

Supporting Co-Design using Design Thinking Business Networks

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Abstract

Knowledge sharing and management is becoming increasingly important in complex environments where business networks work on joint projects or supply chains. Such environments are characterized by continuous change requires knowledge workers to continually propose new solutions and search and develop knowledge to support these solutions. This new knowledge often comes from externally, or from business partners and must be shared in flexible ways. This paper develops a model for gathering and sharing of knowledge using tools that lead to innovative outcomes. It develops a metamodel that allows dynamic reconfiguration of systems, while reassigning knowledge processing functions to meet emerging needs. The paper then illustrates a prototype for implementing the model on the cloud.

Keywords: Knowledge Sharing, Business Networks, Design Thinking.

1. Introduction:

Our aim is to develop a model and a prototype implementation on the cloud to support co-design within business networks in complex environments. Business networks [1] have an increasingly dominant role in complex environments. Businesses contribute the success through these networks by many ways. One way is through knowledge sharing, another is through collaboration that brings knowledge together to create new products and services by combining ideas from different businesses. Such environments call for businesses to respond in innovative ways to continuous change. The proposed model provides ways to create new activities that will assist businesses to quickly to respond to change by providing design thinking tools to facilitate the innovation needed to respond to such change. Such business and business units can then adapt flexibly and quickly to share and analyze knowledge to respond to emergence business needs.

The emphasis in the emerging networks is towards services rather than software applications. Such services support collaboration that leads to innovative outcomes. Furthermore the services need to be generic and reconfigurable as knowledge needs cannot be anticipated in today's dynamic environment. Consequently a flexible approach is needed where knowledge flows and responsibilities [2, 3] can be easily changed without the need to reprogram the systems. A typical scenario may be a new partner entering a network, decisions to develop new products and services that require new expertise, or simply improving workflows. Each of these not only brings in new knowledge but often also requires the

rearrangement of responsibility for processing the knowledge. Networks also exist within businesses where different business units network to create new products and services for business clients.

Traditional knowledge management systems have limited ability to support innovation. Knowledge Management (KM) systems does not serve more than storage of information. That is because the KM systems are designed by the same way of designing and implementing the information systems ([4], [5] and [6]). These systems also overlook the social interaction needed for innovation, where it is important for people to exchange information and knowledge to create innovative outcomes. These traditional systems cannot support the social interaction needed for innovation. Other methods such as design thinking techniques are now used to find out solutions to this kind of problems. That provides businesses with the self-organization feature. Self-organization [7] is the property that is related to adaptation in the complex systems. This paper describes a way to combine design thinking and knowledge management within environments that supports the self-organization needed for innovation.

The paper begins by describing design thinking. It then follows by showing how design thinking tools are integrated into the model and implemented in ways that support flexible use.

2. Design Thinking:

Design thinking is becoming increasingly popular within businesses and organizations, which have been shown to benefit from following and applying design thinking procedures and strategies in design process [8]. Design thinking is defined as [8] “a way of thinking which leads to transformation, evolution and innovation, to new forms of living and to new ways of managing business”. Most new products and services are designed collaboratively and implemented across different business units [9]. Such success requires sharing of knowledge in terms of ideas, skills, experiences and views. Du et al. [9] report that there is a lack of software tools to support design thinking.

In this paper we propose a generic model for integrating knowledge sharing and design thinking in complex business networks. In this model we consider design thinking activities as it is one way that is followed to solve wicked problems in complex business environments these days.

Our model is based on the model developed by d-school of Hasso-Plattner-Institute at University of Potsdam in Germany (Fig.1.) and at Stanford University.

