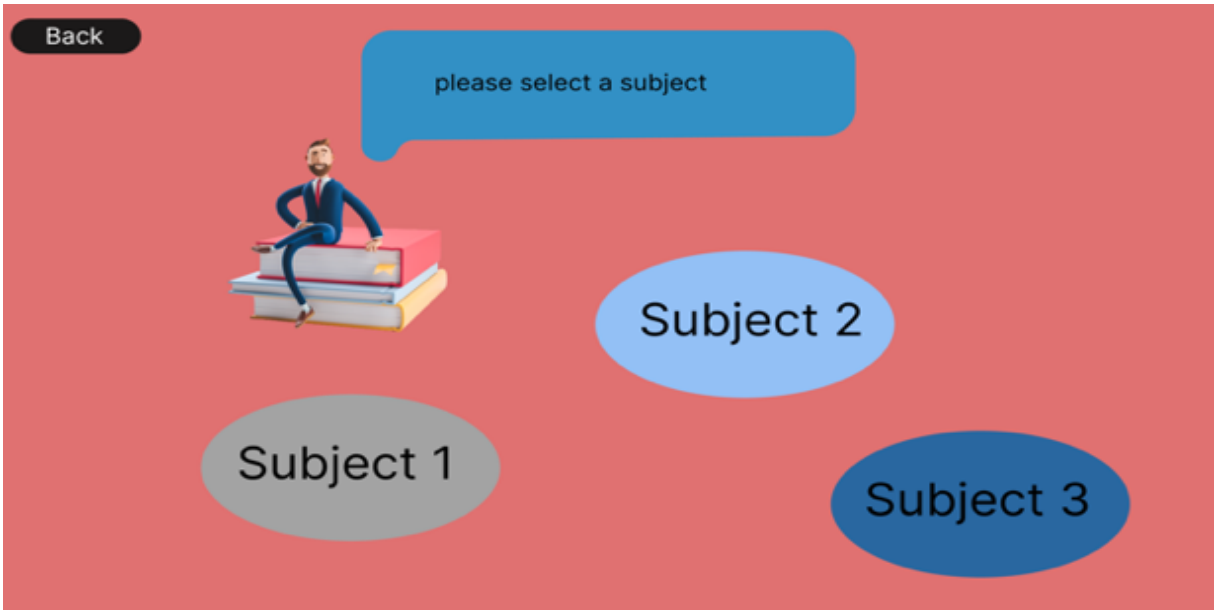
5. Result

A design of an interactive 3D development system is suggested in this thesis to enhance new employees' motivation during their learning and training processes. Afterward, we derived four DFs and submitted a guideline about the functionality of the system to function properly. After analyzing the interviews with the new employees from the company, involving an interactive technological system was needed to bring the KS up to a certain level among the members of an organization in some departments.

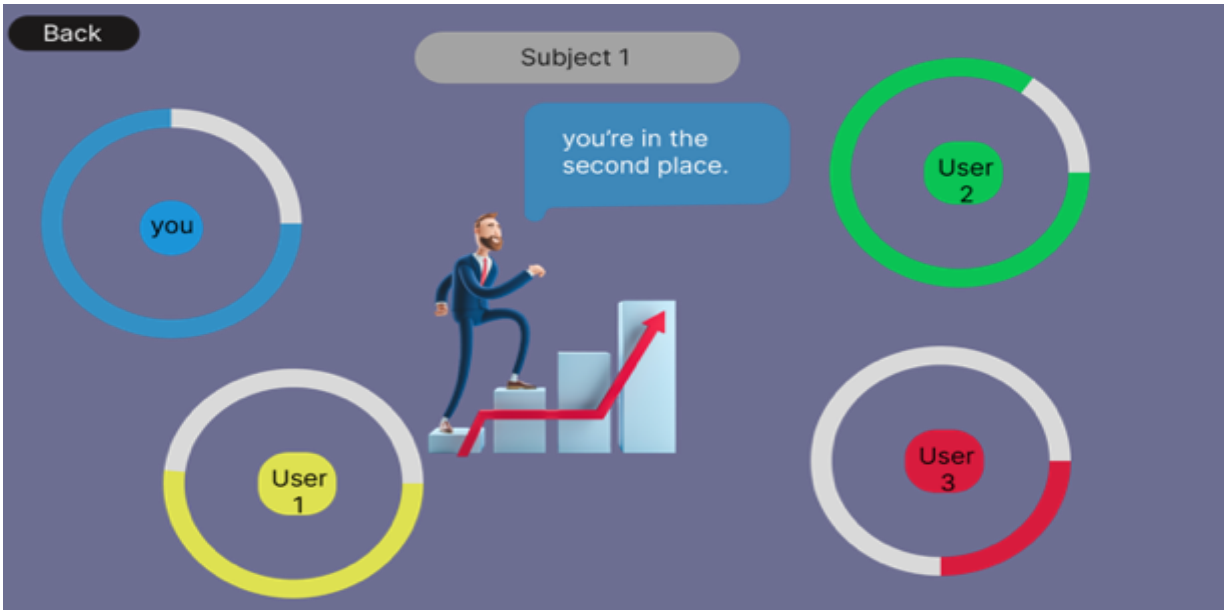
Design circle 1:



