

WISETales: Designing  
a New Niche Online Community  
for Women in  
Science and Engineering  
to Share Personal Stories

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in Partial Fulfillment of the Requirements  
for the Degree of Masters of Science  
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Saskatoon

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## ABSTRACT

User contributions are vital to online communities; therefore it is important to know how to motivate user participation to ensure flow and quality of content, and to generate more traffic and revenue to community owners. In contrast to previous research which has explored the motivations of participants in already existing online communities, I investigate whether a new niche online community with a particular focus (women in Science and Engineering sharing their personal experiences through stories) can be started through a design that follows best practices for community design and principles derived from theories of motivation.

The design of the WISETales community is based upon insights from literature in three main areas: social psychology, computer science, and gender studies. A social visualization which serves informational, navigational and motivational tool was also developed. One pilot study and two exploratory studies were carried out to evaluate the need for such a community, its design and interface usability. The design of the community and visualization, along with the results from the studies, their analysis and discussion are presented in the thesis.

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## DEDICATION

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## LIST OF ABBREVIATIONS

ICT	Information and Communications Technology
COPs	Communities of Practice
CMS	Content Management System
IRC	Internet Relay Chat
MADMUC	Multi Agent Distributed Mobile and Ubiquitous Computing
PAWS	Personalized Access to Web Services

# CHAPTER 1

## INTRODUCTION

The evolution of information and communications technology (ICT) has enabled people to communicate through the Internet. Whether it is to stay in touch with family members in different parts of the world, to connect with school friends or interact with other people who share the same interests/hobbies or even to collaborate with colleagues at work, people have used technology to their advantage. Communication started out through applications such as mailing lists, newsgroups, message bulletin boards, and then simple text-based chat rooms. Each of these applications improved and developed over time, and they became collectively known as “online communities”. Newer technologies like Web 2.0 allowed users with no programming knowledge to create content and to have control over the way it is shared.

Motivating users to participate in online communities has become vital with the emergence of Web 2.0. Users’ contributions are vital to Web 2.0 applications and online communities; therefore, it is important to understand how to motivate users’ participation to ensure flow of content, to maintain its quality, and to generate more traffic and revenue for community owners. This knowledge is also of interest for researchers from sociology, social psychology and economics who investigate motivations in human behaviour in online communities. Previous research has generally explored motivations of participants in already established, large and thriving online communities. In contrast, in this thesis, I investigate how to motivate participation in a new online community with a specific focus and audience (a niche community). More specifically, I explore if a new online community with a particular focus and audience (women working or studying in the areas of Science and Engineering sharing personal stories) can be started through a design that follows best practices for community design

and principles derived from theories of motivation. This new online community (called WISETales) is used as the platform for this research. This leads to the definition of the research question addressed in this thesis:

*What is an effective way to motivate women in Science and Engineering to participate and share personal stories in the new WISETales community?*

The thesis is organized as follows:

Chapter 2 presents an overview of related work from several areas: gender studies, theories of human motivation, online communities, including the “cold start” problem, and information visualization as applied to online communities.

Chapter 3 is a discussion of my proposed approach to encourage participation, including: the design of the community’s interface, the three factors in WISETales (Document/Media/Human), the design of the community interface, marketing this new online community, how this design and marketing addresses the “cold start” problem, and the pilot study.

Chapter 4 presents WISETales visualization, which provides a visual representation of WISETales stories. Chapter 5 presents the first exploratory study to evaluate the first design of WISETales, while Chapter 6 discusses the design modifications which took place based upon results from the first exploratory study. Chapter 7 presents the second exploratory study and its results. Finally, Chapter 8 presents final conclusions and areas for future work.

## CHAPTER 2

### LITERATURE REVIEW

This chapter presents the literature review from several fields as follows: First, a review of research from gender studies is presented to learn about the status of professional women in Science and Engineering. Next, several theories of human motivation are presented, originating from the fields of psychology, social psychology, economics and organizational studies. Then, a literature review in the area of online communities is presented, followed by the “cold start” problem that faces new online communities. Chapter two ends with an overview of work from the area of information visualization that has been applied in online communities.

#### **2.1 Gender Studies – Literature about professional women in Science and Engineering**

Although most developed countries have an equivalent of the UK Sex Discrimination Act which protects both men and women from discrimination on basis of gender in education, employment and training (Wikipedia, The Sex Discrimination Act, 2008), they all have some type of occupational segregation, based on gender. Research shows two types of segregation: horizontal segregation and vertical segregation. In a horizontal segregation, women are disproportionately over-represented in some occupational sectors (e.g. nursing, education) while being under-represented in others. In a vertical segregation, women are disproportionately over-represented at certain levels of occupational sectors (e.g. junior levels), and disproportionately under-represented at other (e.g. senior) levels (Woodfield, 2007).

A general identification measure on whether an occupational sector is considered to be gender typical or gender atypical is the proportion of employees of a given gender. For example, if 75% of the employees of an occupational sector are female employees, then it is a gender-typical sector, and if less than 25% of the employees are female, then this occupational sector is considered atypical with regards to women employees. In many countries, there are two main types of gender atypical occupational sectors; those involving physically labour-intensive work, and the Science and Technology sectors (Woodfield, 2007).

Despite the variations in the level of work, the sectors that reportedly suffer the most women under-representation are Agriculture, Industry, Finance, and the Science and Engineering fields including Information Technology (Woodfield, 2007). Next, I present data mostly from United Kingdom, based on Woodfield's recent article (2007), yet the findings are representative for other developed countries as well:

*Recent estimates suggest that 60 percent of UK women workers are employed in just 10 out of 77 occupations, with most employed within the '5Cs: Caring, Cashiering, Catering, Cleaning and Clerical' (HMSO 2005:6). The UK is by no means alone in this pattern. (Woodfield, 2007)*

Both horizontal and vertical segregations have pay difference between genders, and each type of segregation has its own effect on women. The horizontal segregation is associated with a lower status in the community and limited potential for professional growth in gender typical sectors. Although this effect is applicable to both men and women when entering each other's dominated occupational sectors, the results are quite different; while men who choose to enter female-dominated occupational sectors, they usually enter it at a higher professional level, get promoted faster and are paid more; women who work in male-dominated occupational sectors achieve a better status than if working in a female dominated sector, yet eventually their professional growth is not comparable of that of their male peers (Woodfield, 2007).

On the other hand, in vertical segregation, although the number of women who reach managerial positions has increased compared to many years ago, these women still make less than 40% of the highly-paid workforce in United Kingdom alone, as reported in



2006. The vertical segregation limits the levels at which women work. For example, in the services sector, more women are working in social services than financial services, and in the education sector, more women occupy entry level positions than senior levels (Woodfield, 2007).

Studies on segregations in the European labour market show that the differences between the number of men and women across fields of employment lead to the difference in distribution, causing the horizontal segregation to be more prominent. Table 2.1 represents the percentage distribution of women at an ISCED 6 level (Advanced research programmes at the tertiary level, equivalent to PhD programs) in European countries (Commission, 2003).

Table 2.1 Percentage of ISCED 6 graduates who are women by broad field of study in EU Member States, 2001

Percentage Women	EDUCATION	HUMANITIES AND ARTS	SCIENCE, MATHEMATICS AND COMPUTING	AGRICULTURE & VETERINARY	HEALTH AND SOCIAL SERVICES	ENGINEERING, MANUFACTURING & CONSTRUCTION	SOCIAL SCIENCES, BUSINESS AND LAW
Belgium	54,5	31,1	33,6	31,2	39,6	15,4	35,0
Denmark <sup>(2)</sup>	X	50,6	32,6	46,6	47,5	23,7	41,7
Germany	41,7	45,2	26,8	52,5	45,5	11,8	32,1
Greece	:	:	:	:	:	:	:
Spain	54,3	45,4	44,6	33,3	48,7	23,2	44,0
France	50,0	56,5	39,3	56,5	57,0	26,8	42,4
Ireland	50,0	54,3	42,7	36,8	60,3	22,2	49,1
Italy	:	57,9	47,7	56,0	66,3	34,4	46,0
Luxembourg	-	-	-	-	-	-	-
Netherlands	:	31,5	25,5	32,8	41,8	13,8	37,2
Austria	62,1	51,4	35,6	51,1	71,9	13,0	39,4
Portugal	66,4	64,2	49,8	56,1	64,9	39,1	46,1
Finland	72,2	45,6	37,4	39,2	62,9	21,2	50,9
Sweden	65,6	44,0	33,0	48,4	52,7	24,1	41,1
United Kingdom	55,2	46,4	38,9	39,6	51,6	18,8	40,2
EU-15 <sup>(3)</sup>	55,4	48,9	35,7	46,5	49,0	20,6	39,3

Source: Eurostat, Education  
Notes: <sup>(1)</sup>Exceptions to the reference year: DK, FR, IT, FI: 2000  
<sup>(2)</sup>Humanities and arts includes education  
<sup>(3)</sup>EU-15: estimate excludes EL, LU. Above exceptions to reference year apply

Women in North America are also under-represented in most of the Science and Engineering fields. Table 2.2 presents data from the University of Saskatchewan on female vs. male undergraduate enrolment for 2005, which shows a noticeable difference between female enrolment in Science and Engineering fields compared to other fields,

especially in the undergraduate level in Computer Science, Physics, Electrical and Mechanical Engineering. On the graduate level the percentage seems higher, but there is a higher fluctuation since the numbers are low.

