

# Application of Computer Supported Cooperative Work in Sebha University in Student Affairs Unit

Almabrouk W. Ibrahim, Mahdi Alhaji Musa, Nor Zairah Ab.Rahim

**Abstract**—Computer Supported Cooperative Work (CSCW) is the study of how people use technology, with relation to hardware and software, to work together in shared time and space. The nature of computer-supported cooperative work (CSCW) is to facilitate work using technology in such a way that supports human interaction in cooperative work situations. This study was conducted in order to investigate on application of CSCW in Sebha University, in particular, in students' affairs unit. The proposed application system would be the tools that will facilitate and automate workflow in this organization. This study was also proposed an outline policy for the organization based on the use of the automated system. For this study, the researcher designed a survey and distributed organization to 40 employees of this organization. Besides that, since the study is about current workflow, an observation was conducted to see how process is done. Findings revealed that most of the participants replied positively that they are seriously in need to use up-to date automated technology to ease their interaction in that unit.

**Index Terms**—CSCW, current work flow, new work flow, Sebha University, automated system.

## I. INTRODUCTION

Computer Supported Cooperative Work (CSCW) focuses on utilizing technology in terms of collaborative work to help employees to work together in a time and space shared. CSCW developed by two technologists to assist them to understand groups' activity in a better way and how technology could be used in supporting people in their work [1]. As for students' affairs unit in Sebha University, there is no web-based communication in place. The students need to use this media in order to register, enquire about admission requirements, online application status, rules and services, and to solve any academic issues. In fact, in the students affairs unit in Sebha university, staffs use the phone, face to face interaction to contact with students in case of further requirements, missing documents, incomplete application, or other problems[2]. But, because of the huge number of prospective students and their problems, it is too difficult to solve all of their problems[2]. Therefore, there is a need to have web-based communication media in Sebha university in order to overcome the students' communication problems, before and after students' registration. The Student-University Communication Portal will use some Web 2.0 tools such as the Blogs, intranet, Instant Message (IM), SNSs, and other tools[3]. Each one will be applied to solve a specific type of problems. At the end, all the applicable tools will be used in the proposed workflow to be used in the unit under investigation[3].

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The problem of current workflow that needs to be solved is that most of the students' services are done manually that cause delay in document approval. During registration process, some forms need to be approved by different staff. Staff might not be all available to approve these documents and students will wait until their documents be approved by the specific staff. Since one document need to be approved by different members, this would make some deficiencies in the workflow. Throughout observation process, students might wait for days to get their documents back approved. Some students are late in attending classes and getting their registration/ subject forms to be signed and approved by different members.

Students might need to come personally to see whether their documents are ready to be collected or not, all students gather at the office individually. They causes a gathering at the office. By implementing web-based technology in a form of students email gateway that helps to fulfill all students' services in a cohesive manner by sending an email to all to inform them that their documents are o be collected. Therefore this is to identify that paper-based work consumes much of the time. The following figure (5.4) shows the current workflow in student affairs unit in Sebha University.

## II. LITERATURE REVIEW

### A. Computer Supported Co-operative Work (CSCW)

Few years ago, a considerable amount of research was conducted on the subject of computer supported co-operative work (CSCW). CSCW's origin as a research field is dated back to the beginning of 1980s, in a workshop under the organization of the two researchers Irene Greif and Paul Cashman [4]. Over the last decade, a keen desire and interest in the field of CSCW has increased greatly and a large number of systems have been developed to achieve the main goal which is supporting cooperative work. The efforts exerted have led to understand the complex nature of group work and the application of this complexity. In regard to the flexibility that is needed to support computer systems, much of the recent work done in the field has been driven [5] and [6] stated that (The Web) was developed to be a pool of human knowledge which would allow collaborators in remote sites to share their ideas and all aspects of a common project. Cooperation may involve coordination and collaboration [7]. The first type of cooperation is Coordination. Coordination as a cooperative process is present where the actions of individual persons contribute to the others' action and the other's action related to the action of an individual. Coordination's main problem is the synchronization of persons, actions, and individual actions consistency with regard to the process as a whole[8]

Collaboration is the second type of coordination as the working-together to execute certain action. The success of collaboration relies on individuals' contribution to build up a common understanding and a shared knowledge [9]. Ultimately, the individuals' contribution cannot be identified because the ultimate product is a result of all contributions of the group [10].