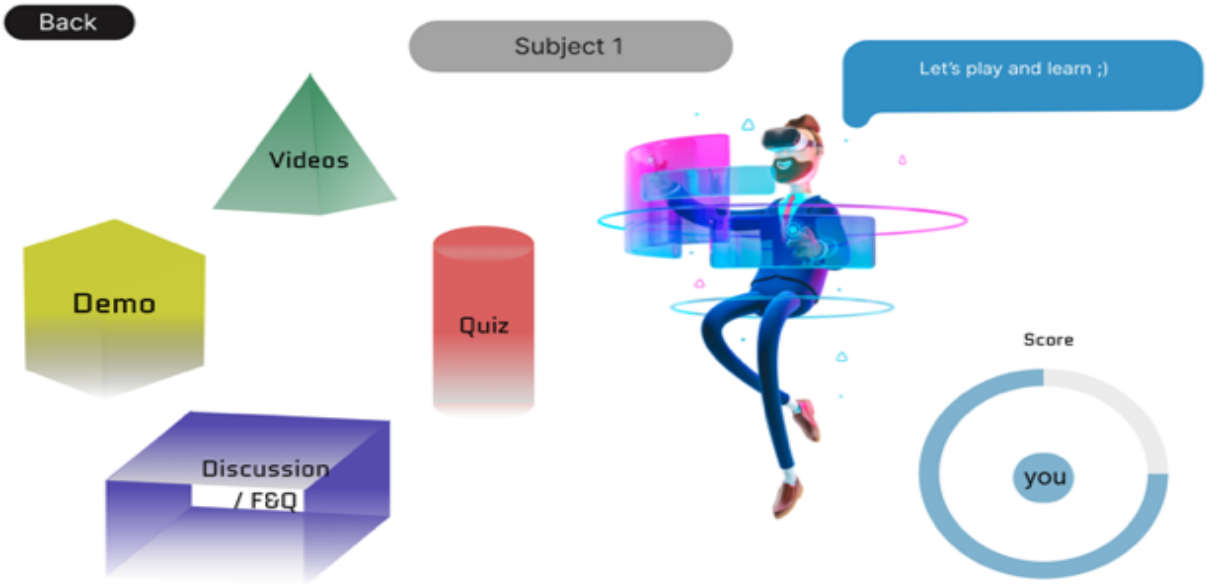
Screen (1)



Screen (2)



Screen (3)

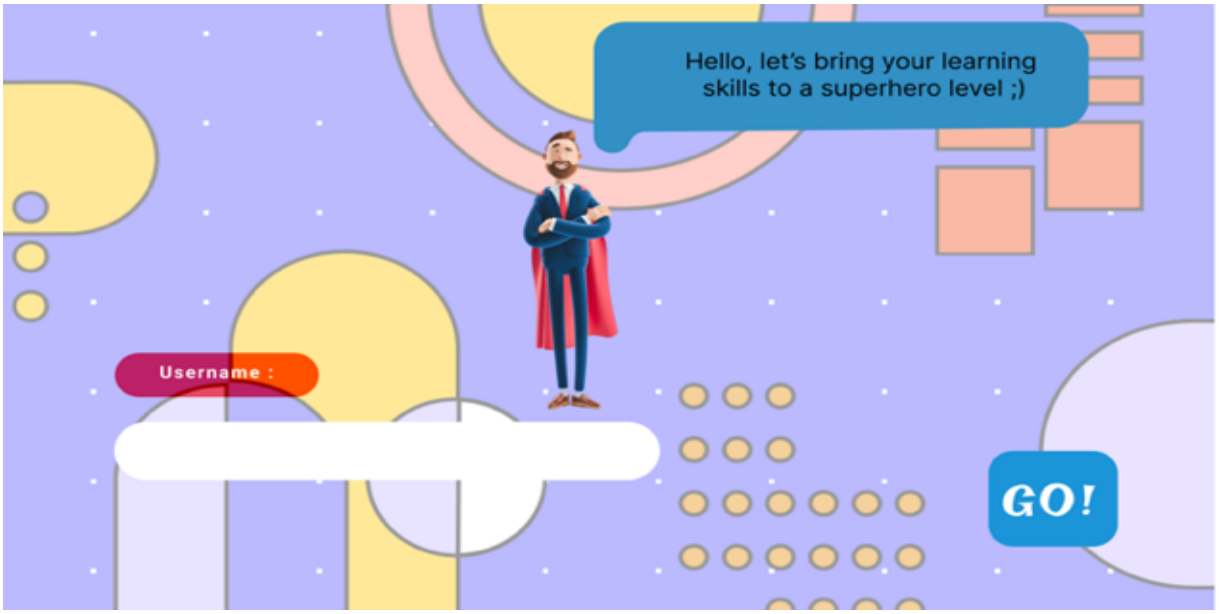


Screen (4)