Table 2.2 Undergraduate enrolment representation at the University of Saskatchewan  
-2005

<b>Female</b>	<b>Male</b>	<b>% Female</b>	<b>Level</b>	<b>Dept</b>	
260	132	66	Biology	200	AR
74	52	58	Biology	300	AR
31	20	60	Biology	400	AR
541	353	60	Chemistry	200	AR
45	40	52	Chemistry	300	AR
11	14	44	Chemistry	400	AR
9	70	11	Computer Science	200	AR
14	107	11	Computer Science	300	AR
11	79	12	Computer Science	400	AR
32	62	34	Geological Sciences	200	AR
15	29	34	Geological Sciences	300	AR
18	39	31	Geological Sciences	400	AR
265	505	34	Mathematics & Statistics	200	AR
33	70	32	Mathematics & Statistics	300	AR
5	14	26	Mathematics & Statistics	400	AR
10	50	16	Physics & Engineering Physics	200	AR
8	47	14	Physics & Engineering Physics	300	AR
4	32	11	Physics & Engineering Physics	400	AR
14	33	29	Agricultural Engineering	000	EN
6	20	23	Agricultural Engineering	200	EN
18	44	29	Agricultural Engineering	300	EN
6	13	31	Agricultural Engineering	400	EN
21	63	25	Chemical Engineering	200	EN
23	36	38	Chemical Engineering	300	EN
44	86	33	Chemical Engineering	400	EN

21	73	22	Civil Engineering	200	EN
23	68	25	Civil Engineering	300	EN
13	54	19	Civil Engineering	400	EN
4	51	7	Electrical Engineering	200	EN
9	82	9	Electrical Engineering	300	EN
12	98	10	Electrical Engineering	400	EN
25	176	12	Engineering	200	EN
22	235	8	Engineering	300	EN
42	164	20	Engineering	400	EN
3	94	3	Mechanical Engineering	200	EN
4	97	3	Mechanical Engineering	300	EN
14	108	11	Mechanical Engineering	400	EN
4	1	80	Biology	800 M.Sc.	GS
26	18	59	Biology	900 PhD.	GS
0	6	0	Chemistry	800 M.Sc.	GS
15	46	24	Chemistry	900 PhD.	GS
7	15	31	Computer Science	800 M.Sc.	GS
26	68	27	Computer Science	900 PhD.	GS
0	2	0	Geological Sciences	800 M.Sc.	GS
9	18	33	Geological Sciences	900 PhD.	GS
1	2	33	Mathematics & Statistics	800 M.Sc.	GS
6	9	40	Mathematics & Statistics	900 PhD.	GS
0	4	0	Physics & Engineering Physics	800 M.Sc.	GS
7	40	14	Physics & Engineering Physics	900 PhD.	GS

One explanation for the under-representation of women in Science is that there are differences in the cognitive abilities of women and men. While some researchers emphasize gender differences, other researchers (Benbow & Lubinski, 1992) argue that these differences are very minimal, to an extent that they should be referred to as gender similarities instead. According to Lippa (2005), the differences do not appear at all under some conditions, and when they appear, they are due to the environment (social setting) surrounding the experiments, i.e. wrong research methods and gender stereotypes.

Research on cognitive development in humans (from preschoolers to high school students) shows that mathematical and scientific abilities develop from biologically-based cognitive abilities that are shared equally by men and women, hence, both genders develop equal aptitude for mathematics and science (Spelke, 2005). Individual differences are not due to general cognitive dissimilarities but due to other factors like individual biology and social surroundings.

Research (Mulemwa, 1996) suggests that men are more motivated than women, and this difference can be explained in terms of the social environment and gender stereotypes (as well) for the following reasons:

1. Men are more motivated than women due to biological reasons, because their hormones encourage them to be more aggressive and competitive.
2. Many cultures encourage boys to set and achieve their goals, while they encourage girls to look after others and give priority to others' goals before their own.
3. Gender stereotyping affects the behaviours of both genders and influences their goals and achievements.

Self-efficacy is also a very important factor in women's success in male-dominated fields. Women with higher self-efficacy (i.e. belief in their abilities to complete a given task) rise up to the challenges of succeeding in gender atypical jobs while women with lower self-efficacy settle down with lower-level jobs that are considered more "gender typical" in their environment. According to (Cohoon, 2007), women's low self-efficacy in their computing abilities is the reason why fewer women enter in computer science programs in comparison to men. A study of female doctoral candidates in Science and Engineering disciplines reported that they had much lower expectations compared to male candidates in terms of completing their relative doctoral program.

Cohoon's results (2007) agree with Lippa's (2005) conclusions that cognitive differences are not the cause of women's under-representation in Science and Engineering, but that instead, the social environment and gender stereotyping negatively affect women's self-confidence by lowering their expectations in these fields, thus directing them away to other socially-accepted fields for females. Cohoon's (2007)

study also shows that the low self-confidence problem was enhanced when the environment was supportive, in this case, the faculty.

The effect of self-efficacy on women's motivation to join Science and Engineering fields is nicely expressed as follows:

*Students with high self-efficacy will approach difficult tasks as challenges to be mastered rather than dangers to be avoided, have greater intrinsic interest in activities, set challenging goals and maintain a strong commitment to them, heighten their efforts in the face of failure and more easily recover confidences after setbacks. (Shull & Weiner, 2002)*

In a study of women-entrepreneurs and the challenges they faced as female business owners, Carter and Cannon (1992) found that many women believed that their problems are mainly related to their own self-confidence and credibility. They also faced cognitive-dissonance between their "typical" role in the community in gender typical jobs and their new role as entrepreneurs, which successful entrepreneurs chose to overcome by placing their professional goals first. What motivated them to continue despite the difficulties was, first, the challenge of owning a business and second, the desire to earn more money. While entrepreneur women identified a lack of professional training as a key difficulty, they came up with various strategies to succeed. For example, when starting their business, women often had to send male business partners to meetings to be able to get their first contracts, and they had to keep up their professionalism, networking and training to maintain their business. Knowing such strategies early in the career can be very helpful for young women.

In the United States, Toussaint (2005) reports that working women are faced with the "glass ceiling" phenomenon, where their professional progress is affected by the social norm in the work environment which evolves around male employees. Since it is not obvious, many women feel that they are treated equally; however, once they reach the border of this invisible box, they realize the limitations to their careers. Welle and Heilman's findings (2005) also point to the issue of subtle discrimination against women in the workforce, which contributes to the vertical segregation. Women can only reach certain high-level positions because they are subtly discriminated in many ways; like

having fewer mentoring opportunities, being excluded from informal networks and facing unwelcoming work environments, where their expertise is implicitly questioned.

There has been a lot of research on how to address the “leaking pipeline” problem in the Science and Engineering fields, where the ratio of female students decreases as they progress from high-school to undergraduate and then to graduate school and faculty positions (Camp, 1997). Others (Svinth, 2006) criticize the pipeline metaphor because it suggests only one possible streamlined career path. In reality, however, women tend to have much more complex paths, by taking time to raise their kids and starting their higher education later, leaving jobs to follow their partners, taking care of ailing or ageing family members and re-entering the workforce again later. Instead of “fixing the pipeline”, these authors suggest that women need support at critical points when they make decisions in their lives. Providing mentorship and advice at these critical points has been found to be extremely valuable (Ingram & Mikawoz, 2006), (Committes, 2006). However, often such advice is missing, simply because women are often isolated, due to their under-representation. An online community can help fill this need.

The purpose of WISETales’ community is to provide a medium for sharing such strategies, advice or warnings in the form of personal stories. In the next chapter, the design of WISETales is described drawing on the previous discussion of theories of motivation, existing online communities, the “cold start” problem, and visualization.

## **2.2 Human Motivation**

‘To motivate’ is to stir to action or feeling (Answers.com, 2008), or as Alexander (1944) states, “To cause a release of energy in relation to a desired goal. Or you may say, a motive is any particular internal factor or condition that tends to initiate and sustain activity”.

People are motivated to participate in communities for various reasons (Murphy, 2006). In order to understand users’ behaviours and interactions online, and be able to steer this behaviour towards what online community owners want, we need to identify

what a motivation is, and how it differs from a goal and a need. According to (Fiedler, 2007):

*A goal:*

*is the purpose towards which an endeavor is directed.*

*A motive:*

*is the underlying reason for actions and goals.*

*A need:*

*is a basic physiological and psychological human requirement, and it's the foundation for motives.*

*In sum, needs drive motives, motives drive goals, and goals can potentially drive strategies and behaviour.*

Early literature in the area of Organizational Science (Alexander, 1944) has categorized the types of motivations and incentives used in organizations into two types: financial incentives and non-financial incentives. Historically, financial incentives were identified and used first. They are easily used (by offering money as a reward for good work) and gave immediate results at work; however, they were not effective in cases where the final goal of the organization was collaboration because this type of incentives raised fear (of losing the job) and led to “attitude” problems among employees when it was used without considering the non-financial incentives (since employees would tend to focus on working individually to get the most monetary value rather than establishing a collaborative work environment).

Non-financial incentives were categorized into three types: interest motivation, social motivation and motivation by promotion and transfer. While interest motivation is related to a person's own interest and pleasure at work, social motivation refers to a person's morale in the work environment (like feelings of appreciation, being heard and respected). Finally, there is the motivation a person feels from knowing that they have a chance of being promoted at work. Therefore, non-financial incentives include a person's interest, social status and a chance of advancement at work (Alexander, 1944).

Recent literature from the area of psychology refers to financial and non-financial incentives as extrinsic and intrinsic motivations respectively. Extrinsic motivation is an external influential factor that affects a person to take a certain action or behaviour. It is not generated from within, and is associated with either rewards or punishments. In contrast, intrinsic motivation is self motivation that comes from within for self satisfaction and it is not initiated by external factors.

While intrinsic motivation is more difficult to achieve, it can strongly affect contributions (Tedjamulia, et. al, 2005). Its influence lasts longer (Mulemwa, 1996) and it is a more powerful stimulus in knowledge-sharing communities than extrinsic motivation (Ardichvili, Page, & Wentling, 2003). The intrinsic motivation also plays an important role in an online community, as the individual factors remain relatively unchanged over time (Zhang & Zhu, 2006). Furthermore, Alexander (1944) suggests that intrinsic motivation must be considered along with extrinsic motivation, as the extrinsic motivation would not have a lasting effect;

*But when financial incentives are used they should be proportional to individual effort, and secondly, they should be used with other types of incentives which take into account social factors. (Alexander, 1944)*

Adults have a greater appreciation for intrinsic motivation which they develop throughout the years, while children can be trained to develop and value their intrinsic motivation by offering them extrinsic motivation first (Mulemwa, 1996).