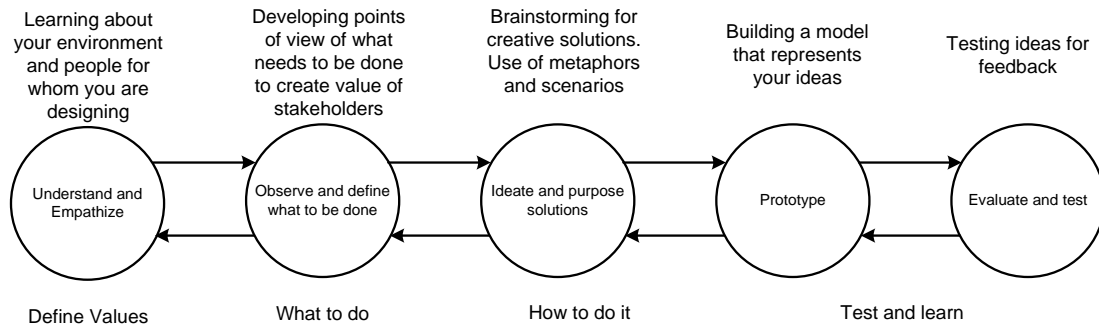


Fig .1. Design Thinking stages as derived from Hasso-Plattner Model

Here we define our method to implement design thinking by four major activities:

Phase 1: Identifying problems and creative ideas to approach them.

Phase 2: Identifying innovative business model to put idea into practice.

Phase 3: Organizing to implement the business model and

Phase 4: Implementing the business model using existing technologies.

In this paper we focus on phase 1. Our design thinking process and associated tools for phase 1 are shown in Fig.2. It begins by finding out stakeholder values, empathizing with them and finding out their points of view and needs. This is followed by identifying the major themes of what to do and often a vision of where we want to be. Design thinking also provides a large number of creativity-centered tools to identify problems and propose solutions. Phase 1 includes tools for:

- gathering stories and identifying stakeholders,
- developing persona empathy maps, and
- using Lotus Blossom to organize design into themes.

We then use information gathered here to develop a vision and the business intent to realize the vision.

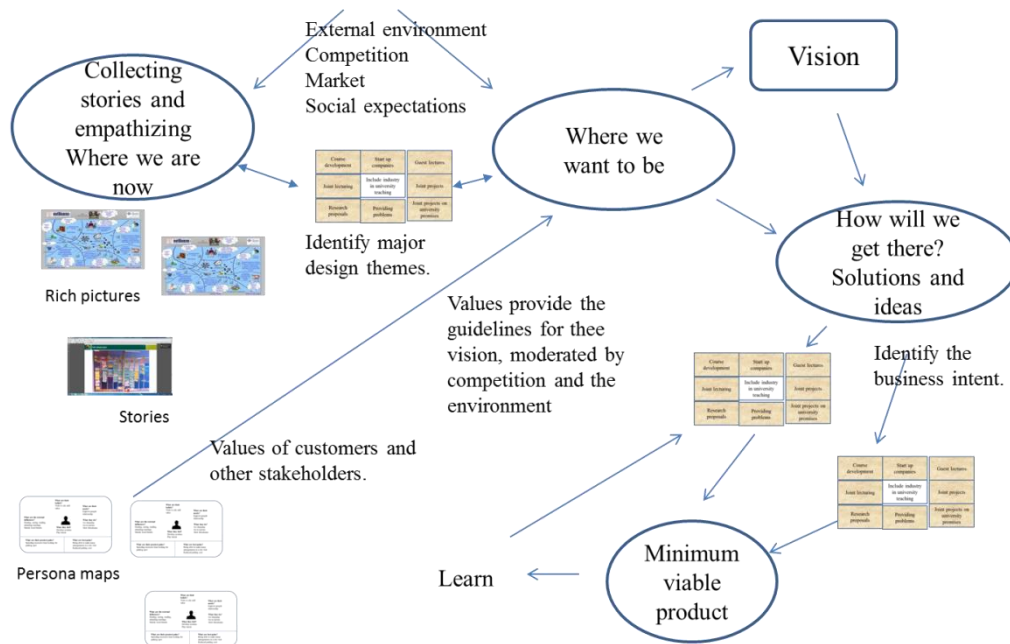


Fig. 2. The design thinking process

The next step of the design is to use the knowledge gathered to propose solutions. We use Lotus Blossom for this purpose. We begin to expand and make sense of the discussions, to identifying the main design themes seen as relevant by stakeholders. These are shown as boxes adjacent to the main issue, as for example the allocation policy or unit management. Each of these can in turn be expanded as their own blossom. As this occurs problems begin to be identified and solutions proposed based on combining the solution fragments from different blossoms.