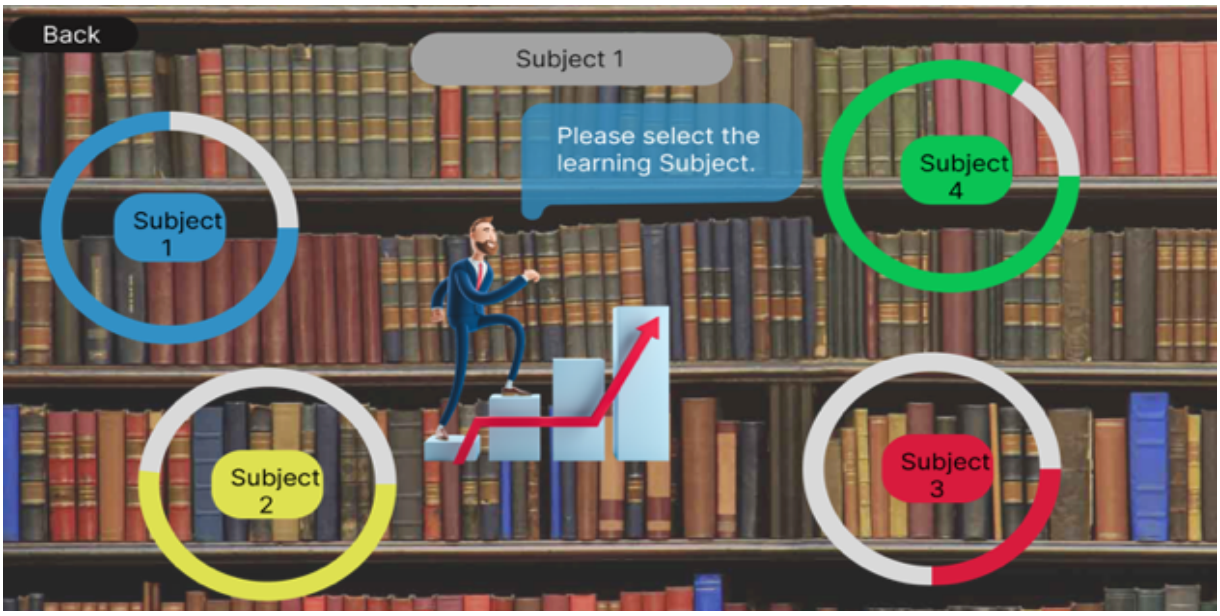
The 3D-figure will ask the user to first login with his username and then klick the “Go” button to jump into the learning system, then he would be asked to select the subject that he would like to learn about, afterwards a dashboard would show him his score and compare it with other users, then by clicking on his score he would jump to a different screen where he have the choice to choose one of the suggested learning method (watching a video on the subject, taking a demonstration tour on the system, taking a quiz or the choice to see the most asked question and answers on the topic).

After getting feedback from the supervisor, the design was changed which leads us to design circle 2.

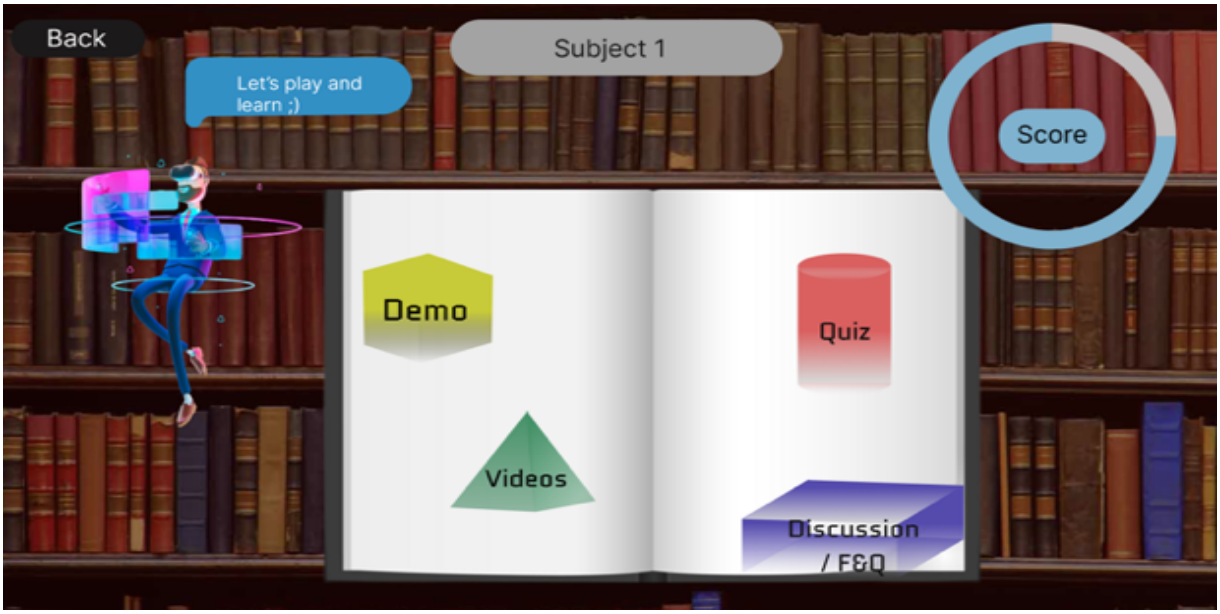
Design circle 2:



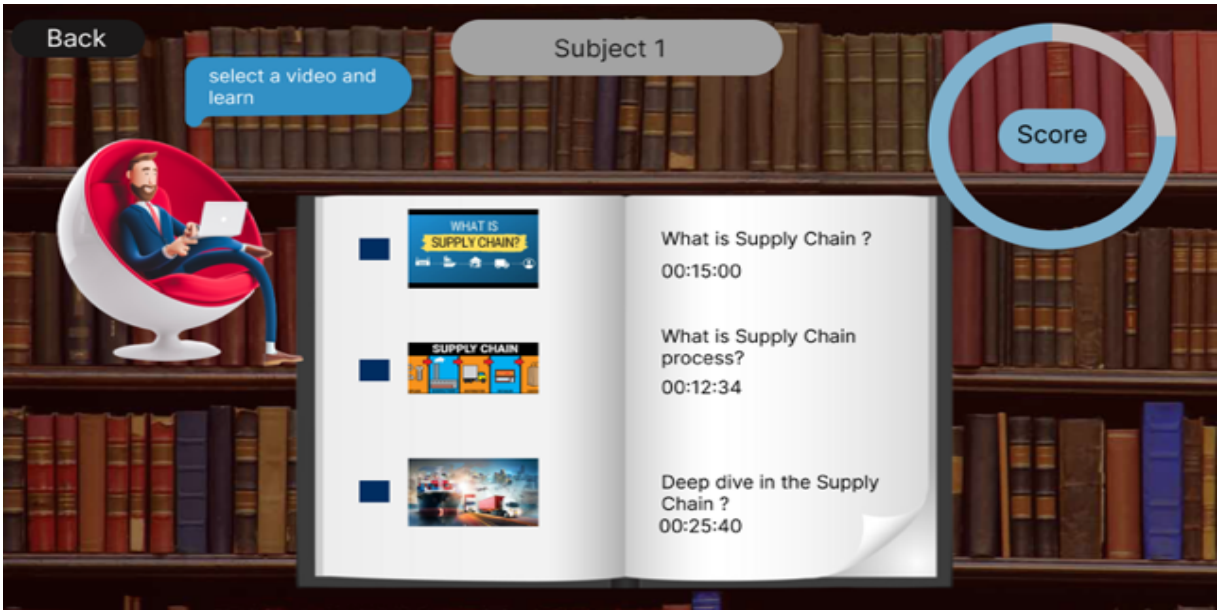
Screen (1)



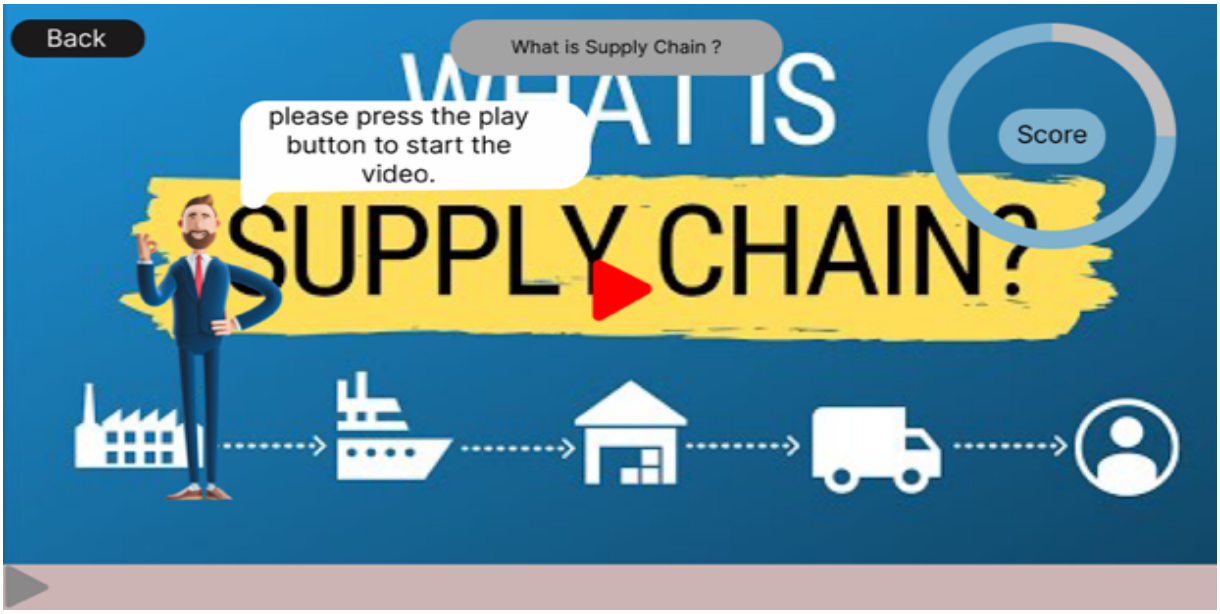
Screen (2)