There are several theories from various fields about intrinsic motivation:

### *2.2.1 Maslow's Hierarchy on Needs*

One important theory in the area of Human Motivation (Norwood, 2007), (Huitt, 2004) is Maslow's Hierarchy of Needs (Maslow, 1943). In this theory, Maslow combined the existing research on Human Motivations at that time in his "Hierarchy of Needs" (Figure 2.1), where people's motivations are derived from two main types of



needs: deficiency needs (the lower four layers of the hierarchy) and growth needs (the top layer of the hierarchy which deals with personal growth) (Huitt, 2004). People aim to fulfill their needs at one level of the hierarchy before moving on to the next level of needs. Once the needs at one level are met, people pursue growth needs and move up in the hierarchy. If at any time a deficiency need rises in one of the previous levels, it is attended first and removed, before continuing to attend to the growth needs.



**Figure 2.1** Maslow`s Hierarchy of Needs

So according to Maslow's theory (Maslow, 1943) once people's basic physiological needs of food and water are met, they seek to satisfy the second level of needs involving security and safety from war or violence. Once that level of needs is met, people seek to satisfy their need for social belonging to family, friends or a group of others with similar interests. Through these social relations they build up their self esteem / ego, and then they seek self actualization in terms of personal growth in education, religion, hobbies or professional advancement.

At each level of Maslow's Hierarchy of Needs, people can be influenced by the external environment (extrinsic motivations) or through their internal psychological and physiological needs (intrinsic motivations) (Reeve, 2005). If we wish to motivate people

towards a certain behaviour, we can either focus on rewarding / punishing them (Reeve, 2005), or work to subtly change their values by emphasizing the personal or social benefit that their behaviour will bring (Fiedler, 2007). In addition, Reeve (2005) suggests that it is not effective to influence people by using both extrinsic and intrinsic motivations at the same time. Yet Alexander's findings (1944) refer to a larger context, the motivation within a job, while Reeve's findings (2005) are about motivations in a specific narrow context, e.g. attracting volunteers or paying people to do a specific task. While applying to intrinsic motivations can work well in attracting volunteers, if some people in the same group get paid to do the job, the motivation for volunteering disappears.

Despite the importance and popularity of Maslow's Hierarchy of Needs Theory, many researchers have criticized it over the years. While early critics (Wahba & Bridgwell, 1976) did not find a lot of evidence to support the existence of a hierarchy, other researchers expanded the theory, for example Alderfer, creating the ERG Theory, as discussed next.

### *2.2.2 Alderfer's ERG Theory*

This theory expands on Maslow's Hierarchy of Needs and classifies needs into three categories (instead of five):

- a. Growth needs (corresponds to Maslow's self actualisation needs)
- b. Relatedness needs (corresponds to Maslow's social and self esteem needs)
- c. Existence needs (corresponds to Maslow's physiological and safety needs)

Furthermore, there is an "addiction" effect; the more satisfied the higher needs are (i.e. growth needs), the more intense they become (Borgatti, 2001). For example, if a person's growth needs involves getting more money, then the more he/she gets, the more money he/she wants.

### *2.2.3 Cognitive Dissonance Theory*

This theory (from social psychology) states that motivation occurs when there is a contradiction between a belief (attitude) and a behaviour, which causes a person to feel uncomfortable (Straker D. , 2002). While behaviour is a public act, i.e. a person cannot deny their behaviour to others, a belief / attitude is more private, so it can be changed easier than changing the behaviour. In case of dissonance, the person tries to resolve it in one of three ways: either change one to match the other, add another consonant belief, or change the importance of the cognitions. Therefore, researchers have focused on changes in beliefs as proof that people are trying to minimize the dissonance. However, cognitive dissonance can be minimized also by changing the behaviour, and thus it can motivate a particular behaviour. For example, although smokers realize the bad effects of their unhealthy habit, they chose to justify it for various reasons, like being under stress; thus they change the importance of smoking compared to another cognition.

### *2.2.4 Herzberg's Two Factor Theory*

This psychology theory distinguishes two types of factors that affect motivation (Borgatti, 2001):

- a. Hygiene factors –factors that do not motivate when present, but if they are not present, would cause demotivation (for example, decent working conditions, food, safety). These factors correspond to the basic lower level needs in Maslow's Hierarchy of Needs.
- b. Motivators –when available - these factors would increase motivation and their lack would not affect it (for example, extrinsic motivators like rewards or intrinsic motivators like a sense of self-satisfaction). They correspond to the achievement needs in Maslow's Hierarchy of Needs.

### *2.2.5 The Theory of Fear*

The Theory of Fear (Dillard & Pfau, 2002) is part of the more general Theory of Discrete Emotions in the area of psychology. According to this theory, people are more susceptible to messages related to avoiding the danger of losing something they have achieved (or threatening a need that they have satisfied). This fear applies across all levels in Maslow's Hierarchy of Needs. People are afraid to lose whatever they have achieved at any level of needs, most acutely at the level which is threatened at the moment; i.e. losing their social status or losing their privacy, and they would be strongly motivated to take the necessary actions to avoid the danger.

### *2.2.6 Social Exchange Theory*

According to this sociology theory, a person investigates all possible actions first in order to pursue the one with best return for minimum cost. According to this theory, four incentive mechanisms are highlighted: anticipated reciprocity, personal reputation, social altruism and tangible rewards. This theory was found applicable in learning communities (Hummel, et al., 2005), where their use increased users' motivation to contribute to the communities.

### *2.2.7 Self-Determination Theory*

This theory evolved in the area of psychology from the Organic-Dialectical Meta Theory which states that people are active organisms that strive to grow. Their surrounding environment - the social context - affects this growth by either supporting or preventing it. This theory was developed into four mini-theories that share the Organic-Dialectical Meta Theory and the concept of basic needs (Deci & Ryan, 2008).

#### 2.2.8 Cognitive Evaluation Theory

This theory investigates the effects of the environment (the social context) on intrinsic motivation. Intrinsic motivation has been proven to increase in situations where self-determination is higher; i.e. in situations where people have more control or freedom over their choices in an action. According to Zuckerman et al (1978):

*The most common theoretical definition suggests that intrinsically motivated behaviours are energized and directed by a basic, innate need to interact effectively with the environment and to have an impact on the environment, i.e. people need to feel competent and self-determining; they need to feel a sense of personal causation. (Zuckerman, et al., 1978)*

#### 2.2.9 Social Comparison Theory

Building self esteem / ego is an important motivator for contribution in online communities. People choose to prioritize their behaviour - to maintain their ego through Self Regulation (Gollwitzer & Bargh, 1996). This social psychology theory suggests that people always compare themselves with others who they perceive as their peers. This comparison can have either upwards or downwards direction. In a downward comparison, people compare their status with that of others with fewer accomplishments, which leads to a feeling of satisfaction and boosts their self esteem and ego. In an upward comparison, people look up to others who have accomplished more and act to improve their status. It is unclear if a tool designed to trigger upward comparison will trigger upward or downward comparison in reality (Suls, Martin, & Wheeler, 2002). Nevertheless, social comparison has been used in the design of online communities by highlighting users' contributions, and has been found effective in increasing users' contributions (Cheng & Vassileva, 2006).

#### *2.2.10 Reciprocation Theory*

Another theory that is related to users' motivation is the Reciprocation Theory from behavioural economics. Researchers have found that people tend to return favours that others made to them in the past, and in this way reinforce social relationships. When users in online communities feel the benefit from others' contributions, they feel obliged to contribute in return (Fehr, Fischbacher, & Gächter, 2002). The reciprocation can happen between one user and the community as a whole (Sun, 2005), or between pairs of users within a community (Webster & Vassileva, 2006).

#### *2.2.11 The Common Identity and the Common Bond Theories*

The Common Identity Theory and the Common Bond Theory originate from the area of organizational studies and have also been used to analyze people's motivations. While the Common Identity Theory focuses on the relationship of an individual with a group as a whole, the Common Bond Theory investigates personal relationships among individuals within a group. In online communities, users are motivated to contribute because they either associate strongly with the community as a whole, and they work hard together to succeed in achieving the community's purpose, or they are motivated to establish strong relationships with certain users in the community. The motivation to contribute to the community may also be a mix of these two motivations (Ren, Kraut, & Kiesler, 2007).

So, in summary, extrinsic motivations have been heavily explored, but not much investigation has been done on intrinsic motivations – specifically in the context of online communities. Researchers have identified a variety of reasons behind the intrinsic motivations of employees at work, according to Fuller & Dornbusch (1988). These factors include:

1. Employees appreciate duties that serve towards the goals of the organization as a whole, which can be explained by the Common Identity Theory.

2. Employees' motivation is positively influenced when they appreciate duties they know they expect to succeed in (can be explained by the Expectancy Theory, where a person is motivated to take an action when the likelihood of being able to complete it is high (Straker D. , 2002) ).
3. Intrinsic motivation does not begin with individual employees, but emanates from the social environment; i.e. the organization sets the motivations to accomplish duties in terms of rewards or recognitions. But then, would this be intrinsic motivation at all?

Most of the studies have focused on real interaction environments (e.g. workplaces) and little on interactions in online communities. Some researchers, e.g. (Zhang & Zhu, 2006) have studied the intrinsic motivations that drive people to join open source communities, and have identified another set of factors that affect intrinsic motivations;

- a. Individual factors: like having a sense of purpose, and self-determination where an individual has the choice over an action (increases their sense of autonomy),
- b. Interpersonal factors: like having a sense of competence (ability to perform well), and self-relatedness to the environment.

A more recent study (DiMicco, et al., 2008) shows that in a work environment, employees were motivated to participate in their work-related social network - 'Beehive' for three reasons: caring (a way to connect socially with their co-workers), climbing (a way to network for future career development) or campaigning (to get support for their work-related assignments).

