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Creating a Team Building Toolkit for Distributed Teams

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Abstract. Team building exercises are often carried out in a face-to-face setting using traditional tools, such as color pens, cards and pin boards. The success of such group exercises depends largely on the experience of facilitators. To support such activities for distributed teams, task-specific tools and coordination mechanisms are needed. In this paper, a cooperative hypermedia approach is presented for developing and guiding the use of the team building tools. The resulting cooperative hypermedia system provides not only general groupware support, but also an application framework for team members to create and customize team-building tools for various team building exercises. The novelty of the work is reflected on its flexible coordination support for facilitators and its seamless connection between tools used for each phase of a team building exercise. Two examples are given to show how team building tools can be built and customized with the approach.

1 Introduction

In recent years, team building has become a phenomenon for organizations wishing to 'get the best' out of their employees. It is scarcely possible to find an employee of any major company who has not experienced some form of team building exercise. These can range from outward bound style adventure weekends, which aim to build relationships between employees through strenuous activity, to more obvious tasks such as brainstorming and self-reflection. The main aim of each of these exercises is to improve communication and collaboration between workers, in the hope that it will help them to work better as a team. Participation and involvement of staff in team building activities increases the sense of ownership and empowerment, and facilitates the development of organizations and individuals. Such activities are also great for breaking down barriers, improving communications inside and outside of departments, and integrating staff after reorganization.

As a kind of team building practice, many research-led organizations operate a yearly "Away Day" or "Retreat" event for strategic planning, reflecting on their current performance, and deriving high-level action plans for the year to come. Such practice can be seen as collaborative activities in the design and redesign of the organizations themselves so as to improve the performance and efficiency of the organizations.

According to Engelbart's ABC model of organizational improvement [2], organizational activities can be categorized into three levels:

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- A-level activities representing core business activities, i.e. the work on the production of its primary products;
- B-level activities aiming at improving A-level work (such as tool building and methodology development for A-level activities); and
- C-level activities aiming at improving B-level work (such as optimizing organizational structure, enhancing team culture, and strategic planning).

In this paper, we focus on information system support for the B- and C- level work so as to improving A-level work more efficiently. More specifically, we try to develop a team building toolkit for both collocated and distributed teams. Each tool of a team building exercise consists of a set of groupware tools for each phase of the exercise. The phases or steps are decided based on the traditional method/process for a team building exercise. We take a hypermedia based approach and a PowerPoint metaphor for the tool development and for the use of the tools led by a facilitator:

- A team building tool (for a specific team building exercise) is configured using a hypermedia editor, which is similar to the editing mode of PowerPoint. The available "slide" types consist of pre-defined base types and tailor-made ones for each step/activity of the team building exercise. Unlike the passive PowerPoint slides, these are interactive hypermedia objects with shared content and task-specific computation support;
- Each groupware tool (i.e., the GUI of a hypermedia object for each phase/activity of a team building exercise) is presented in a hypermedia browser, which is similar to the presentation mode of PowerPoint. These tools are activated using the forward/backward button of the browser by a meeting facilitator. When activated, the groupware tool appears in the content pane of the cooperative hypermedia browser.

The paper is organized as follows: Section 2 presents an analysis on current team building practice. We look at what kind of cooperative activities are performed and what team building methods/technologies are used for such activities. The result of the analysis is a set of requirements for better information system support for such activities. Section 3 presents our approach to meeting the requirements. We take a cooperative hypermedia approach to designing and implementing a toolkit for the team building group exercises. Section 4 presents two application examples of the toolkit. Section 5 discusses the work in comparison with other approaches. Section 6 concludes the paper with a summary and future work.

2 Analysis of Current Practice

2.1 Team Building Activities and Methods

Team-building activities help build teams, develop employee motivation, improve communication and are fun. They can also enhance business projects, giving specific business outputs and organizational benefits. Team building potentially includes a very wide variety of methodologies, techniques, and tools [1]. Among others, team building activities cover team building exercises, team building games, role play, and high level activities such as strategic planning, team designing and organization designing.

Examples of well-known team building exercises include SWOT analysis and PEST analysis. SWOT is an acronym for Strengths, Weaknesses, Opportunities, and Threats. The SWOT analysis is an extremely useful tool for understanding and decision-making for all sorts of situations in business and organizations. The SWOT analysis headings provide a good framework for reviewing strategy, position and direction of a company or business proposition, or any idea. PEST is an acronym for Political, Economic, Social and Technological factors, which are used to assess the market for a business or organizational unit. A PEST analysis measures a market; while a SWOT analysis measures a business unit, a proposition or idea.