3. A Model for Co-Design Process :

Fig.3 shows the model for implementation. Here coordinators are assigned by businesses to create activities through which people in the business work together to generate new ideas. The major model constructs are:

- Activity: activity includes group of tasks to be implemented in order to provide the activity deliverables [10]. Example: brainstorming for ideas to develop new service. By implementing the activity each organization works to a common goal and share all knowledge resources in the activity. Each activity has a number of tasks and roles are assigned to each task. People are assigned to the tasks and roles.
- Task: tasks are breakdowns of the activity. Example: collecting information about the similar services in the market. Each task assigned to one or more users. Each task carries out some design thinking activity and is provided with tools needed by this activity.
- Space: the space in our model it is just a kind of grouping a number of activities together. This grouping can be according to a specific project for example.

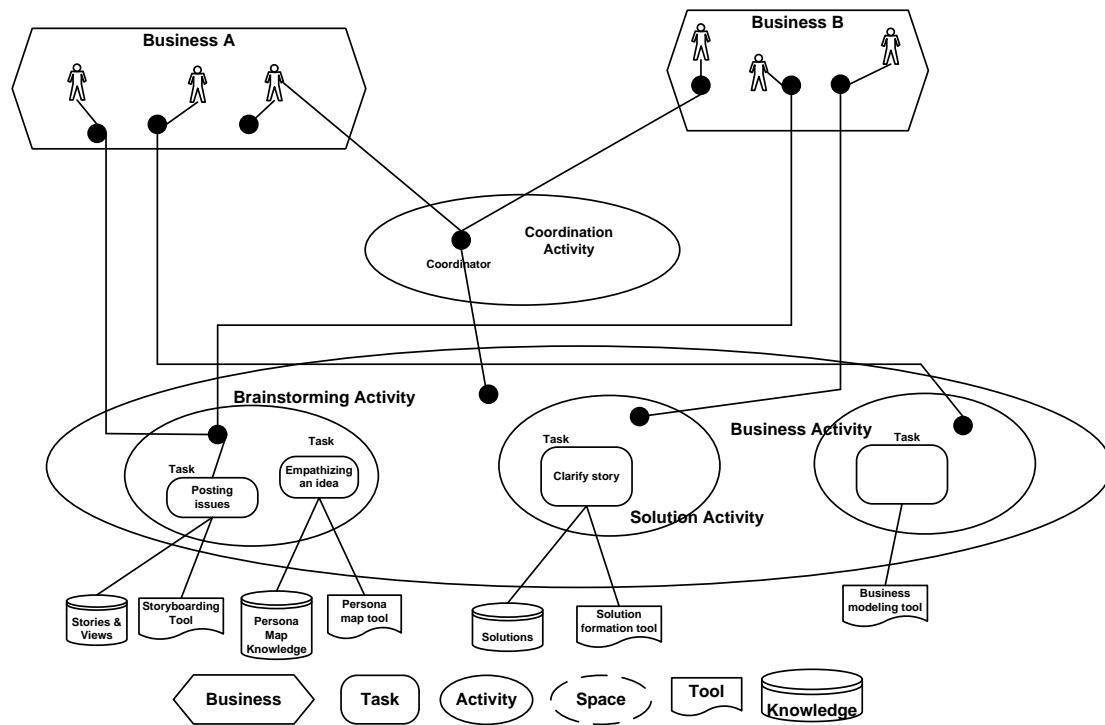


Fig. 3. Activities for design thinking

- Tools: tools in or model are the services that support tasks to provide their deliverables. Example: storyboarding tool.
- Business partners involved in the activity. Members of the business take on roles as coordinators to create activities and assign members of their businesses to collaborate in such activities.