On a final note, the literature surveyed indicates a difference in how researchers perceive the interaction between extrinsic and intrinsic motivations. On one hand, there is an agreement that extrinsic motivations always have a negative effect on intrinsic motivations (e.g. one cannot normally expect to have both volunteer and paid contributions in the same system). Therefore, extrinsic and intrinsic motivations should not be used in the same group of people (Reeve, 2005). On the other hand, some researchers say that this is true under certain conditions only. For example, according to

Alexander (1944), extrinsic motivations should not be used alone, but should incorporate some aspects of intrinsic motivations in the same group of people. Apparently, the context (both social and personal) plays an important role in the interaction between intrinsic and extrinsic motivation.

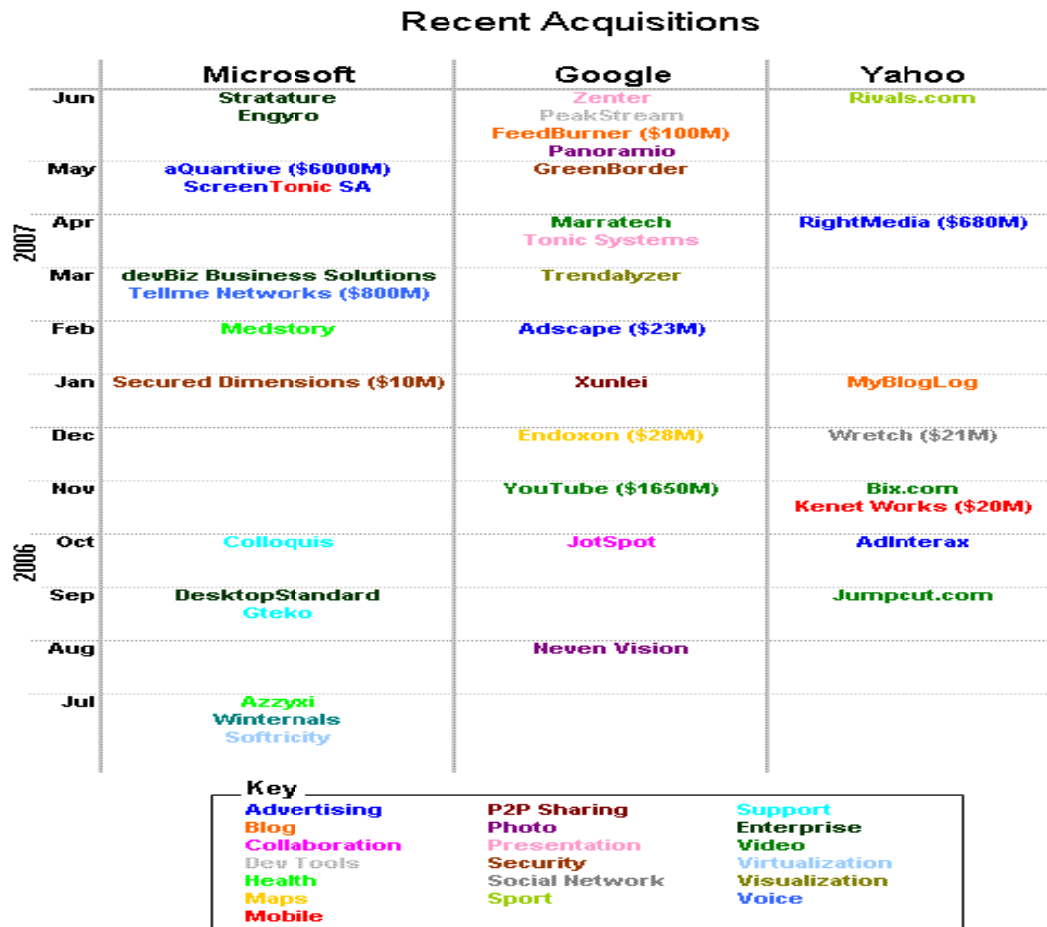
### **2.3 Online Communities**

People are social by nature. They tend to connect easily with others who share their interests and opinions. These connections boost their self-esteem (Festinger, 1954), increase their sense of security (Reed, 1999), and allow them to establish status and build a reputation (Festinger, 1954).

Aside from formal communities (like at school, work, club, etc.), people tend to form informal groups known as Communities of Practice (COPs) (Sharp, 1997). These groups consist of a small number of people (usually up to a maximum of fifty people) who meet informally. One example of a COP is a small group of employees at a company that meet during their coffee breaks. These employees hold different positions in the company, yet, during their coffee break, they get together to enjoy coffee and a small talk about anything they need to learn about or to understand. COPs serve as powerful networking mediums and knowledge sharing resources (Ardichvili, Page, & Wentling, 2003).

The late 1990s brought a revolution in human communication through the Internet. The availability of cheaper computers, more service providers and the development of the Web allowed people to communicate virtually through online communities (Preece & Maloney-Krichmar, 2003). The online communities help bring together people of different backgrounds and geographical locations to share a common interest and build rewarding virtual social relationships (Heckman, Li, & Xiao, 2006). The online communities allow their members to share common goals and interests, engage in active participation, access and contribute to shared resources, and establish their own social behaviour and social norms.





**Figure 2.2** Recent acquisition chart (Scott, 2007)

With the development of web technologies that empowered end users to create content, Web 2.0 online communities emerged (e.g. Flickr, Del.icio.us, YouTube or Facebook) which entirely depend on users' contributions. These online communities along with others proved to be powerful and important in terms of the number of members, opening up the possibility for new markets. That encouraged big companies to purchase them for millions and billions of dollars, as shown in Figure 2.2, which presents a recent acquisitions comparison between the three software giants; Microsoft, Google and Yahoo for the years 2006 and 2007.

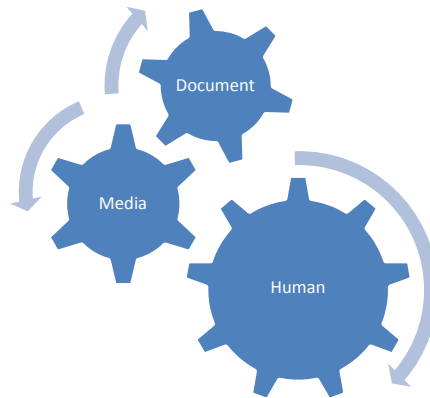
For example, one of the most popular online communities is YouTube where people can share videos through the web. It allows users to watch videos, and registered users to

upload videos. In 2006, it was reported that YouTube was hosting around 6.1 million videos and had about 500,000 user accounts (Wikipedia, 2008). It was purchased by Google in 2006 for US \$1.65 billion dollars, demonstrating the willingness of big companies to spend billions of dollars to get hold of successful online communities with a large number of members. Rather than buying the software, the companies actually buy the community of users; thus they avoid starting a brand new community, or suffer from the so-called “cold start” problem.

Web 2.0 online communities shift the power of controlling the content, moderation, growth and culture of the communities from their original community owners and creators to their members. The success and failure of an online community is dependent on its members’ activities and contributions. While some online communities flourish and grow bigger to an extent where members start creating their own sub communities or suffer from excessive amount of content (Tedjamulia, et al., 2005), other online communities struggle to attract members and maintain quality content to stay afloat.

While some members are active participants contributing a higher amount of content to the online community, others are “lurkers” (Nonnecke & Preece, 2000) (often referred as “social loafers” or “free riders”) with lower levels of participation (Beenen, et al., 2004). The level of members’ participation is important to creating the necessary content that maintains online communities and attracts new members to join.

Although online communities seem to vary in their purposes, content types, goals and target audiences, they are all affected by three main factors: content, design and audience (Maloney-Krichmar, Abras, & Preece, 2002). These factors will be referred to in this document as the Document factor, the Media factor and the Human factor (Figure 2.3). In the next section, I will discuss these three factors as an organizing structure and their relevance to the literature review about online communities and best practices in their design.



**Figure 2.3** Three factors that collaboratively affect an online community

### *2.3.1 The Document Factor*

The Document factor refers to the type of documents people share in the online community which becomes their social interaction tool. Apart from the common notion of a “document” which brings to mind the image of a paper with typed text, technological advancements have revolutionized “documents” in the virtual world to represent information transferred between users in many different formats like video/audio files, emails, forum posts or blogs (Brown & Duguid, 1996). In an online community, the documents shared between its members define its identity, and become the essence of interaction between them. The more documents shared, and the higher quality and diversity of documents, the more interested users will be in reading these documents and eventually contributing themselves.

The relationship between documents and users is defined as a “contribution”. Typically, one makes a contribution by bringing a new document to the community. Users who do not contribute new documents but only read documents contributed by others are known as lurkers. However, the distinction between active contributors and lurkers is unclear. For example, would posting two articles a month be considered lurking in a forum community which has twenty posts a month or in a forum which has 200 posts a month? Although lurkers were initially considered harmful (Adar & Huberman, 2000), further research showed that they also contribute to an online

community (Nonnecke & Preece, 2000), just like an audience contributes to a theatre performance.

Even though documents shared in online communities are `*public goods*` (Kollock, 1999), these “documents” do not get diminished if read or downloaded by lurkers. Moreover, the more they are perceived as public goods, the easier they flow in the community (Ardichvili, Page, & Wentling, 2003). For instance, a peer-to-peer online community that allows users to share media files benefits from having a certain number of lurkers who download rather than upload content, since the online presence of these lurkers supports the peer-to-peer infrastructure of the community. Furthermore, lurkers could eventually contribute content or bring more users to the online community by word of mouth. So we can talk about a range of contributions that users can make towards the documents shared in an online community, ranging from more passive (reading, ensuring the infrastructure for sharing), to more active (rating documents, tagging, commenting, alerting / notifying friends about new documents or creating new documents).