A focus group is a structured discussion about a specific subject. Focus groups are a widely used qualitative technique for information gathering and describing all aspects of the problem.

Brainstorming is a technique that helps a group generates as many ideas as possible in a short time period [6]. It creates new ideas, solves problems, motivates and develops teams. Brainstorming motivates because it involves members of a team in bigger management issues, and it gets a team working together. When used well it may generate excellent results in improving the organization, performance, and developing the team.

Workshops combine training, development, team building, communications, motivation and planning. Workshops are effective in managing change and achieving improvement, and particularly the creation of initiatives, plans, processes and actions to achieve particular business and organizational aims.

A team-building meeting is not simply a random activity. It needs to be structured and it follows certain rules. It places a significant burden on the facilitator to manage the process, people's involvement and sensitivities, and then to manage the follow-up actions. Facilitation is the key to the success of the team building meetings.

Both PEST analysis and SWOT analysis is good subject for workshop sessions. Both of them also work well in brainstorming meetings. Workshops often involve a brainstorming session. This indicates how important of brainstorming techniques and how frequently they may occur.

In addition to brainstorming, another frequently performed activity is to prioritize or rank the generated ideas, or to vote for a consensus. A Prioritization Matrix is a useful technique to help team members to achieve consensus about an issue. The Matrix helps rank problems or issues (usually generated through brainstorming) by particular criteria that are important to an organization. Then one can more clearly see which problems are the most important to work on solving first.

Other high-level team building activities include strategic planning, team design and organization design. Team design involved activities to identify the players, create an identity, develop statement of purpose, name the goals, and make connections [4]. Organization design involves activities to define the business goals the team will work within; behave according to the team values that guide how the team work together; develop an infrastructure for involvement; design the configuration and boundaries of the team to enhance productivity [5].

Deriving and agreeing on follow-up actions are the common concluding part of many team building activities, such as brainstorming, SWOT analysis, and strategic planning workshops.

2.2 Away Day Experience

Away day activities normally consist of a series of face-to-face meetings held in an isolated location that is often quite far away from the normal offices of the staff involved in the practice. The meetings usually include all members meeting and many small group meetings. Most small group meetings are group working or group exercising sessions. The typical examples are:

- Crisis Analysis: Each person posts an issue he/she believes to be a risk to the current project/or joint task. This would lead to categorising and analysing them, and finally reporting back to the all member meeting by a person from each sub group.
- Identifying potential collaborators: Each person prepares a statement of his or her research challenges, and presents it to the group, then gives rating on each of other persons' research ideas to indicate the closeness of his/her research to others. In this way, it is possible to identify potential collaborators.

The tools used for such group exercises are normally a traditional toolbox of colour pin cards, stick notes, pens, and whiteboards or blank papers to place cards, notes, or to write on. Typically, each group exercise is moderated by an experienced facilitator. He or she will start with an introduction to the exercise, and then lead the group through each phase of the exercise. If a task is divided into multiple subtasks for multiple small groups, one person in each group will report back to larger group/all members meetings.

Our own experience from multiple away day events indicates that:

- The informal small group meetings can improve communication and understanding of group members who may not necessarily working in the same group in their daily work.
- The low-tech approach makes the tools easy to use and meeting sessions easy to handle.
- The practice has helped for identifying long term and medium term goals and for achieving consensus on the common goals.

The problems found with the low-tech approach include:

- Preparing and setting up the team building meetings take time; It is better prepared beforehand, rather than at the time when the meeting starts;
- Sometimes, the outcomes recorded on the whiteboard or large paper were lost and forgotten; and,
- In many occasions, quite a number of follow-up actions did not happen. Such inaction may have negative impact on team member's perception and activeness on future team building activities.

To achieve the full potential, we have to retain the advantages and avoid the problems. We need to:

- Provide pre-meeting planning and facilitator support;
- Provide better tools that can capture the meeting history and outcomes;
- Support analysis and decision-making;
- Provide task-specific computation support;
- Support the planning, monitoring and control of follow-up actions.