4. System Design and Implementation:

The businesses will thus need to dynamically create teams who in turn will select tools most appropriate to the activity goal. In this phase stakeholder values are found, empathizing with them and finding out their points of view and needs. This is followed by ideas of what to do and followed by a joint value proposition that precisely defines what is to be done and how it will satisfy stakeholder's needs. Design thinking provides a large number of creativity centered tools to identify problems and propose solutions. The model is implemented on the cloud to facilitate knowledge sharing in agile way in order to respond to the business environment changes and self-organization allowing coordinator to create activities and these activities assigned to users. These activities are knowledge management activities where users can create and share knowledge. The structure can be re-organized in terms of creating/removing the activities and tasks and assigning/resigning the users according to business needs and changes. In the next section we present a scenario that shows the first stages of our system implementation.

5. Scenario:

In this scenario we show a demo of how the system is to be implemented. Presentation of this scenario includes:

1. Scenario description.
2. High level design.
3. User interface.

Scenario Description:

The scenario presents collaborative design process between two firms (Hospital and Bags Factory). This design process follows design thinking activities. The scenario can be described as following:

- Hospital business manager (George) decides to collect the issues face the employees in the workplace in order to address them. These issues can be resolved and transferred to business opportunities for the hospital.
- The idea here is to implement brainstorming activity by using tools such as storyboard to allow employees to post the issues and their views about them.
- These posts can be filtered and measured under specific criteria to get out the potential issues.
- One of the issues filtered out as a potential issue. The issue is described as “The kids back bags in the market may has effect to the backbone of kids; it is to be thought about a solution for this issue”.
- To get a clearer picture empathy tasks can be created within the activity to have more views about such issue.
- More staff and a sample of parents can be involved for empathy by creating empathy tasks for them.
- Through the empathy tasks management observes the views of people regarding the ideas to resolve such issues.
- One of the potential ideas that was observed by management is to think about manufacturing new sort of bags to avoid such effect.
- Management has chosen a bags factory for making this sort of bags.
- Coordination with bags factory has taken place.
- To defining solutions and how bags to be designed and activity for that has been created.

High Level Design:

Fig.4 shows the high level design of scenario described above. As we see in the figure ‘George’, the business manager, creates ‘Activity1’ in order to brainstorm the issues within the business. This activity by definition is implemented through a number of tasks. These tasks are performed by users assigned to them. These users access the service, which here are the tools, according to the task definition.

The services implemented in a way that can be accessed through Internet browser from everywhere, anytime.