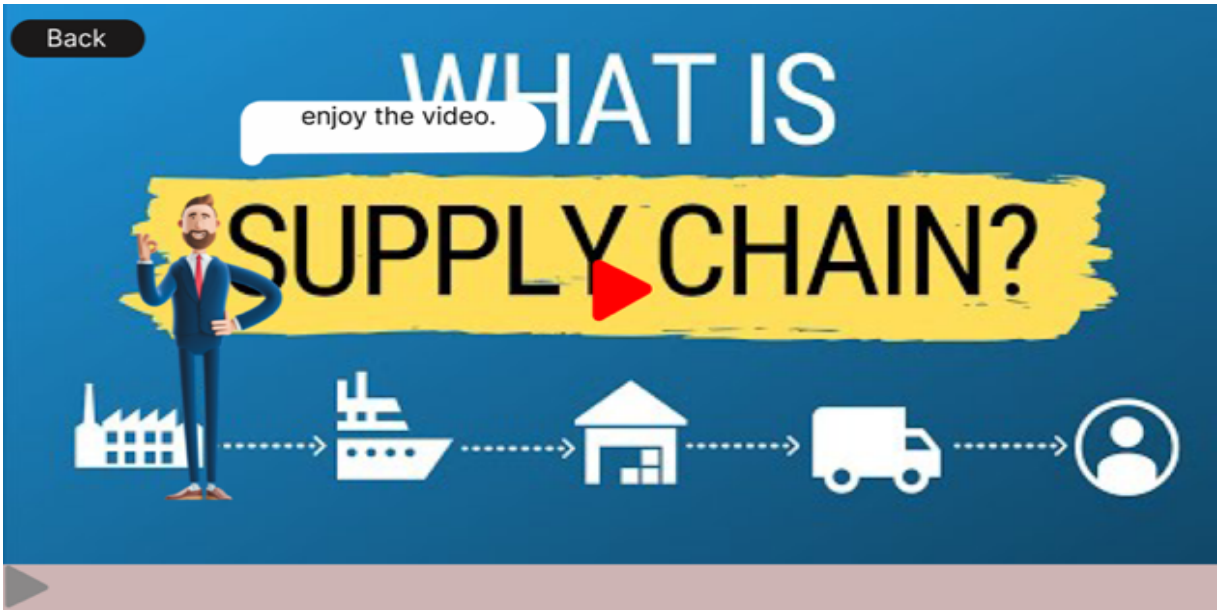
Screen (3)



Screen (4)



Screen (5)

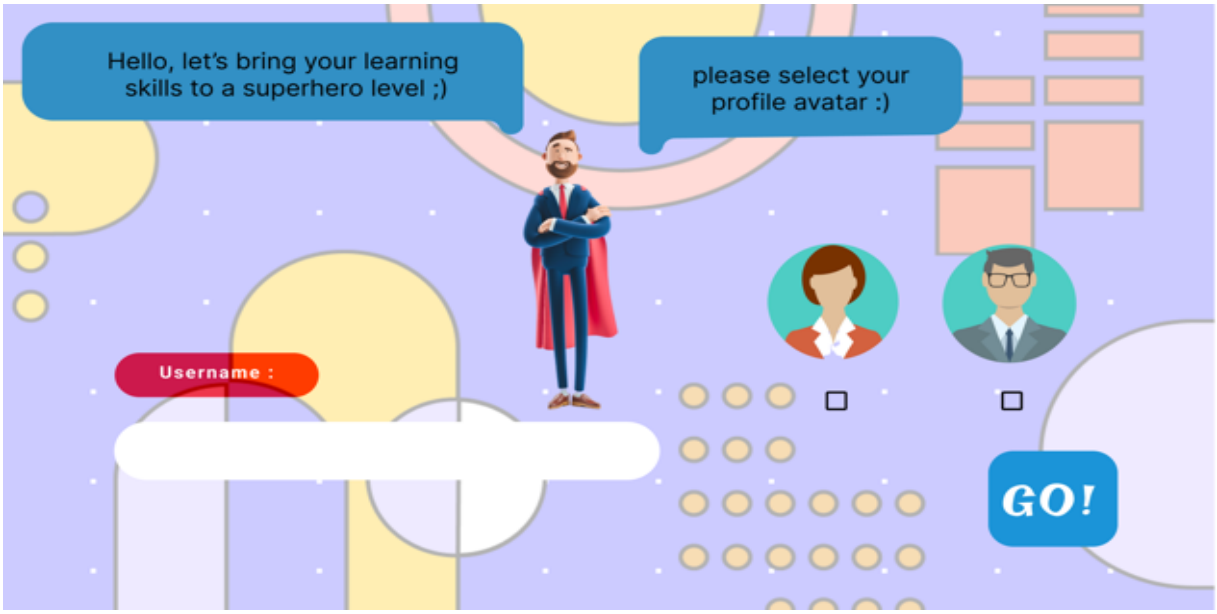


Screen (6)