It is clear that CSCW (Computer-Supported Collaborative Work) is to enhance collaboration among members in a named organization by utilizing computer to manage work systematically [11]. Similarly, CSCW that is needed in this study is defined as the use of computer to enhance cooperation in the division under study to do many tasks in less time based on the use of computer as a factor to enhance cooperation of its member to do all student service (such as document approval, subject registration, etc) in an organized matter [12].

### B. CSCW Tools and Systems

Much of the work determines people to work together. Computer systems of an interactive nature are used to support this shared activity. In an environment based on CSCW, groups must be able to move or transfer from one system to another based on the tasks from time to another. CSCW tools (known as groupware) and applications' number are growing very fast as well as the ways used to categorize them. The following three divisions are examples according to a grouping of different authors [13], [14].

*E-mail:* As a matter of fact, emails and cellular phones are considered as CSCW tools. Additionally, instant messaging (Campbell, 2004), as it was found, is seen as tools for CS [15] pointed out that email is a very popular Groupware. This technology is based on passing simple messages between people. In relation to that, email systems these days include some features such as, filing messages, forwarding messages, creating mailing groups, and attaching files with a message. Many other systems are there such as computer mediated communication (CMC) and meeting support systems.

*Computer Mediated Communication:* There are many examples to be referred to in this part. These examples include: bulletin boards and emails, structured message systems, Videoconferences / desktop video conferencing / multicasting, and Virtual collaborative environments. [16] stated that email and bulletin boards are one of the simple and the successful systems of CSCW. The increasing number of distributed organizations is associated to email as being an effective form of CMC (Computer Mediated Communication). [16].

Another system that contributes to this issue is videoconferencing. Videoconferencing history has developed in line with the growth of technology [5]. It started with the transfer of group of images from one room to another through a monitor. Introducing desktop videoconferencing brings out the multimedia communication. Users communicate by their computer by a microphone, camera and often a digital workspace. Many individuals and sites could be involved when the communication takes place [11].

By introducing media spaces, users that are distributed could access each another such as videoconferencing systems, video and audio links. In this case, media spaces are not only meant for supporting explicit, intentional communication as well as shared artefacts but also

interactions and awareness that are informal [17]. These informal interactions (colleague presence, activity and availability awareness, and unplanned interactions) are considered as significant to efficient group work. Technologies based on awareness have contributed to permit distributed workers to be aware of their co-workers as well as their collaboration potential. The nature of these technologies is based on the use of video images that is the main source of data meant for awareness, despite that there are only audio tools for awareness. Videoconferencing based on the internet, regularly, has been used since the beginning of 1990. However, major contribution to internet Videoconferencing was introducing multicasting. Desktop conferencing that enhances computer workstations can utilize a group of conferencing tools [18].

Moreover, Virtual reality is an application based on a computer that permits human-computer and human-human interaction in an environment called (virtual world) that is governed by the actions of the user. These environments are based on a concept depend of both physical and cognitive involvement. Cognitively, users take part in the environment when being involved in the action. Virtual environments based on collaboration help users in remote areas to cooperate through real interactions in a shared artificial environment. Communication in Virtual reality environments is regarded to provide a natural, intuitive and communicative environment [12], [15].

*Meeting Support Systems:* As a form to support for local synchronous meetings rather than with computer mediated communication (CMC), meeting support applications and tools have been emerged. Traditionally, they were mainly for supporting remote synchronous & asynchronous interactions [23]. Meeting room systems are in a form of a meeting room furnished with a large screen video projector and a number of computer workstation. The focus of these systems was to improve decision-making not by individuals but rather for groups. The same image appears on the large screen as well as all the screens of the participants'. This tool is easily accessed by the group members and often used as an electronic whiteboard [14].