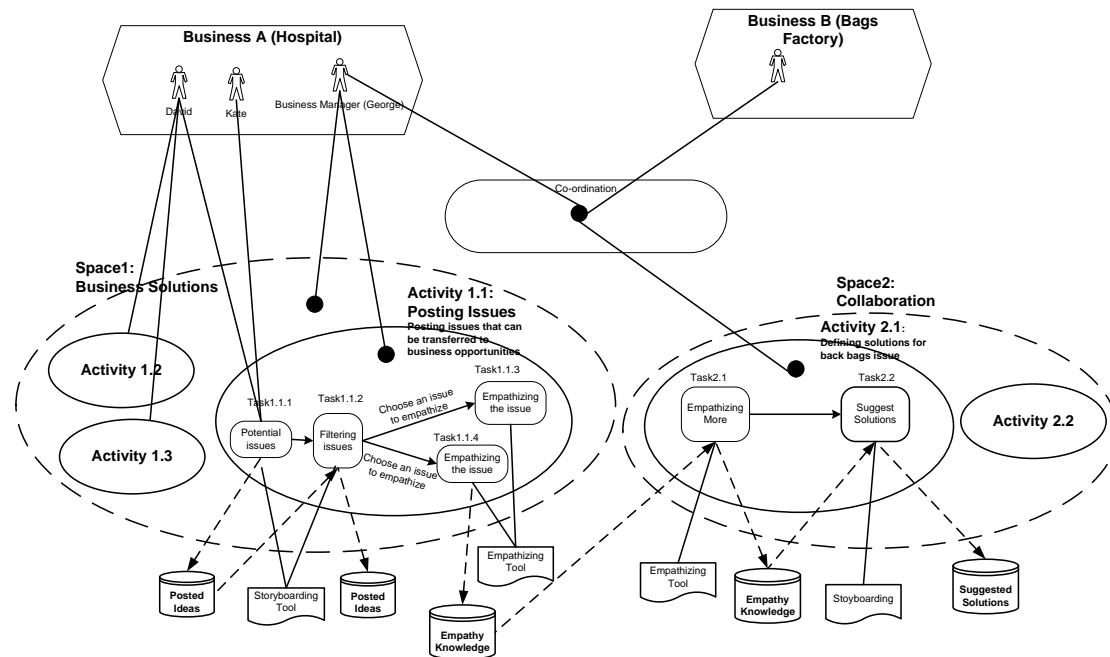


Fig. 4. High Level Design

User Interface:

Users access the services through web browser. Screens snapshots from 1 to 5 shown below illustrate the scenario. According to the number of each screen we can describe them as following according to our scenario:

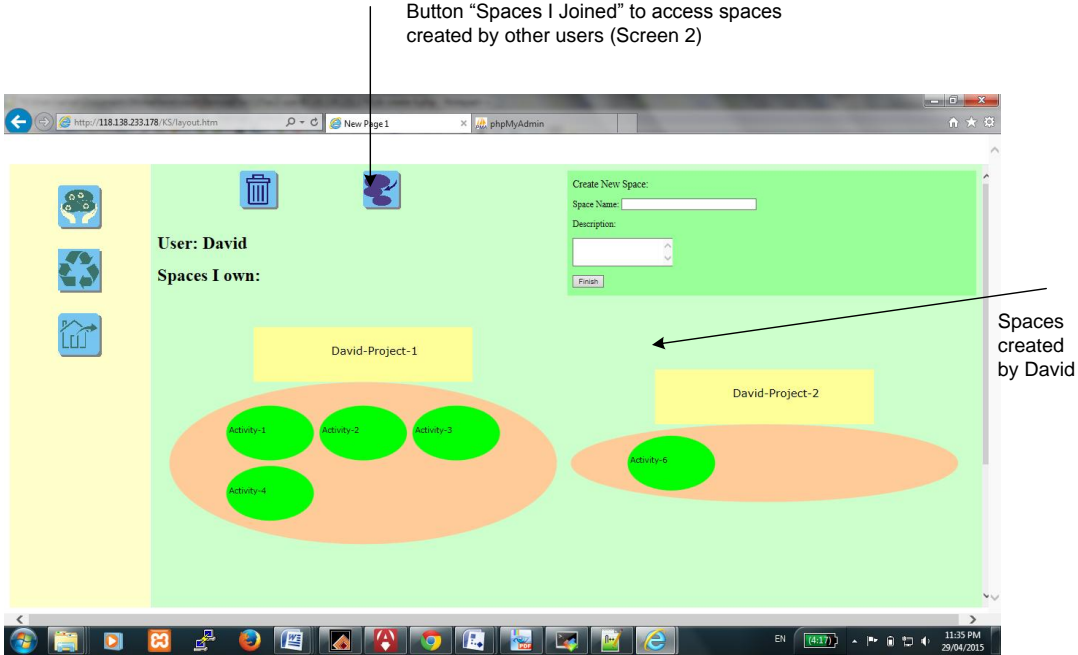
1. Through the login screen the user can login by his account. If he/she does not have one he/she can sign up. The successful login will make him/her access the screen of his/her spaces. In this example the user is “Kate” from the hospital.
2. Kate accesses the spaces that she created through screen 2. She can create new spaces as well. From this screen she can access spaces that she has been joined to by other users. That is can be done by pressing the “Spaces I Join” button.
3. That allows her to accesses the spaces she joins through screen 3. One of the spaces she joins the “Business Solutions” space created by “George”.
4. Here she clicks the title of space to access the joined activities through screen 4.