Documents are also a commodity that users can exchange in some communities for rewards like money or reputation. Providing incentive mechanisms in online communities can trigger users’ motivation to contribute documents in anticipation of reciprocity, to maintain their reputation (self esteem/ego) or to achieve a sense of self-efficacy (Kollock, 1999). Various incentive mechanisms have proven useful in different online communities to control the quality and quantity of users’ contributions. For example, the large online community Slashdot (which provides news on technology topics, mainly related to open source software) uses Karma (virtual reputation) to motivate users to contribute documents (Lampe & Resnick, 2004). Once users achieve a certain Karma level (helps build their self esteem / ego), they are qualified to become moderators, which gives them power to steer the directions of the community and achieve a form of self-actualization.

Another example is the incentive mechanism for participation applied in Comtella, a small educational online community developed in the MADMUC lab at the University of Saskatchewan, where students share course-related papers from the web. Students were motivated to increase the number and quality of their contributions and to rate each

other's contributions by modeling users' participation and activities, and classifying users into different levels and lead to different memberships (bronze, silver and gold) and different privileges. Each level had a differently-colored interface and search options (Cheng & Vassileva, 2006). Users were also able to view themselves and others in the community in a specially-designed motivational visualization which, as predicted by the social comparison theory, appeals to the user's self-esteem / ego (Vassileva & Sun, 2007), and motivated them to contribute more.

### *2.3.2 The Media Factor*

The second important factor that should be taken into consideration when creating an online community is the Media Factor. Since each online community must serve one or more specific purpose(s), it is important to be aware of various technologies (community infrastructures) that aid in reaching these purposes. Today's online communities started when the Web became popular (Preece & Maloney-Krichmar, 2003). They evolved with the continuous development of web technologies. In the beginning, mailing lists were available for people with computer skills to communicate online (after registering) and to leave messages to each other. With the growth of mailing lists, it became harder to read all posts sent to everyone. Newsgroups emerged allowing a more convenient group interaction and user anonymity. However, newsgroups developed problems with increasing number of hostile posts and spamming. The message bulletin boards (discussion forums) made it easier to find groups of interest but seemed a bit confusing for newcomers trying to join conversations and follow up on threads.

The evolutions of technology lead to text-based chat which offered real time communication, but all of the participating users had to be online at the same time. This was followed by more attractive graphics chat environments which allowed synchronous interaction with sound, graphics and animation but needed more processing and memory power along with specific software downloads (Preece & Maloney-Krichmar, 2003).

Web 2.0 applications like Wikipedia (Wikipedia, 2008) and YouTube (YouTube, 2008) revolutionized the relationship between an online community and the user because

they are entirely based on users' contributions. Easy to use tools and services allow users to configure their spaces with respect to layout and functionality. In the future users will have the tools to negotiate and configure their social spaces.

There are certain factors that contribute to the success of Web 2.0 online communities. For example, looking at the success story of Wikipedia, a *scalable infrastructure* is required to allow for many users and extensible functionalities to form the basis for a successful online community (Prasarnphanich & Wagner, 2008). *Ease of use* is paramount to attract users of different backgrounds and computer skills to participate and contribute content (Fogg, et al., 2003). *Immediate feedback* to users' contributions is rewarding and motivating (Webster & Vassileva, 2006), and makes the interface easier to comprehend and interact with (Norman, 1988).

### 2.3.3 The Human Factor

The Human Factor is the most dynamic and unpredictable factor. Humans are diverse in their ideas, cultures, beliefs and goals. Their behaviour changes are not always predictable as sometimes they are based on cognitive assessment of a situation, and other times it is based on a change of mood. These behaviour changes occur on a daily basis through face-to-face communication in real life. It is worthwhile to investigate human behaviour, and more specifically, to understand what the human's basic needs are and how they are prioritized.

If we apply Maslow's Hierarchy of Needs theory (Maslow, 1943) to online communities, once the basic needs of availability of Internet access and usability of the technology are met, and once users feel secure about the online community in terms of trusting the community's credibility and the implementation of privacy and security policies, they can look for online social relations with other members and comfortably pursue social belonging. These online social relations can boost their self-esteem and help them reach the stage of self-actualization (for example, by becoming moderators and steering the direction of the community). Finally, there are several different theories in Social Psychology (reviewed in Section 2.1) that identify social motivations behind

users' actions. Some of these theories resonate with the existing best practices in software tools design which have proven to be effective in motivating users to contribute more. For example, according to the Social Comparison Theory, users can be motivated to contribute more when the environment allows them to compare themselves to others (Suls, Martin, & Wheeler, 2002). Correspondingly, displaying a ranking of users with respect to reputation in YouTube (YouTube, 2008) has stimulated users to invest a lot of time and effort to contribute content.

## **2.4 The “cold start” Problem**

The “cold start” problem faces any type of online community in the beginning, when the media has been launched, but there is no content yet and/or no users. In online communities, the “cold start” problem refers to the difficulty of starting a new online community from scratch until it attains the necessary amount of content (called “critical mass”) to become sustainable.

The “cold start” problem manifests itself in every system that depends on user participation. For example, researchers in the area of recommender systems have reported the difficulty of correlating the ratings of a given user with those of others and generating personal recommendations in the beginning where there are few ratings in the system (Konstan, et al., 1997). Online educational or professional development communities have also experienced difficulties starting with no users or content (De Paula, 2003). Community support systems that provide various support services to customers initially run into the problem of not having users as well (Kock, 2002).

In the real world, it is well known that fundraising is hardest at start. Once the initiative attracts a critical number of sponsors, they start attracting other sponsors.

Motivating users to participate in online communities is an important research topic that has been studied by many researchers who implemented their concepts in either an already existing and active online community that has many users and content, as in the movie-recommender system MovieLens (Harper, et al., 2007), or in a specific online

community that can be controlled in terms of the number of registered users and their contributions as in Comtella (Cheng & Vassileva, 2006).

So why is it hard to attract user contributions in new online communities? According to (Tedjamulia, et al., 2005), while some members of online communities face challenges in terms of costs (e.g. time, effort, difficulties accessing the community), others are faced with the Knowledge Sharing Dilemma; i.e. since consuming documents does not affect their availability and quality, why contribute?

To overcome the “cold start” problem, researchers have either provided existing content or imported existing user profiles into their systems (Turner, 2007). In practice, when the community is used within an existing organization, various incentives can be used to attract users. For example, in an educational context the use of the online community can be necessitated by requiring students to submit their course-work, or by providing bonus or participation marks (Cheng & Vassileva, 2006).

Another way to explore this problem is to go back to the design of an online community taking into consideration the three factors (document, media and human) influencing an online community introduced earlier. In order to start and maintain a successful online community, nine design principles which revolve around the three factors were identified as keys to success (Kim, 2000). These principles include:

- Identifying a goal of the community (by considering the human factor);
- Having a flexible environment (media factor);
- Establishing users’ profiles (media factor);
- Assigning roles in the community (human factor / document factor);
- Assigning leaders to projects (human factor);
- Encouraging social norms (human factor);
- Promoting events (document / human and media factors);
- Creating and celebrating special community occasions (document / human and media factors);
- Assisting users in creating and managing their own subgroups (human factor) (Kim, 2000).



Finally, the use of a suitable social visualization (which will be discussed next) can play an important role in tying together the document, media and human factors in an online community by providing a map of the community and documents for users to navigate.

## **2.5 Visualization**

Visualizations assist humans with data analysis by representing information visually. (Tory & Moller, 2004)

Visualization, if used appropriately, is a great tool to represent data. A representative visualization can successfully summarize vast amounts of data in a small space, highlight important data, facilitate data access and enable users to learn more about the information presented in a shorter time since “image recognition is significantly faster than word recognition” (Brath, 1999). For example, online community visualization can show the community members and the relationships between them, and record the member’s social history in the community (Viégas et. al., 2004). However, an inappropriate visualization can be very confusing and misleading to users.

Users have diverse backgrounds and technical abilities; therefore, visualizations should be designed to be simple, easy to understand, and facilitate locating the information users want. Although the visions and metaphors behind visualizations vary, successful ones share some common characteristics. Shneiderman (Shneiderman, 1996) offers seven abstract information seeking tasks: overview, zoom, filter, details-on-demand, relate, history and extract. Carr suggests a number of guidelines to help designers direct their visualization in a representative, easy and meaningful way to users (Carr, 1999):

- Visualization is not always the best solution;
- User tasks must be supported;
- The graphic method should depend on data;
- Three dimensions are not necessarily better than two;

- Navigating and zooming do not replace filtering;
- Multiple views should be coordinated;
- Test your design with users.

There are several areas where visualization techniques are used:

*Information visualization* is a graphical representation of data that allows users to see and interpret data patterns. It focuses on important data characteristics and their relations. Information visualization developers must come up with creative ideas to graphically convey plain data to users, in a way they can relate to and comprehend. This task can be either simple or complicated depending on the nature of information that has to be represented (Carr, 1999).

*Scientific visualization* is the “study concerned with the interactive display and analysis of data” (Tech, 2008). It focuses on trying to understand and analyze data rather than displaying data in an easy to overview way. It is mainly used when trying to analyze a natural phenomenon (Carr, 1999), as for example in meteorology.

*Knowledge visualization* “aims to further transfer insights, experiences, attitudes, values, expectations, perspectives, opinions, and predictions by using various complementary visualizations” (Wikipedia, Visualization, 2008).

Visualizations of online communities have emerged recently. The area of *social visualization* can be considered as a sub-area of knowledge visualization, since social visualizations are purposefully designed to highlight particular factors in the community with a specific purpose (e.g. to inform users about particular patterns in the community or to change the attitude of viewers). Some visualizations focus on the “document” factor. For example, “Coterie” (Donath, 2002), is a visualization implemented in an IRC Chat system to display active discussion threads and their participants. The titles of the active threads appear on a white space, and darker coloured ovals at the bottom of the visualization represent current users participating in the corresponding thread. Other visualizations focus on the users’ presence in the community and their contributions. “PeopleGarden” (Donath, 2002), visualizes a discussion board, which uses the metaphor of a garden with flowers, each representing a different user. The longer the flower is, the

longer the user has been in the community, the more posts they have contributed, the more petals their flowers have.