Meetings in academic organizations go round discussing the internal issues of the organization such as student registration, staff employments, organization regulations, finance future plans of the organization, etc. Each part of the previously mentioned issues is fully discussed until a decision is made at the end about those issues [3]. Meetings can be in different ways through face-to-face or through a video- conferences that save time and effort [5].

Intranet is a term used to describe the use of Internet technologies internally within an organization rather than externally to connect to the global Internet [20]. An intranet is a network system for usage within organizations designed to facilitate communication and cooperation among employees who are dispersed in various locations [24].

[21] has defined an intranet as follows: "a private computer network based on the data communication standards and technologies of the public Internet". [12] and [22] define an intranet as a private computing network, internal to an organization, allowing access only to authorized users.

[25] describes an intranet simply as a means of making use and benefit from Internet technologies in computer-based environment within an organization

### III. METHODS

Generally, research methodology is a set of methods or procedures that describe a way to conduct the research. This chapter provides an overview on the design of the study. It discusses the research design, the setting of the study, the subjects, the instruments, data collection, and data analysis.

This study uses a survey as a data collection method. It was distributed in the named organization under investigation (The Administration of Sebha University) in order to get an overall view of the organization's current status. The survey covers The surveys covers information on the need of using IT system in the organization, the workflow in the organization as well as the need for a policy to be applied in the student affair division of this organization.

The survey used is developed based on the literature review sections. As an initial step, the survey is translated into Arabic to be distributed in this organization due to staff's mother tongue is Arabic. The questionnaire will be analyzed using the Statistical Package of Social Sciences (SPSS) software in order to get the mean and standard deviation of the responses in order to proof reliability of the answers. The following operational framework explains the three phases that the research will go through and followed by a brief explanation of each phase.

#### A. Data Collection Procedures

The data for this study were gathered by means of a survey questionnaire administered to 40 employee of students' affairs division of Sebha University during the 2011/2012 session. The survey instructed employee to provide feedback about their experiences with the currents work flow. The survey targeted senior officers and middle officers of students' affairs division. Respondents were majority male (62.5%) compared to female (37.5%). More detailed descriptive statistics about the respondents' characteristics are shown in Table 1 Analysis was performed based on using the SPSS statistical software

**Table 1 descriptive statics of respondents**

Items	Value	Frequency (n)	Percentage (%)
<b>Gender</b>	Male	25	62.5
	Female	15	37.5
<b>level</b>	Senior officers	10	25
	Middle officers	20	50
	Technical staffs	10	25

#### B. Instruments

A questionnaire was constructed using a 5-point scale and administered to collect the data for this research: *1-Strongly Agree, 2- Agree, 3-Neutral, 4-Disagree, and 5-Strongly Disagree*. This survey instrument comprises of two parts, computer supported cooperated work (including work flows and organizational policy) and the demographic characteristics section.

This study proposed two computers supported cooperated work, which are work flow processes and organizational

policy. So many instruments have been proposed by the previous researchers and prove to be good. Hence there are a lot of indicators available to measure computer supported work

11 indicators (OW1-OW11) were developed to measure the work flow of the students affairs division which includes Technology supports task transmission among the joint task participants, Internet access as an important factor in the organization, Employees must stick to the tasks they are assigned to, Delay in document approval that result in deficiency in workflow, Paper-based work as it is time consuming, Web-based technology helps people to exchange information electronically, Electronic mail as a tool helps in automating workflow in the organization, Through email, one can send as many documents as possible, Workflow technology minimize delays in the process( see appendix for details)

For the organizational policy 12 indicators were developed (OP1-OP12) to measure the policies currently available in the organization which includes: need of having a policy to enhanced by the use of technology, having a policy as a guide to achieve goals, working under a policy helps to understand responsibilities and goals, Policy in an organization as important ( see appendix for details)