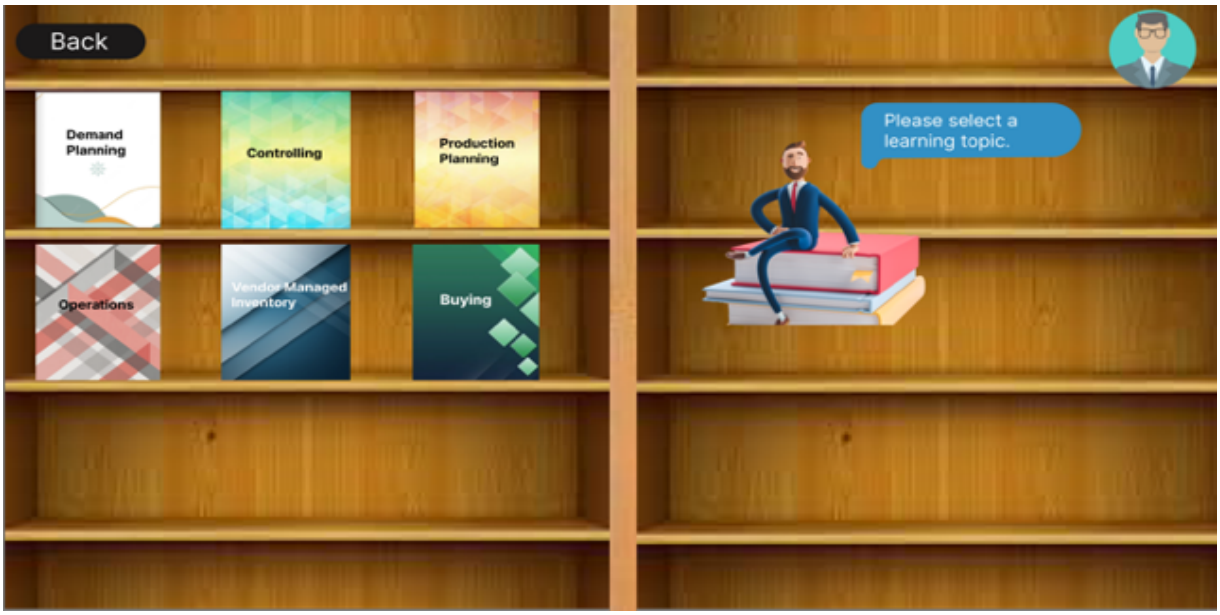
Like in the first design the 3D-figure will ask the user to login with his username and the click the "Go" button to get in the system, then the system will show the user his score based on the subjects, by clicking on one of the subjects the 3D-figure will ask the user to select one of the suggested learnings methods by choosing the Video method as shown in screen (4), the user will have the possibility to choose one of the topics and watch the video.

After getting feedback from the supervisor for the second time, the design was changed which leads us to the last design circle.

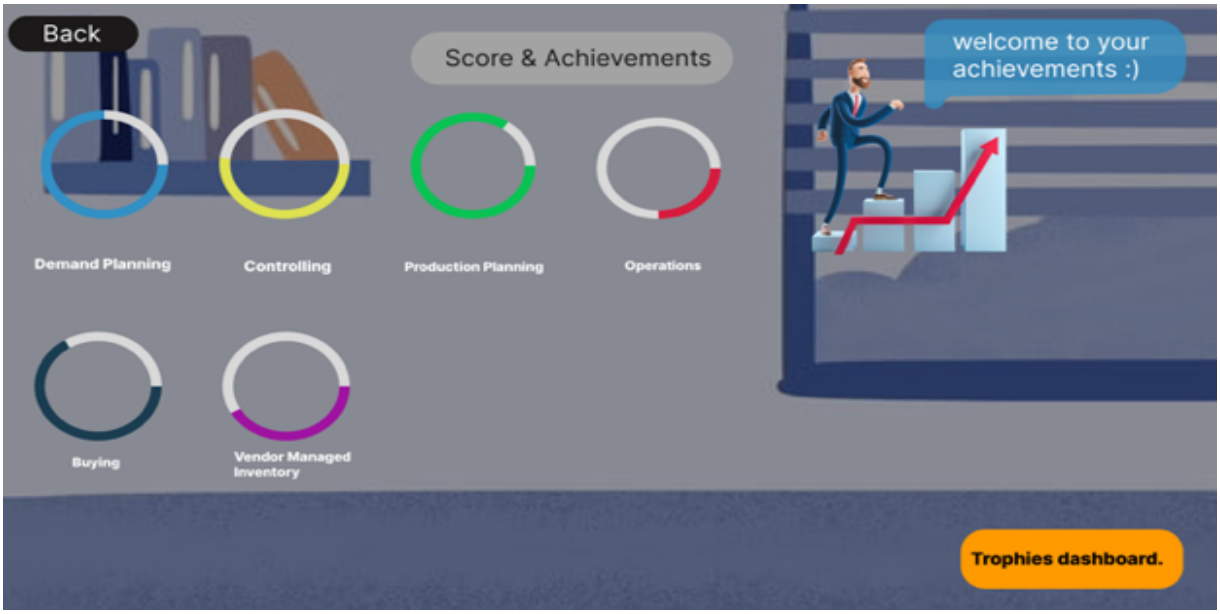
Design circle 3:



Screen (1)