5. By clicking on the title of the activity Kate accesses tasks that she have been assigned to in this activity according to screen 5. According to the scenario the activity she joins here is Activity 1.
6. One of the tasks she has been assigned to here is “Posting Issues” activity.
7. By selecting the task and pressing the “Tools” button the user, whom here is “Kate”, can access the tools that support this task in terms of knowledge creation and sharing.
8. As the task here is to collect and post emergence issues the tool assigned to this task is the storyboarding tool (Screen 6).
9. Through the storyboarding tool the user can do the following:
 - a. Create new knowledge including ideas, thoughts and view according to the task description defined by the user who created the task (George in this case).
 - b. Post any files by uploading them.
 - c. Comment to any other posts created by other users.
 - d. Download the knowledge created for this task in text format.
 - e. Draw sketches by using the drawing tool.

In our model users performing a specific task can be given the permission to access the knowledge created through the other tasks if needed.

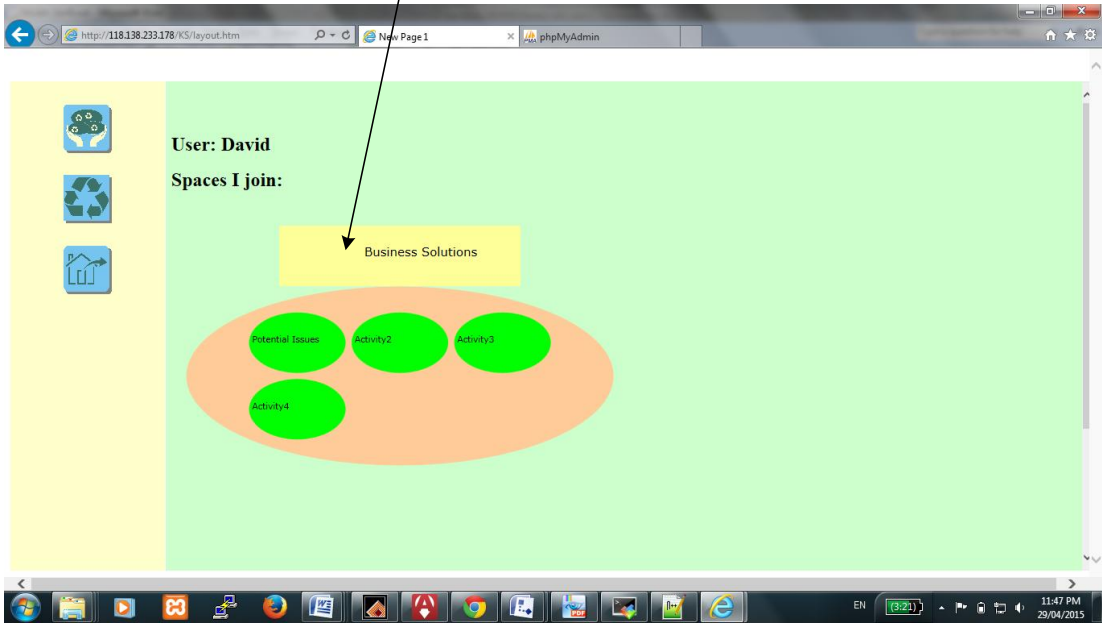
6. Conclusion and Future Work:

This paper focused on ways to combine knowledge management and design thinking in ways that support self-organizing social structures for innovation. It first described design thinking. It then showed how design thinking tools can be integrated into an implementation model that is implemented on the cloud. The model allows businesses to organize activities that provide the tools in flexible ways as they are needed in design. In this paper we have presented an initial prototype of our model including the storyboarding tool. We are now working to finish the other tools including persona-maps and lotus blossom. Our next step also includes testing and evaluation of the model.