**Table 2 standard deviation and means of construct**

Construct	Item	Means	Standard deviation (SD)
Organizational work flow (OW)	OW1	3.21	0.87
	OW2	3.62	0.95
	OW3	2.84	0.99
	OW4	2.41	0.94
	OW5	2.81	0.95
	OW6	2.54	0.88
	OW7	2.86	0.96
	OW8	2.97	0.97
	OW9	2.84	0.98
	OW10	2.42	0.96
	OW11	2.78	0.94
Organizational Policy (OP)	OP1	2.57	0.88
	OP2	2.56	0.86
	OP3	2.46	0.93
	OP4	2.76	0.95
	OP5	2.47	0.89
	OP6	2.88	0.84
	OP7	2.56	0.95
	OP8	2.61	0.01
	OP9	2.70	0.93
	OP10	2.65	0.92
	OP11	3.10	0.00
	OP12	3.20	0.83
OP13	2.55	0.87	

IV. RESULTS AND DISCUSSION

To analyze each of the CSCW categories, the researcher employ the use of exploratory factor analysis. Organizational work flow and organizational policy are the two CSCW to examine using this technique. The factor analysis was at the same time used to determine the validity of each factor. LISREL version 8.52 was used to develop the polychoric correlation used in generating the factor loadings.

Table3. Factor loading

	OW	OP
OW1	0.79	
OW2	0.97	
OW3	0.85	
OW4	0.78	
OW5	0.92	
OW6	0.81	
OW7	0.73	
OW8	0.65	
OW9	0.86	
OW10	0.69	
OW11	0.71	
OP1		0.79
OP2		0.76
OP3		0.73
OP4		0.58
OP5		0.79
OP6		0.79
OP7		0.66
OP8		0.97
OP9		0.88
OP10		0.87
OP11		0.77
OP12		0.85
OP13		0.93

From table 3 above the 11 indicators were proposed to measure the organizational work flow (OW1-OW11). These indicators includes: Technology supports task transmission among the joint task participants, Internet access as an important factor in the organization, Employees must stick to the tasks they are assigned to, Delay in document approval that result in deficiency in workflow, Paper-based work as it is time consuming, Web-based technology helps people to exchange information electronically. All the constructs have a factor loading value  $\geq 0.65$  which indicates a good correlation with the indicators. The internet access OW2 with the highest value of factor loading of 0.97 indicates more criticality in the list of critical success factors.

This is follow by paper work base that consume time (OW5) with a factor loading value of 0.92 which is having a high correlation as well. This indicates that the paper work currently available in the University is time consuming and therefore need to be avoided. While for the second category which is organizational policy OP8 which is Student affair division is in need to work under a well-defined technical system (e.g. internet, Intranet and groupware is having highest factor loading of 0.97 indicating good correlation and level of importance

A. The Current Workflow of Student Affair Unit

As can be seen from figure 1, all student affairs come under the registrar office of faculties. In this respect, focus will be on the registration office and graduation office. In both offices to start with, registration office is responsible of registration of students, their records and study system, whereas graduation office is responsible of all matters that are related to graduation of students till issuing their certificates and transcripts of both under and postgraduate students.