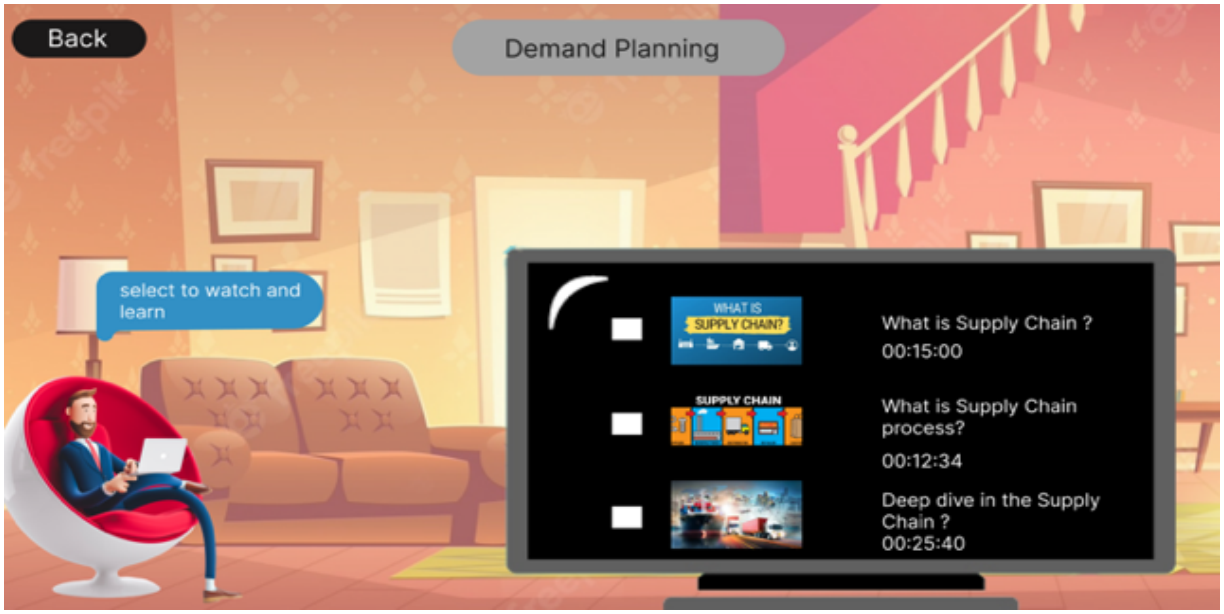


Screen (2)

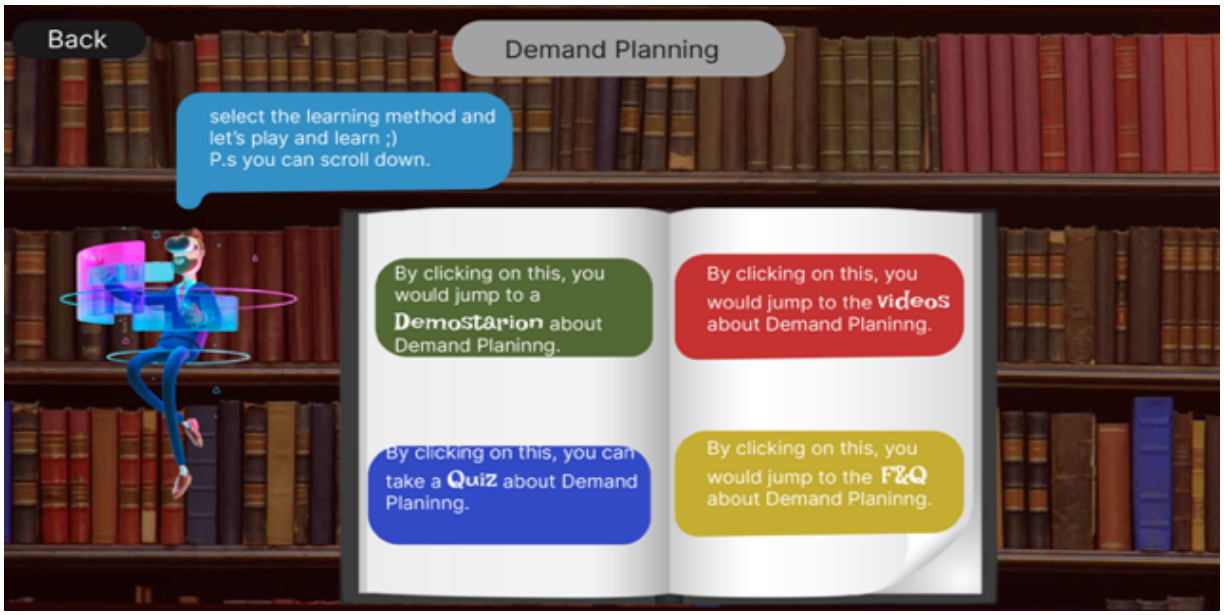


Screen (3)

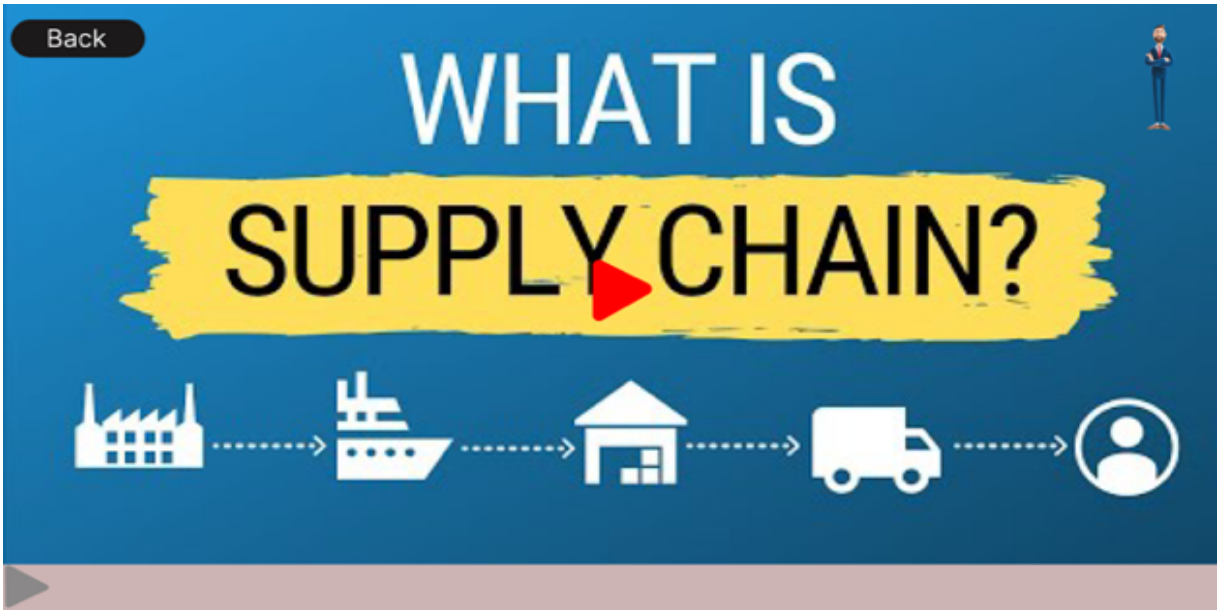
Screen (4)