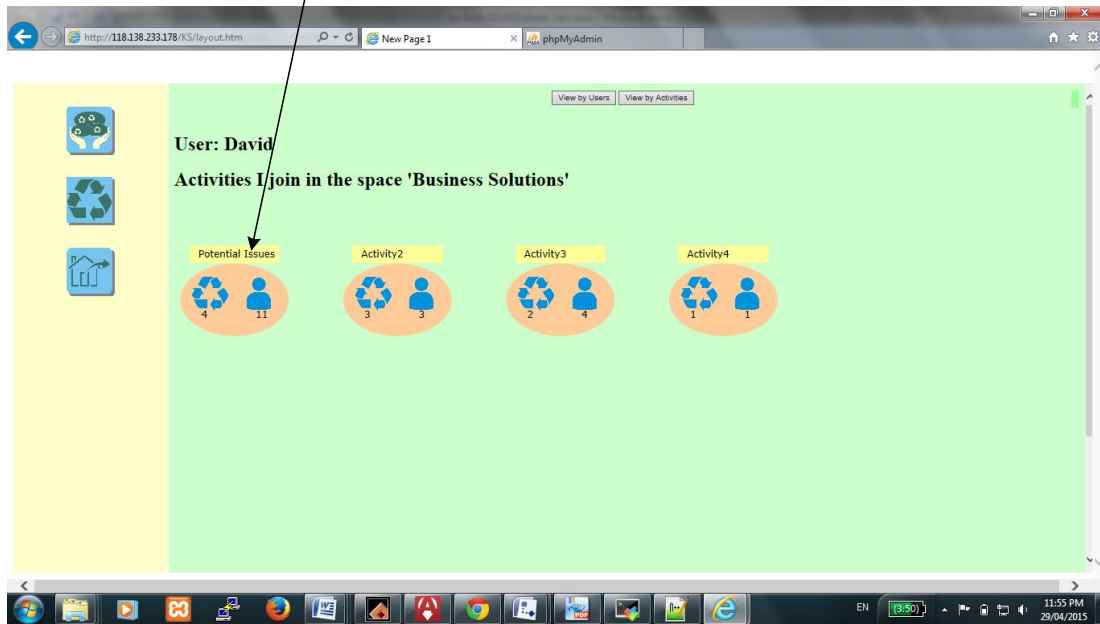
Screen 1: The first screen accessed by the user once logged in

By clicking on the title the user accesses the activities assigned to him/her within the joined space (Screen 3).