3 The Cooperative Hypermedia Approach

We take a cooperative hypermedia approach to developing a team-building toolkit. The cooperative hypermedia system supports object-oriented modelling of application domains (i.e. domain concepts and relationship) using typed hypermedia nodes and links. The nodes and links can be visualised as icon images and labelled arrow lines in a graphical hypermedia browser/editor. The relationship between nodes could also be captured by the containment relationship using composite nodes as well as the spatial layout and visual characteristics among the nodes contained in a composite node. For instance, related things may have similar icon images or placed close to one another. Each node in the system has at least two views: an iconic view and a content view that shows the content of the node when it is opened.

The system has a set of built-in hypermedia components (i.e. nodes together with their content viewers) for communication (e.g. Chat component), coordination (e.g. a set of types for flexible process support) [10], and hypermedia space browsers and editors for creating new hypermedia objects and navigating in the created hypermedia space.

New groupware tools can be incorporated into the system by either tailoring existing hypermedia components or by adding new hypermedia components (through developing new node types and their content viewers). The behaviour related to the node and the node content is defined in their underlying data models [9].

The hypermedia system supports a shared hypermedia model in that its node and link based model are persistently managed by the system server and that it maintains the consistency of the replicas distributed on its clients. Node content views at all client sites will be updated whenever a change is made to its underlying data model [10].

3.1 Base Types and Tailor-Made Types

Using the above described component based hypermedia approach; the components used for building a Team Building Toolkit can be created by:

- Creating a set of components that are common in several team building tools (e.g. pin card board component, ordering component, action planning component, and action enactment and monitoring component);
- Developing tailor-made task-specific tool/components for some phases of a specific team building exercise.

We use the well-known PowerPoint metaphor for composing a team building tool using the base types and tailor-made node types as components ("slides") and for the use of the tools led by a facilitator. The design of each team building tool is based on the widely used team building methods and the requirements identified in the analysis section. In the following, we describe the "slides" editor (i.e., a graphical hypermedia editor), and the "slides" presenter (i.e., a hypermedia browser).

3.2 Composing a Tool with a PowerPoint Metaphor

Tool for each team building exercise is composed by defining a new template (captured in a composite node) using a graphical hypermedia editor. The composite node

contains a set of typed nodes linked with a "precede" typed link. Whenever a new node type is added to the system, it is made available to the graphical hypermedia editor to instantiate. As each of the typed node represents a groupware tool for one phase of a team building exercise, a team building method (or process) for a specific team building exercise is represented by the composite node. A "precede" link represents control flow between two nodes (representing the sequence of the phases). It can also specify data flow semantics between the tools supporting the phases. The "precede" link has a "dataflow" property, whose value could be "none", "share", "copy" or "move". "None" means no dataflow. "Share" means the tools for the two phases share the same content. "Copy" means the content is copied to the next phase; while "move" means the content objects are moved into the next phase. In this way, the data connection between tools for different phases is established.

The graphical hypermedia editor can also provide a persistent access point or portal for users to access specific hypermedia objects in a shared workspace.

3.3 Using a Tool with a PowerPoint Metaphor

These templates (i.e. composite nodes) can then be accessed using a hypermedia browser. Unlike the graphical hypermedia editor, this hypermedia browser navigates a hypermedia structure by opening tools for each phase of a team building activity in the content panel of the browser (when its forward/backward buttons are pressed by a team building meeting facilitator).

The GUI of the hypermedia browser is laid out in an application session window which contains session management functions, i.e. to invite and remove user into and from the application, and to display a list of users currently working in the same session. It also includes a communication area for textual chat and a large content pane for placing tools for each phase of a team building task.

In the following, we describe how team building methods are applied to the tool design and how the identified requirements are met with the specific functionality and GUI design of a team building tool:

Communication: A chat area is provided on the bottom part of the session window. The shared content panel (presented in the middle of the session window) and the group awareness information (e.g. the online users presented on the left-hand side of the session window) also provide support for communication among team members.

Flexible Coordination and Support for Facilitator: As team building meetings are supposed to be informal and flexible, we do not hard code any action script into the system; rather, components configured using the graphical hypermedia editor are displayed (one by one) in the content panel of the session window. When there is a need to change the predefined phases, the facilitator can always press the "template" button to access the graphical hypermedia editor on the hypermedia structure representing the team building exercise to make changes to it.

As many team building activities can be organised in a brainstorming meeting, a default template (i.e. a composite node) is provided which contains components supporting each step of a brainstorming process:

- Introducing the task (a textual component);
- Brainstorming ideas and suggestions (a pin-card board component);

- Categorising/condensing/combining/refining (the same pin card board component);
- Analysing the results (optional task-specific component(s));
- Prioritising options as appropriate (a ranking/voting component that shares the data with the brainstorming tool);
- Agreeing on follow-up actions and their timescale (an action planning component);
- Controlling and monitoring the follow-up actions (an action plan enactment and monitoring component that shares the same data with the action planning component).