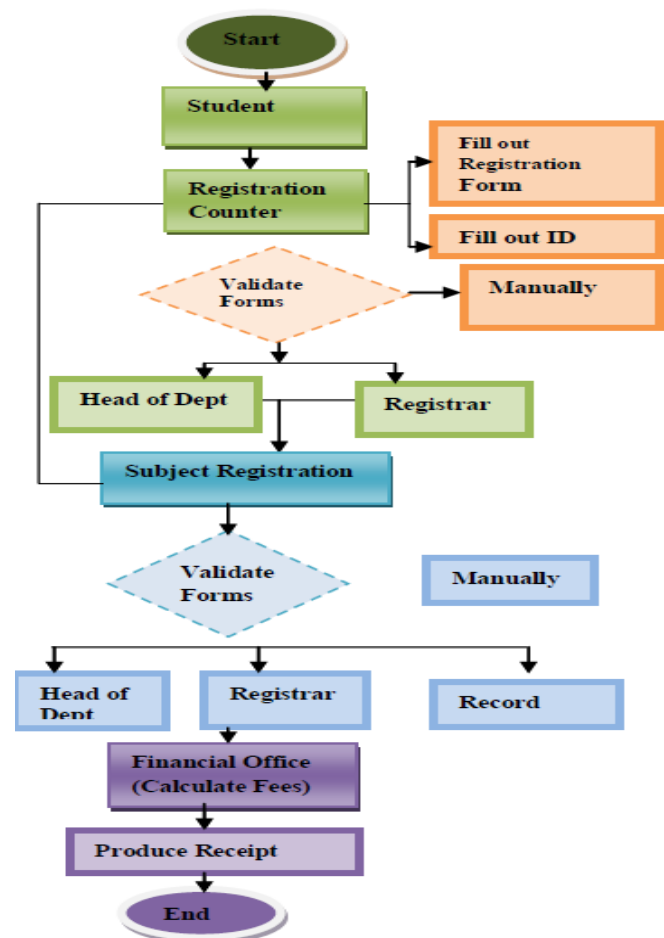


Figure 1 current work flow

The registrar office is responsible of all student affairs. Through observation, registration processes come under the registrar office. At the registration counter, the students fill in a form manually at registration department. The officer directs the students to fill in another form to get student ID card with a student number. At the registrar office students get the cards approved by the registrar. To avoid crowdedness of students, the cards will be sent to the departments. Students in this case get their cards from the head of the department accordingly. The end of this process is the beginning of the subject registration process where students fill in a form of subject registration counter at their departments. Then, students take the form for the registrar to approve that. Staffs at the registrar office make copies of registration forms to give one for the student, copy for head of the department and another copy to be sent to the staff of student record office. At this point, students are asked to pay the required fees for that.

## B. The new proposed work flow

This proposed workflow helps to automate the workflow in this unit and helps the whole process to be done in a collaborative manner. The scenario is a major component of any academic system i.e. semester registration process. This takes place during the period of renewal of registration altogether and deal with all of the cast (student):

Student will obtain a password to access the portal from anywhere (the university or outside the country) will benefit the student of the gate to get school schedules and examination schedules of courses and student can see the transcript and GPA in all previous semesters and also register the subjects of the semester through the gate (portal) without the attendance to the College. Registration process is done through the interaction of the student with an electronic guide (staff) who instructs and helps the student to select appropriate materials in each semester. The student prints out the table and know the time and place of the lecture through the gate. Besides that, the student gets the subject registration form and Exam schedule of the semester. During the study the student visits the gate to see the ads or to send a message to the management portal to inquire about the subject of the study with regard to access to the results of mid-semester and final progress from the gate.

This is a collaborative process that maintains the workflow in the student affair unit to flow smoothly and all students services will be done in an organized manner. This proves that each member know his/her important role in this process to see that all services are achieved to make up time, since time is an important factor in the registration process.