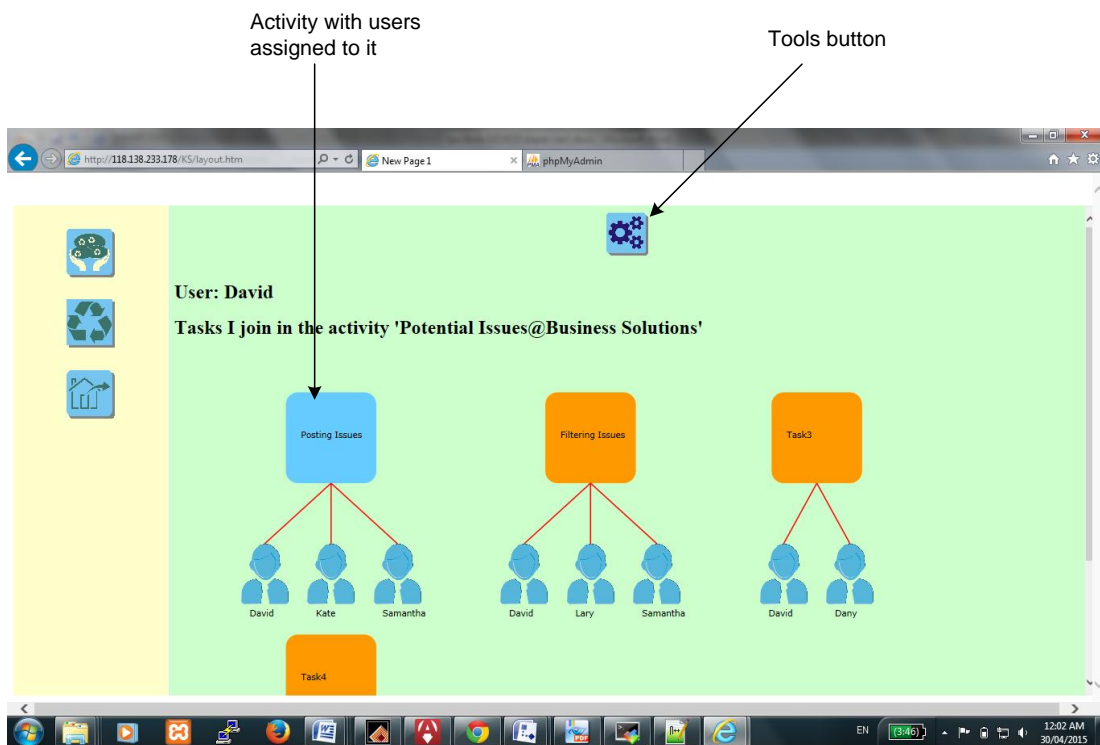


Screen 2: Spaces joined through other users whom created them

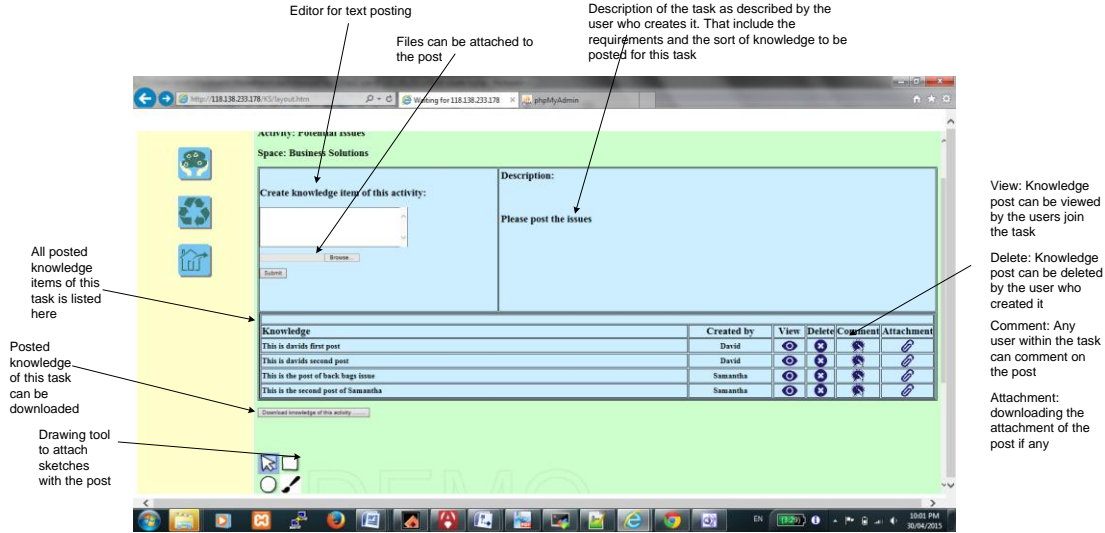
By clicking on the title the user accesses the tasks within the activity (Screen 4)



Screen 3: Activities joined by the user. Task and User symbols indicate the number of tasks and users assigned to this activity.



Screen 4: By selecting the activity and clicking “Tools” button the user accesses the tool that support this task, here the tool is the storyboarding tool (Screen 5)



Screen 5: Storyboarding tool reached by clicking tools button in the previous screen

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