The facilitator can lead a team building session by manually activating the forward button and walking through each phase one by one together with all the participants;

Seamless Connection between Brainstorming and Analysis Tools: This is achieved by the shared data model between components and by the dataflow specification using the "precede" link in the graphical hypermedia editor. For instance, a pin card board component can share the same content with one or more analysis tools – they provide different views on the same data;

Support for Follow-up Actions: A tool for action planning and a tool for enactment and monitoring are integrated for the purposes [10]. The tool for action planning is similar to the graphical hypermedia editor. Its palette contains predefined node and link types representing a process description. The tool for enactment and monitoring is laid out as swim lanes, one for the tasks of each task performer. The task states are colour-coded on the node iconic views. Filters are provided for users to search for the tasks with specific properties, for example, to display all delayed tasks on the swim lane if there is any. Users could use the tool to access information objects (documents) relating to a task and to change the state of a task (e.g. from "ready" to "running" and to "completed").

4 Examples

We use the two team building activities mentioned in the away day experience section as examples to show how such activities can be supported with our approach. The first example tries to illustrator how to create a tool by customizing the default component set using the cooperative hypermedia approach. The second example focuses on how task-specific computation support can be incorporated into a team building tool.

4.1. The Crisis Analysis Tool

This tool can be created by simply adapting a team-building model to guide the customization of the default brainstorming template using the graphical hypermedia editor. More specifically, we could use the SWOT model and focus on its T (Threat) aspect only.

The textual description on Threat analysis and how it should proceed is added to the content for the Introduction Component. The pin-card board component can be

customized by editing the appearance of cards to be used by team members. For instance by setting its foreground and background color to black and yellow, and setting a card type label as "Threat". This card type is then ready for user to write a specific threat on and then place on the board. In this example, no optional component for specific analysis is needed and for all the other components we could just use the default ones. Finally, we give the template (a composite node) a name and select an icon image for it. By adding it as a new (composite) node type to the cooperative hypermedia system, the tool becomes available for all the user of the system.

To use the tool in a team building meeting, a facilitator or meeting organizer clowns an instance of the node type (the newly customized template) using the hypermedia browser and adds all the team members to a synchronous meeting session.

When each team member starts the system client on their computer, the tool (i.e. the hypermedia browser with the template) opens automatically on his/her desktop. The facilitator decides when to start the meeting by pressing the "next" button. He or she can communicate to all the members and to lead the meeting by switching to the next step until all the phase is completed. In the follow-up action planning phase, actions are derived from those highly ranked threats. Responsible persons for the actions are named and agreed. The controlling and monitoring components allow the responsible persons to activate the tasks, and to trigger the state transitions from ready, to running, to complete or abortion. All other team members can also use the Crisis Analysis Tool (or the task control component directly) to monitor the progress of the follow-up actions.

Tools for a full SWOT analysis can be created in a similar way. A SWOT analysis can be performed by dividing people into four subgroups, with each focus on one of the S, W, O, T aspects, and then reporting back to a large group meeting.

4.2 The Collaborator Finder

For this tool, only the above-mentioned Introduction, Pin Board and Analysis components are needed. Other default components can be removed.

After the ideas are gathered in a brainstorming phase using a Pin Board component, users can view the results using specific analysis components. In this case, there will be an "ideas matrix" component that plots each idea suggested against each user logged into the system. If a user gave an idea a low relevance score (<=6), then he or she would not be recommended to work together on the idea. If he or she gave it a high relevance score (>6), then he or she would be recommended to work on the idea, and would have an "X" placed in the matrix where the axis of his or her name meets the axis of the idea. This way, it can be easily seen which team members are working on a particular idea, simply by looking down the column for the idea in the matrix and noting which users have an "X" in the column.

Each idea is also represented as a button, which can be clicked to open up an idea dialog. The idea dialog will list the idea, the name of the person who suggested it, user comments on the idea and a list of people who are collaborating on it.

The use of the tool is similar to the first example, with a facilitator leading to a shared working session by inviting members into the session and by switching from one stage to the next.