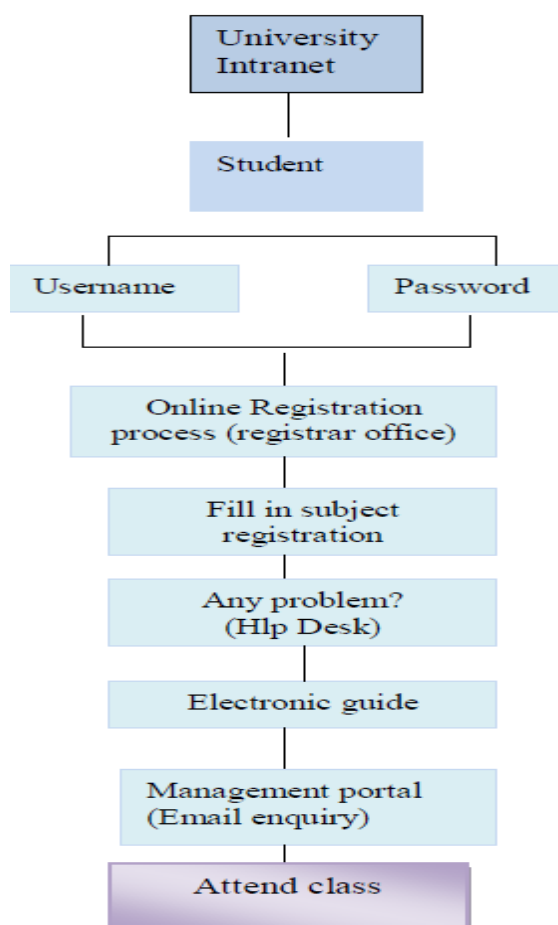


Figure 2 new proposed work flow

## V. CONCLUSION AND FUTURE WORK

This research was meant to introduce technology in this organization to help staff work collaboratively especially when it comes to the student affair division. Most student services are delayed and document approval takes time. That is why this technical system will change the whole process especially when it comes to student registration process. This will help staff to accomplish their tasks and do students services in the right time

Based on the results obtained from the two surveys, the demand is for a technology that enhances the services in the student affair unit as a vehicle to ease all students' applications and documents to be fulfilled on time and without delay. It is of a vital importance for this division to work under an intranet system after the adoption of the internet service within the organization. By designing an intranet system, all applications and services can be done online based on the internet system. As can be seen from the literature, many researchers referred to the importance of the intranet system in the organization.

## APPENDIX

### Organization Workflow

- OW1 Technology supports task transmission among the joint task participants.
- OW2 Internet access is an important factor in the organization. .
- OW3 Employees must stick to the tasks they are assigned to
- OW4 Delay in document approval may result in deficiency in workflow
- OW5 Paper-based work is time consuming
- OW6 Web-based technology helps people to exchange information electronically
- OW7 Electronic mail as a tool helps in automating workflow in the organization
- OW8 Through email, one can send as many documents as possible
- OW9 Workflow technology minimize delays in the process
- OW10 Doing the right thing in the right time is one of the characteristics of office work
- OW11 Workflow servers allow people to share process to perform activities in the process

## ORGANIZATIONAL POLICY

- OP1 I need to have a policy enhanced by the use of technology
- OP2 Having a policy is considered as a guide to achieve your goals
- OP3 Working under a policy helps you to understand your responsibilities and goals
- OP4 Policy in an organization is very important
- OP5 I like to work under disciplinary steps already made within an organization
- OP6 Collaboration based on the use of technology is needed
- OP7 Collaboration using web tools facilitate working.
- OP8 Student affair division is in need to work under a well-defined technical system (e.g. internet, Intranet and groupware)

OP9 A well-defined policy have a positive impact on student service system

OP10 Student services can be enhanced by implementing technology.(e.g., email system, intranet to access documents online).

OP11 Implementing tasks in student affair division takes time.

OP12 Applications (e.g., approval of documents) for students are all done on time Students' services (e.g., updates, notifications for students) can be fulfilled by sending emails to all students.

OP13 Email system helps employees to send and attach files from one person to another in the flow process.