*Anthropomorphic Visualization* (Perry & Donath, 2004) depicts each user in a small human miniature that has facial expressions which correspond to the emotional tone of their message. A bigger size of the miniature represents a user with more contributions, while the distance between the miniature's legs (indication of a firmer status in the group) represents the importance of the member in the community. Other visualizations raise awareness of interpersonal relationships between users in the community and highlight reciprocal relationships, hence engaging lurkers with active members. "Relavis" for example, is a two-dimensional-relation-visualization where the viewer sees all other users in the community scattered in space like a coordinate-system, where each quadrant represents the relationship between the viewer and other users in terms of 'unknown', 'you see them', 'they see you', and 'you see each other' where 'seeing' here refers to the act of reading, rating and commenting each other's contributions (Webster & Vassileva, 2006).

It is useful to remember that although these visualizations look very different from each other and follow different metaphors, each serves a certain purpose within the context of the community in which they are built, and is tailored to suit the target audience of that online community.

For this research work, a new online community (called WISETales) is developed, which targets professional women in Science and Engineering, whom are discussed in the next section.

## **2.6 Summary**

In summary, the literature review covered work from the areas of gender studies, human motivation, online communities, the "cold start" problem, and visualization. The review of gender studies literature shows that women are under-represented in the fields of Science and Engineering for many reasons: their lack of self-confidence, gender stereotyping in their social environments, lack of mentorship, professional support and

networking opportunities, the “glass ceiling” phenomenon, subtle discrimination at the workplace, and others. Therefore, an online community that allows women in these areas to connect, share their experiences, and support each other, can be helpful.

The literature review in the area of online communities helped identify the main factors, from a design point of view, that are involved in creating successful online communities. Various kinds of online communities exist which differ among each other depending on three main factors: the human audience they attract with their goals and values, the type of documents that are shared in them, and the media that implements the community infrastructure. All communities struggle with the “cold start problem” in the beginning and when starting a new community; it is very important to decide what documents will be shared, how the community infrastructure will be designed, and what audience will be addressed.

To start a community for women in Science and Engineering, it is important to investigate in particular the human factor – e.g. to find what would motivate them to participate. Unfortunately, there doesn’t seem to be any research literature addressing this question. However, researchers who study human motivation have identified two types of motivations: extrinsic motivation (through money or glory) and intrinsic motivation (through self-actualization). Intrinsic motivation is a longer term motivation, but it is much harder to induce in people than extrinsic motivation. Researchers have incorporated motivational tools in the design of online communities to stimulate participation. These tools have been influenced by different theories of motivation. One commonly used tool is social visualization, which creates awareness among community members. Previous research has shown that it was possible to stimulate participation by triggering extrinsic motivation in terms of glory / reputation through social comparison. No previous research has reported the use of motivational tools or social visualizations addressing intrinsic motivation in the users.

## CHAPTER 3

### PROPOSED APPROACH TO ENCOURAGE PARTICIPATION

*The physics of participation is much more like the physics of weather than it is like the physics of gravity. We know all the forces that combine to make these kinds of things work: there's an interesting community over here, there's an interesting sharing model over there, those people are collaborating on open source software. But despite knowing the inputs, we can't predict the outputs yet because there's so much complexity.*

*The way you explore complex ecosystems is you just try lots and lots and lots of things, and you hope that everybody who fails fails informatively so that you can at least find a skull on a pikestaff near where you're going. That's the phase we're in now. (Shirky, 2008)*

The research question of my work is:

*What is an effective way to motivate women in Science and Engineering to participate and share personal stories in the new WISETales community?*

From the literature review discussed in the previous chapter, the following challenges can be identified in answering the research question stated above:

#### **Challenge 1:**

What can motivate this specific group (women in Science and Engineering) to put the time and effort to share (write), read and comment on others' stories?

As we saw in Chapter 2, there is a lot of research on human motivation, more on extrinsic motivation rather than intrinsic motivation, and there is virtually no research on what motivates women in Science and Engineering particularly.

### **Challenge 2:**

What medium is going to be used to research this question?

Many researchers choose to use data sets from existing communities. For example, Beenen, et al. (2004) and Harper, et al. (2007) use the MovieLens datasets, while Lampe & Resnick (2004) use the Slashdot dataset. While there exist several online communities for women to share personal stories related to their life-experiences (to support single mothers, mothers of sick children, ..etc), there is no existing community for women in the area of Science and Engineering to share personal stories. Therefore, a new online community has to be built. This decision has advantages and disadvantages. The advantages are that I have the freedom to design and shape the community as I want and I have full access to the data. The disadvantage is that to be able to study the effect of different motivational approaches, a ‘critical mass’ of active users needs to be reached. Yet, it is a relatively small (niche) group – what is a “critical mass” in such a group? This leads to the next challenge.

### **Challenge 3:**

The “cold start” problem. How to deal with it?

The literature shows that the “cold start” problem is a very difficult problem to solve. Other researchers have dealt with it by either providing extrinsic motivation for members, or by creating a community that is used in an organizational context, e.g. accompanying a university class (Cheng & Vassileva, 2006), (Webster & Vassileva, 2006), (Vassileva & Sun, 2007). However, it would be hard or impossible to apply rewards to enforce use in a geographically scattered community of women professionals and students. There are a number of “best practices” and guidelines defined in the popular and business literature on starting new communities. This research presents an opportunity to test these practices and guidelines.

When will I know that I have solved the “cold start” problem?

Finding no guidance in literature, I set a threshold based on my intuition and conversation with colleagues – also women in Science and Engineering. The goal of 2-4 stories a month is reasonable for this community – because professional women in

Science and Engineering are extremely busy. As the community and the number of documents grow, users will be encouraged to focus on specific interest areas and moderate the submitted stories themselves. The design of the community took into account some of the motivational theories discussed in Chapter 2.

#### **Challenge 4:**

What motivational approach is going to be implemented?

Social visualization has proven to be quite successful in stimulating participation by creating conditions for social comparison and social reciprocation (Vassileva & Sun, 2007). Therefore, I would like to explore the usefulness of visualization for this type of community. However, what specific purpose should the visualisation achieve? It depends on what motivates women to participate. If it is social comparison, the visualization should stimulate social comparison. If the motivation is intrinsic, the visualization should seek to stimulate intrinsic motivation in the viewer, in coherence with some of the discussed theories. Once it is decided what the purpose of the visualization is, I have to decide what the metaphor will be, and what the actual design of the visualization will look like, if it will be interactive or not, personalized or not.

By dealing with this set of challenges, my research will attempt to answer the main question.

### **3.1 Motivating User Participation in WISETales**

An important question to investigate is what would motivate women, specifically in the fields of Science and Engineering, to participate and share their personal stories. In this research, I investigated whether women in Science and Engineering would be intrinsically motivated to participate in WISETales (by emphasizing the goal of WISETales in the design and visualization), rather than extrinsically motivated (by social comparison, seeking reputation or monetary rewards). Intrinsic motivation encourages members to build the online community for reasons like their own personal satisfaction of helping others (self-actualization) or relating to the goal/cause of the

community (The Common Identity Theory). Since my target audience are adults rather than children, intrinsic motivation is applicable in terms of a motivating mechanism for participation in the research's online community.

Research in intrinsic motivations for contributions has found different types of intrinsic motivations like members' sense of belonging, reciprocity, obligation, pro-social behaviour and altruistic reasons (Tedjamulia, et al., 2005). While all these play a role for the individual member's contributions to WISETales; I investigated one motivation in particular – feeling attachment to the community as a whole, to its mission, identity and purpose, as suggested by the Common Identity Theory, because to me, it seemed to be the most suitable one.

To enhance the intrinsic motivation, a community visualization was designed to encourage women to participate and share their personal stories for the benefit of all women in Science and Engineering. I developed two visualizations (a main one and a modification of it) which are inspired by the Common Identity Theory to emphasize the effect of collaborative contributions rather than highlight the relationships among members of the community. Their design is presented in the next chapter.

### **3.2 The three factors in WISETales (Document / Media / Human)**

#### *3.2.1 The Document Factor*

Some of the most effective ways of creating and communicating knowledge are informal. They are not based on textbooks, but through conversation, storytelling and dialogue (Thomas, Kellogg, & Erickson, 2001). Personal interactions are important because knowledge is not just representation of what is on one's mind; it also involves its interpretation by others (Walsham, 2001). When people learn from texts, only one side of the knowledge building takes place; the reader cannot validate that their interpretation is correct. Interactions with the author can reduce this problem and the reader can argue, ask questions and validate their understanding with the author. At the



same time, the author can assess readers' interest and understanding, and potentially re-evaluate their own understanding and knowledge.

Narratives have always played an important role in informal learning, because humans have narrative brains (Newman, 2005). Through narratives, people define their identity and roles in relation to those of others. The author of a story learns through personal reflection at the time of writing and by reflecting from different viewpoints, after seeing comments to her story. Readers learn through relating their own experience to that of others, and through the realization that their experiences are not unique, but shared by many. They learn also through explicit advice and discussion, as well as through comments given to provide support and encouragement.

According to Wikipedia, "Storytelling is the ancient art of conveying events in words, images, and sounds often by improvisation or embellishment. Stories or narratives have been shared in every culture and in every land as a means of entertainment, education, preservation of culture and in order to instill moral values."

*Story telling is a feminist teaching strategy endorsed for the value it places on the personal, and for its capacity to develop a voice among women who historically have been silent. .... because moral experience, like all lived experience, always occurs in time and in relationship...whenever an individual has to report "what really happened", the natural impulse is to tell a story, to compose a narrative that recounts the actions and events of interest in some kind of temporal sequence. (Bowman, 1995)*

By sharing stories about personal experience, women can educate, support or warn other women going through similar situations. While positive stories encourage women in their professional journey by providing a role model's original stories, negative stories project a realistic depth into the unfortunate and current obstacles and difficulties they experience at various levels. The diversity and richness of the posted stories would serve many women in different stages in their lives and careers.