5 Related Work

Comparative to the abundance of team-building approaches for co-located teams, the options for distributed teams are significantly fewer. One approach is to use Meeting Support Systems for team building purposes. Meeting support systems, also referred to as Electronic Meeting Systems or Group Support Systems, are a special type of groupware consisting of a set of tools for structuring and focusing the efforts of teams working toward a goal. Despite significant progress has been made over 15 years, meeting support systems have still been found inadequate in their support for effective coordination, especially when participants are distributed at different locations [3, 7]. Such systems have no built-in process enactment support for managing flow dependencies; they rely on a human facilitator to control the meeting process. But it can be difficult to keep high-quality facilitators in place. One of the approaches to tackle the issue is to encapsulate a facilitator's best-practice regarding establishing a certain pattern of collaboration in a process kind of construct, for instance, ThinkLet [8]. Our approach is in agreement with the ThankLet like explicit process support. Using our cooperative hypermedia based process representation; ThinkLet-like structures will emerge from used-defined team building meeting processes.

The team building tools developed in this work are kinds of meeting support tools. Many other meeting support tools focus on A/V communication or application sharing; they have not provided flexible support for meeting planning, meeting facilitation, and task-specific computation support for team building activities. Many groupware tools are developed for either general cooperation support, such as co-editing or joint navigation, or support for isolated cooperative activities; while what we did here is for a series of closely related activities. Workflow systems provide strong process support, but they are usually too rigid to be useful for supporting meeting processes. Most hypermedia systems, such as the Web, are developed for passive information accessing or for activating some e-commerce services; while our approach uses hypermedia objects as components of interactive information systems that help people to work together and get their job done.

6 Discussions

Team-building activities are normally carried out in a face-to-face meeting led by a facilitator. In such a meeting, traditional tools such as color pens, sticky notes, cards, and whiteboard or pin board are widely used. Such practice is to some extent quite successful. So why bother to create groupware tools for such activities? On the one hand such tools may enhance the face-to-face based team building session (by addressing the deficits identified in our analysis section); on the other hand such tools provide a team building solution for distributed teams that may not be able to meet in a face-to-face setting.

In this paper, we present a cooperative hypermedia based approach together with a PowerPoint metaphor for developing and guiding the use of the team building tools. The cooperative hypermedia system provides not only general groupware support, but also an application framework for developer to create and customise team-building tools. The team building tools are designed based on the existing team building

methods and the requirements derived from the deficit of the current practice. The novelty of the work is reflected on its flexible coordination support for facilitators, its seamless connection between brainstorming and analysis tools, and its integrated support for follow-up actions.

We wish to create a rich set of tools that not only match to each of the widely used team building methods/techniques, but also new tools that support higher level team building activities that are closely integrated with the different level of work of an organisation. Although this work focuses on developing a tool building approach for team building groupware, we recognise that rigorous evolutions are needed to see how they are received by their users and what effect they may have on the ultimate goal to improve the productivity and efficiency of an organisation.

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A Model for Interaction Rules to Define Governance Policies in Collaborative Environments

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Abstract. Policies aimed at governing collaborative environments are strongly based on rules of conduct involving the interaction of the elements of five dimensions: actors; activities; objects; time and space. Every collaborative environment requires a collaborative policy; otherwise, the environment tends to become chaotic, lacking in behavioral constraints, rights or obligations. The collaborative policy model presented here serves as a framework to design collaboration policies for use in the specification phase of collaborative system engineering or the creation of configuration files containing rules of collaboration to be used in adaptable or dynamic collaborative environments.

1 Introduction

The human need for interaction requires that society develop communication resources aimed at reaching people regardless of geographical location or distance. The optimization of these interactions increases the complexity of work in social and commercial organizations, creating new needs (activities, procedures and tools). Historically, technological development has met this need, and research has focused on synchronous and asynchronous interaction using computer-supported collaborative work (CSCW) environments. However, the technologies involved in supporting human relationships fall far short of reproducing the requirements of easy face-to-face interaction. Therefore, the characteristics of these interactions require flexibility for the adaptation and configuration of collaborative work involving the characteristics, skills and competencies of human collaborators [18].

In the last decade, research has focused on the behavioral aspects of CSCW grouped into collaborative policies that establish rules of conduct to formalize human interactions [3]. Despite the evolution of CSCW environments, little research has been dedicated to collaborative policies, whose composition still lacks a clear definition and which must meet the demands and maturity of collaborative groups involved in a project.

Policy specification languages have been proposed (e.g., Rei [9], KAoS [17] and Ponder [4]) for interchanging data among collaborative environments, but they are unsuitable for supporting several important features of collaborative work in design (CSCWD), such as:

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