## REFERENCES

1. Abrams,S.Two-made Social Network Analysis as Exploratory Tool for CSCW: *Technology Adotion and Use.2004, vol2., Page 34-46*
2. Ackerman,M.S & Starr, B. *Social Activity Indicators: Interface Components for CSCW Systems.* Department of Information and Computer Science. University of California, Irvine. 1999, vol.1. page 4-12
3. Aqeel-ur-Rehman, Zubair A. Shaikh.. *Intelligent Workflow: A Step towards Intelligent Agent based Academic Workflow System.* Shah Latif Town, Karachi, Pakistan, 2006. Page 45-47
4. Agostini, Alessandra, Giorgio De Michelis, Maria Antonietta Grasso, Wolfgang Prinz and Anja Syri Contexts, Work Processes, and Workspaces in Computer Supported Cooperative Work : The Journal of Collaborative Computing, Kluwer Academic Publishers, 1996, pp. 223-250.
5. Baecker, R.M. Readings in Groupware and Computer Supported Cooperative Work: assisting human-human collaboration. 2004. Page 2-6
- Baker, S.. Getting the most from your intranet and extranet strategies. *Journal of Business Strategy*, 2004, 21 (4), 40-43.
6. Baker, S., Green, H., Blogs Will Change Your Business, *BusinessWeek*, 2006, page 67-69
7. Barber, P. Putting Your Organization on the Internet. THE Grantsmanship Center.. 1996
8. Bentley,R. Horstmann, T., and Trevor, J..The World Wide Web as enabling technology for CSCW: The case of BSCW. *The Journal of Collaborative Computing: Special issue on CSCW and the Web*, 1997, 2-3, 1997, Kluwer Academic Publishers, Amsterdam.
9. Berghel, H. The Client's Side of the World Y&D Web, *ACM*, 1996, 39, 12, 30-40.
10. Berners-Lee, T., Cailliau, R., Luotonen, A., Frystyck Nielsen, H., and Secret, A. the Wide Web, in *Communications of the ACM*, 37(8), August, 1994, pp 76-82.).
11. Best, M. H. *The New Competition - Institutions of Industrial Restructuring*\ Polity Press, Cambridge. 1998, page 7-23
12. Bowers, J. *Conceptual Framework for Describing Organizations COMIC D-1.2*, Lancaster University. 1994
13. Blackmore, P. "The development of an intranet within a college of further and higher education", *ASLIB Proceedings*, 1997, Vol. 49 No. 3, pp. 67-72.
14. Campbell, J.D *Instant messages: a framework for reading between the lines, CSCW 2004.*
15. Castells, M. *The Rise of the Network Society* Blackwell, Oxford. 1994, page 34-36
16. Christensen, U. *CSCW in Organizations: A perspective on workflow, awareness and organizational context*, center for Tele-Information Technical University of Denmark. 2000
17. Curry, A. & Stancich, L. The intranet - an intrinsic component of strategic information management [Electronic version]. *International Journal of Information Management*, 2000, 20(4), 249-268.
18. Dix, A.J., Finley,J., Abowd,G.D., Beale,R. *Human-Computer Interaction.* New York: Prentice Hall. 1993.
19. Ellis, C. A., S. J. Gibbs and G. L. Rein *Groupware: Some issues and experiences in Communications of the ACM*, 1991, vol. 34, no. 1, pp. 38-58.
20. Fichter, D. Recipes for intranet standards [Electronic version]. *Online (Weston, Conn.)*, 2004, 28(1), 51-53.
21. [21]Fisher, D., McDonald, D.W., Brooks, A.L., Churchill, E.F. *Terms of Service, Ethics and Bias. Tapping the Social Web for CSCW Research.* Great America Parkway. 2004
22. [22] Fitzpatrick, G., Tolone, W.J. and Kaplan, S.: M. *Work, Locales and Distributed Social Worlds.* Proceedings of the 1995 European

Conference on Computer Supported Cooperative Work (ECSCW '95), 1995, pp. 1-16.

23. Gerson, Elihu M. and Susan Leigh Star : *Analyzing due process in the workplace.* *ACM Transactions on Office Information Systems*, vol. 4, no. 3, July 1986, pp. 257-270.
24. Greif, I. "Computer-Supported Cooperative Work: A Book of Readings," Morgan Kaufmann, San Mateo, CA.1980, page 4-8
25. G.M. Olson, D.E. Atkins. Supporting collaboration with advanced multimedia electronic mail: The NSF EXPRES Project, in: J. Galegher, R.E. Kraut, C. Egido (Eds.), *Intellectual Teamwork: Social and Technological Foundations of Co operative Work*, Lawrence Erlbaum Associates, Hillsdale, 1990, page 429-451.

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