The choice of having stories as "documents" in this online community is justified by the need for such a community. Despite the availability of many different online communities for women, none of them target this specific audience and none could be found (at the time of this research) that focus on sharing stories. Another reason for

choosing stories is that women in general like to talk about their problems, not necessarily to get answers, but simply to share joys, worries and vent frustrations. Finally, as a result of story-sharing online, a repository of narratives evolves providing a deep and realistic perspective of the life and choices females in Science and Engineering face, which could be used as a resource for researchers in gender studies, sociology, and business (human resources).

The goal of the new online community (called WISETales) is to provide an online support group for professional women in Science and Engineering fields where they can share their experiences, learn from others, help advise and encourage others (through comments). The diversity and richness of the posted stories would serve many women in different aspects of their lives, like the beginnings and difficulties of their careers, issues with safety or harassment (at home, school or work), relationships with others (e.g. professors, bosses, colleagues, friends or family members), their personal reflections on their own experiences and stories of their own achievements.

The approach of having group support for sharing the stresses or failures of professionals proved useful to individuals who participated in it since it convinces them that many of their concerns are relevant to people in diverse careers (Daniell, 2006). An online community for sharing stories would not only help women vent out their frustrations, it would also raise awareness of the fact that they are not alone, as most of the experiences they encounter repeat themselves in different environments, which would hopefully boost their self-efficacy and encourage them to help other women in Science and Engineering.

The document space was “seeded” by posting two personal stories so women can see examples of the type of stories that can be shared. The first story, is a memoir of a school experience where a good Math teacher made a difference in the lives of his students. The second story is about a female teacher’s experience in a male-dominated class, the challenges she faced and how she managed to overcome them.

### 3.2.2 The Media Factor

The choice of having an online community is due to the fact the women in Science and Engineering do not reside in the same area. They are scattered in many different geographical locations, and developing an online community is the easiest and fastest way to reach them.

The Drupal Content Management System (CMS) was used to implement the community's infrastructure because at the time of development, it was the most powerful software available in terms of the flexibility of adding new functionality and in the long run, it is easily scalable. It also offers many freely available add-on modules. Table 3.1 summarizes the software used for the implementation of WISETales:

Table 3.1 Software used for the implementation of WISETales

<b>Engine</b>	<b>Drupal 5.2</b>
<b>Database</b>	My Sql 5.0.45
<b>Web Dev. Script. Lang.</b>	PHP 5.2
<b>Environment</b>	Apache 2.2

Drupal is open source software that was created by Dries Buytaert in 2001, and written in PHP. It is a web-based, content management system allows users to publish and organize content. Since Drupal is modular, i.e. consists of downloadable extensions/modules that add more features, it is not one big module that does everything. On the contrary, it allows the addition and deletion of various modules which are placed in a flexible yet structured framework. While Drupal provides the framework (connection of all modules), many developers of various technical skills contribute to the creation, development, and troubleshooting of their modules.

Drupal provides many “themes” that define the overall look of the site. I chose the Drupal theme “Fancy” since it was the most appealing in terms of color choices, graphical tabs, design and appropriateness (for storytelling and target audience). Unlike static websites that provide a page of information, a Drupal website is created as a page by the theme engine. For example, when someone types www.example.com on a static website, they will see the contents of the file `index.html`; it will never change until someone physically changes the file itself. In Drupal, when someone types www.example.com, they are actually performing a query and will get to see what has been set up by the Administrator to display, typically the last ten nodes (content) added to the site, as well as anything else that Drupal has been set up to show. These nodes can be constantly changing with no additional work by a maintainer (webmaster) needed. Each URL or address typed into a Drupal site is actually a query (search) of the database and not an address of a file.

For a simple website, Drupal framework and modules offers a lot. Although Drupal is free software, it has a high learning curve. Since it is a collaborative effort of many programmers running different computer configurations, their modules do not necessarily work properly on different systems, and might not work well with other modules. WISETales implementation required a lot of modification to many modules in order for them to work properly together and to work with the fancy theme.

### *3.2.3 The Human Factor*

Since WISETales is a new online community, everyone can read the posted stories. In this way, many lurkers can be attracted into the community including men. Allowing men to read the stories can help them comprehend women’s struggles within these male-dominated areas. Once users feel comfortable and understand the importance of sharing stories, they will hopefully start to participate actively. If they wish to participate by posting a story or a comment, they would have to register with WISETales. For registered members there are many “privileges”, like seeing who is online at the moment and who is new in the community, and being able to comment on stories and view

comments by others. In this way, everyone can read the stories, yet members can relate to the community by posting comments and viewing other members. Once well established, the community can be accessible to members only, to trigger the scarcity effect (Oinas-Kukkonen & Harjumaa, 2008) where the community would look more attractive to non-members since it will only be accessible to its registered members.

In summary, the three main factors that were identified earlier which collaboratively create an online community: document, media and human; a clear identification of these factors in the new community is determined first:

- Document factor: Women will be sharing stories from their personal experiences related to being women in the Science or Engineering fields. The focus is on the story itself, not the author.
- Media factor: The platform for this research is going to be a new web-based online community implemented using the Drupal (Drupal, 2008) Content Management System (CMS) engine.
- Human factor: My target audience are women in Science and Engineering at various stages in their professional lives including but not limited to undergraduates, graduate students, women in academia or industry in different position levels, from entry to senior levels.

### **3.3 Design of the Community Interface**

Once the document, media and human factors were identified, and the goal of the online community was clear, the following guidelines were considered for the design, in an attempt to facilitate the media factor in the online community:

- ‘Simplicity has its own charm’ (Kumaris, 2008);
- Principle of Least Effort (Cheng & Vassileva, 2006);
- Security, privacy, trust and credibility ;
- The Liking Principle (Wilson, 2007);
- Same interface for all users;
- Motivation.

### *3.3.1 Simplicity of the WISETales interface design*

Since professional women in Science and Engineering fields usually have tight work schedules, distracting them with much functionality and requiring from them a lot of effort to select options would be counter-productive. Therefore, the community's interface must be simple, clear and easy to use. Despite the rich functionality available in Drupal, only four, relevant functions to the goal of the community are available for members: to contribute stories; to search for stories with particular tags / keywords or published in a particular month; and to read and to comment on these stories. In this way, users remain focused on the activity of sharing and reading stories. Once the community is established, it is possible to add other functionalities like personal blogs, threaded discussions, a twitter-line awareness tool or chat communication.

### *3.3.2 Principle of Least Effort*

The Principle of Least Effort states that the easier the online community is to use, the more contributions to be expected (Cheng & Vassileva, 2006). This ease of use allows women with various computer skills and ages to participate. A simple layout (see Figure 3.1) was chosen with a short horizontal menu on the top allowing a user to submit a story, a “contact us” and a “log out” buttons. The left section of the website has a login entry, a calendar to view archived stories, and a tag search to facilitate locating stories. The central space of the screen is dedicated to the shared stories, shown in a reverse chronological order with the latest stories at the top. The mission statement is always displayed at the top of the stories space, along with a section with a few motivational questions to give women ideas about what kind of stories to send.



Figure 3.1 The interface of the community

### 3.3.3. Security, privacy, trust and credibility

In order to provide women with a sense of security to share their personal experiences without the fear of being targeted or identified, two guidelines are incorporated in the design. First, members can use aliases when submitting their stories, and they can create as many aliases as they want. Second, in the policy of use, members are discouraged from referring directly to certain individuals or organizations in their stories.

To increase trust in the community, the logo of the NSERC/Cameco Chair at the Prairies for Women in Science & Engineering (WISE) is posted along with a link to the Chair's webpage, to give the assurance of a legitimate organization that is behind the online community. Clarification is also provided regarding who is moderating the content, along with a list of terms and conditions (see Figure 3.2) for members to abide by, before submitting any stories for publishing. The importance of setting the norms or culture of this community is to reduce members' anxiety (Ardichvili, Page, & Wentling, 2003).

Mentioning the authority of the chair and the policies will make women feel more comfortable regarding the protection of their identity, and encourage them to follow the suggested guidelines. Furthermore, it also increases their trust in the community, which is very important issue for online communities which are big and full of strangers (Ardichvili, Page, & Wentling, 2003).



## Terms and Conditions of Use

### What to do:

- Play nice. We're a community of many types of women, who all have the right to feel comfortable and who may not think what you think, believe what you believe or see what you see. So, be polite and respectful in your interactions with other members.
- Upload your stories that you or someone you know have experienced. Respect the copyright of others. This means don't steal stories that other people have published and pass them off as your own.
- Be discreet. Do not name individuals. If you think you or some of the people in your story can be recognized, do not post it or create a new alias.
- Do enjoy WISETales! See the world through others' eyes, participate, share your experience and encourage other women in the field.

### What not to do:

- Do not vent your frustrations, rant, or bore the brains out of other members. Be reflective and constructive. WISETales is not a venue to harass, abuse, impersonate, or intimidate others. If we receive a valid complaint about your conduct, we'll send you a warning and may terminate your account.

### Personal information, other data we collect and copyrights:

- WISETales collects stories you contribute when you register for a WISETales service or otherwise voluntarily provide such information. We may combine information collected from you with information from other members for scientific research, auditing, analysis and publication. You acknowledge by registering to WISETales that you give WISETales this right, including customizing content for you.
- The stories that are shared are yours. However, we reserve the right to produce a publication (collection of stories) or to use them for research.
- WISETales's servers automatically record information when you visit our website or use some of our products, including the URL, IP address, browser type and language, and the date and time of your request.
- We may also share information with third parties in limited circumstances, including when complying with legal process, preventing fraud or imminent harm, and ensuring the security of our network and services. Policy: The stories are provided solely by this site's users. The administrator of this site (<http://wisetales.usask.ca> or <http://www.ourwisetales.com>) cannot be held responsible for what its users post, or any other actions of its users. You may not use this site (<http://wisetales.usask.ca> or <http://www.ourwisetales.com>) to distribute or download any material when you do not have the legal rights to do so. It is your own responsibility to adhere to these terms. WISETales accounts are intended for personal use, for our members to share stories that they themselves have experienced. The following Community Guidelines are here to help you understand what it means to be a member of WISETales. Don't forget that your use of WISETales is subject to these Terms and Conditions.