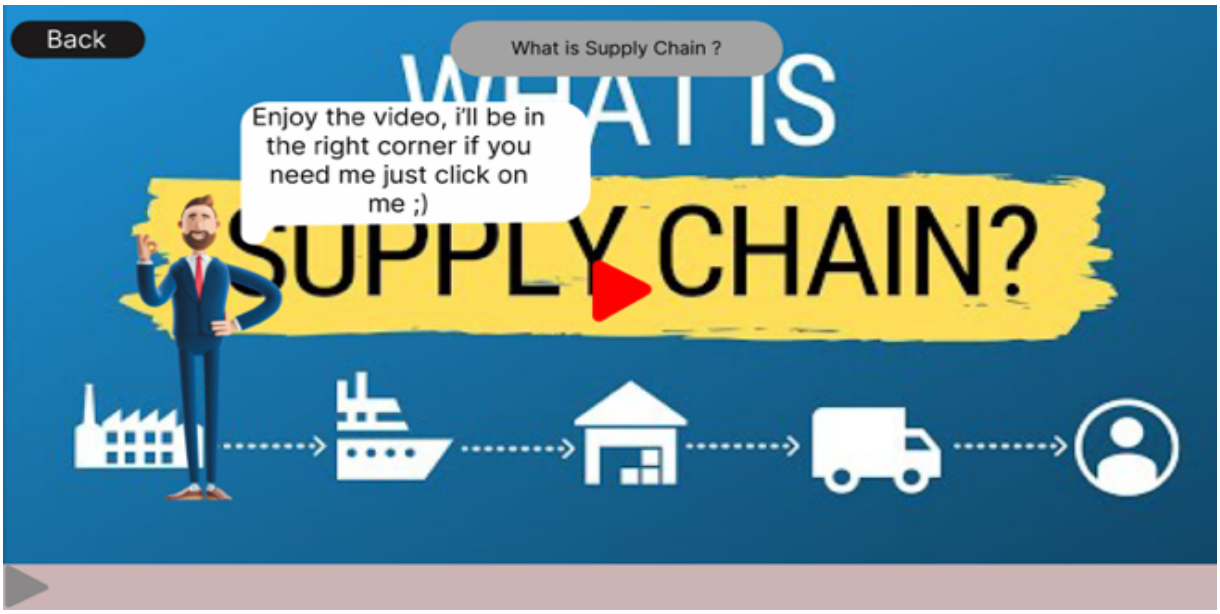
Screen (5)



Screen (6)



Screen (7)



Screen (8)

Like in the first two design circles in the beginning the 3D-figure will ask the user to login with his username and choose an avatar icon to select for his profile, then to click the "Go" button to jump into the system, then he will see a library with different learning subjects, by clicking on the profile icon the system will show the user his score based on the subjects and can jump to a page where his trophies based on the learned knowledge

level to each topic are collected, by clicking on one of the learning subjects in the second screen, the 3D-figure will ask the user to select one of the suggested learnings methods by choosing the Video method as shown in screen (4), the user will have the possibility to choose one of the topics and watch a video about it, in the whole process the 3D-figure is appeared on the screen and ready to interact just by clicking on it.

6. Conclusion

This paper has aimed to answer two main research questions: (1) Understanding the phenomena of knowledge sharing in organizations. And (2) What is the role of technologies for sharing knowledge in companies?

After getting feedback from the support and quality, and sales department employees the interview analysis showed that the employees were supporting the idea of an interactive knowledge sharing system, the fact that the usage of an interactive system to share knowledge and learn can enhance the speed of the process and bring the employee to the required level of knowledge in a learning-by-doing process, as Lalmas et al. (2014) stated, this demonstrates that interactivity enhances users' interest and encourages them to interact with the system for longer and in greater detail.

On the other hand, this study comes with limitations, the feedback from the employees in the consulting and development department, showed that the new employees would rather shadow their mentor during the training phase to learn directly from their experience. After discussing the idea of merging the interactive system to learn from it with the senior consultant, it showed the limitation of the system in general. The senior consultants were positive that the new employees can only learn to a certain level from the system which is not enough based on the different cases that they face with the customers, afterwards they expressed that in the process it is necessary to have a senior consultant to shadow through his daily work life to learn directly from him. Therefore, this allows future research to find a solution on how it is possible to benefit from merging such a system in every department of an organization.

After analyzing knowledge sharing in different departments of the organization, the findings of this paper suggests that in SMEs in the software sector, technology can be a great help to share the knowledge between members in some departments, in other departments sharing knowledge can be limited with the help of technology. Therefore, this paper

proposed two DPs for the design of an interactive 3D development system as a suggestion to use technology to share the knowledge between members of an organization.

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