☐ **Accept** Terms & Conditions of Use

**Figure 3.2** WISETales terms and conditions

#### *3.3.4 The Liking Principle*

According to Liking Principle, the more liked the online community is as a whole, the more persuasive it becomes (Wilson, 2007). The community has a genuine and important cause that women will hopefully like and relate to.

When users evaluate the credibility of a website, the visual appearance is the most important factor (Fogg, et al., 2003); therefore, a simple design with a friendly yet professional look is chosen (Figure 3.1).

The homepage of the community also looks aesthetically pleasing and offers an inviting space that women will hopefully like. It incorporates a mild palette of inviting colors that gives a sense of calmness so that users can focus on their readings. Members of the community have a virtual identity and alias that may or may not be the same as their name. Following Kim's recommendation for allowing users to build profiles (Kim, 2000), members can select to be represented by avatar icons which also adds to the visual appeal of the community.

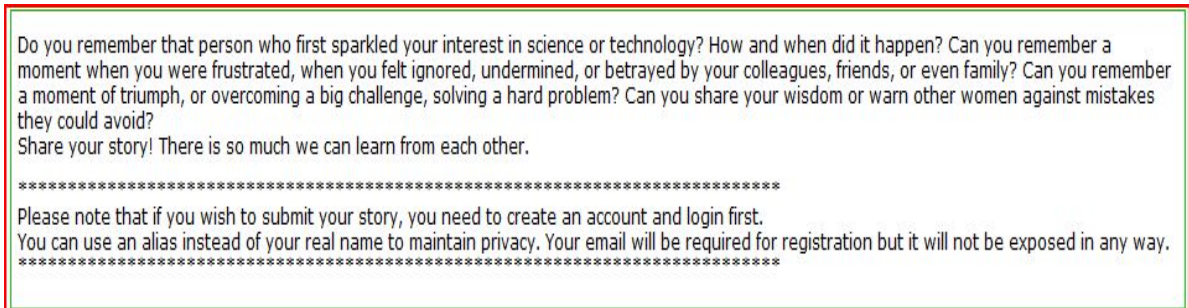
#### *3.3.5 Same interface for all users*

In order to connect users, it is important for them to know they all view the same interface and to get awareness of the other users, to allow for social transparency, i.e, a mutual understanding between users, where they can feel responsible for their actions (Erickson, 2003). The users can see who is online at the moment and who is new (Figure 3.1, left bottom part of the screen).

#### *3.3.6 Motivation*

To stimulate self-actualization, a strong motivational welcome message that touches women and relates to their experiences is provided (Figure 3.3). The more stories are shared, the more diverse and unique the stories become (Beenen, et al., 2004), the wider range of women will be touched by the stories, and the stories will turn into motivational

messages to other women. Women could relate to these stories since they go through similar experiences in different environments.



**Figure 3.3** WISETales.usask.ca motivational questions

This motivational welcome message also emphasizes the goal of the community, which is helping all professional women in Science and Engineering through sharing their stories. According to the Common Identity Theory (discussed earlier), women would be motivated to contribute stories since they relate to the community as a whole and believe in its goal.

### **3.4 Marketing of the community**

Once the online community was designed and implemented, reciprocation (Oinas-Kukkonen & Harjumaa, 2008), viral marketing (Helm, 2000) and friendly reminders were used to “market” the community to women in Science and Engineering. Email invitations were sent to personal friends and acquaintances to join the online community. The invitation included the goal of the community, and asked the recipient to visit it, share a story and help “spread the word” to other women they know. Personal email invitations were intended to trigger a reciprocity effect that would encourage them to take action (Fehr, Fischbacher and Gächter, 2002).

This way of marketing, also called “word-of-mouth” (Helm, 2000) follows the social networks of participants who become marketing agents themselves. It is an important marketing strategy since having members refer their friends to the site increases its

credibility (Fehr, Fischbacher and Gächter, 2002). Following the previously emailed invitations, follow up emails were also sent as friendly reminders to access the community and read the posted stories. The reminders are short and simple, to help motivate members who have not logged in for a while to read the recently uploaded stories they have missed. Other means of marketing were also used to bring attention to this new online community by: spreading the word between female faculty and students at the University of Saskatchewan and announcing its launch in meetings.

### **3.5 How this design and marketing addresses the “cold start” problem**

The specific problems associated with the “cold start” problem faced by this online community are:

First, the potential size of the entire community of women in Science and Engineering is not large because women are under-represented in these areas. Second, many women are scattered in classes, workplaces or departments where there are only one or two other women. It is harder to reach out to these women due to their isolation; and third, women, specifically in Science and Engineering, are very busy. They do not have much time to sit and write stories.

WISETales dealt with the “cold start” problem by using an approach that consists of five main points. First, in order to start the flow of stories in the community, a couple of stories were “seeded” simply to give the audience a sense of direction about the type of stories this community publishes. Second, a motivational welcome message is always visible at the top of the main page, which serves as a constant reminder and a motivational tool for the audience to participate. Third, contributors can receive feedback. The community allows posting comments, which is less time and effort-consuming form of participation. Comments would also encourage the authors by letting them know that their stories are being read and commented on. Another feedback is the implementation of two site counters; one that gives statistics of the number of visitors, registered users, published and unpublished stories; and a second counter that provides a visual map of where the site is being accessed from; i.e. from which continent / country.

Fourth, marketing or spreading the word about the community to as many eligible women and organizations as possible. This included personal email invitations, posts on Facebook's various related groups, and at workshops, conferences and meetings. Finally, a motivational visualization was designed and added to the community's interface. The visualization design is described in the next chapter.

### **3.6 Pilot study**

After creating the online community, a pilot study was done to evaluate the design. The results of the study were formative, determining the usability of design, the interface's ease of use, and the understandability of the policies set and determining areas that need improvement. In addition, participant's feedback on the online community was also of interest.

Initially, the aim was having ten to twelve female participants, students and professionals of different age groups. Twelve female participants were recruited, all graduate students and below the age of forty. Eight participants were enrolled full time in a Master's Program, and four participants were enrolled full time in a PhD Program at the University of Saskatchewan. Ten of these participants were from the Department of Computer Science, one from the Department of Chemistry, and one from the English Department.

While seven participants were skilled in using computers, the remaining five participants were comfortable using computers. Over half of the participants spend on a weekday a minimum of 6 hours a day on the internet, for email and participation in online communities, mostly Facebook.

The pilot study (provided in Appendix A) took approximately 50 minutes to complete, and participants were paid \$10. The usability study took place at MADMUC Lab at the University of Saskatchewan, and consisted of the following steps:

- Brief introduction and overview of the scenario (5 minutes);
- Participants explore WISE Tales and upload a sample story following the scenario (30 minutes);

- Participants answer a short questionnaire (5 minutes);
- Participants attend a brief interview (10 minutes).

The results were as follows. All participants found it easy to understand the goal of the community. Eleven participants found it very easy to register as a new member to the community, and ten participants found it very easy/easy to browse through the community to access current and previously-posted stories. Furthermore, all participants found it easy to find out how to read a whole story when only part of it was showing (due to screen size constraints).

Regarding the overall design, while nine participants liked it, three participants “somewhat” liked it. Below is a summary of the suggestions made by the participants:

- Some participants were confused by the tags – they did not comprehend how they worked, why some tags appeared bigger than others and suggested to provide them with guidelines on how to use the existing tags or add new ones.
- Some suggested improving the layout, for example, left - aligning the two content boxes on the homepage and increasing the space between the “log in” box and the menu.
- Some participants wanted to find out more about other members’ hobbies or interests and to be able to engage in social interaction other than comments on their stories.

Feedback on the functionality and access to stories was also received. While eleven participants thought that one should register in order to submit a story or post a comment (their main reason was to ensure moderation on all posts, to maintain privacy and avoid useless stories and inflammatory comments), the remaining participant did not mind allowing non-registered users to make comments.

All participants liked the anonymity option allowing authors to not reveal their true identity, to maintain the privacy of women posting sensitive stories. Interestingly, eleven participants did not prefer the community to be more exclusive; i.e. they did not mind revealing the stories to non-registered members because they saw it as a way to attract more members. The remaining participant suggested allowing the authors to decide whether they wish their story to be open to the public or to registered users only.

Surprisingly, many participants suggested adding more functionalities like a chat system to communicate with other members, a “Q & A” section for advice, a fashion and entertainment section (which contradicts with the focus on stories only), a “most popular story” or a “most active user” section which indicates either a desire for social comparison or a wish to navigate easier in the stories by being able to see an indication of their popularity.

Many participants ignored or skimmed through the set policies which are available under “Terms and Conditions” upon registering. They simply scrolled down to check “Accept” and continue on with the registration, which indicates that these participants are used to joining online communities without fully reading the terms involved, and/or they do not perceive WISETales as a dangerous online community in terms of their privacy, identity or use. It is important to mention however that the pool of participants included a limited sample of audience only; the younger and more computer-adept participants who are familiar with social software. Also the participants shared an example story (provided to them in advance), not a personal story that could be potentially sensitive. The results might differ if the same study was run with professional women of a different age group and different areas of expertise, and if they were sharing their own stories.

## CHAPTER 4

### WISETALES VISUALIZATION

This section presents the three versions of WISETales visualization, their needs, implementation and differences. The initial idea and the first visualization were developed during the design of WISETales, but they were not evaluated at that time and were not incorporated in the design. The first exploratory study evaluated the design of WISETales and collected some feedback on the first visualization through a separate link. The second visualization was incorporated in WISETales design and evaluated in the second exploratory study. The results of the evaluations are presented in the next chapters.

#### **4.1 Initial Ideas**

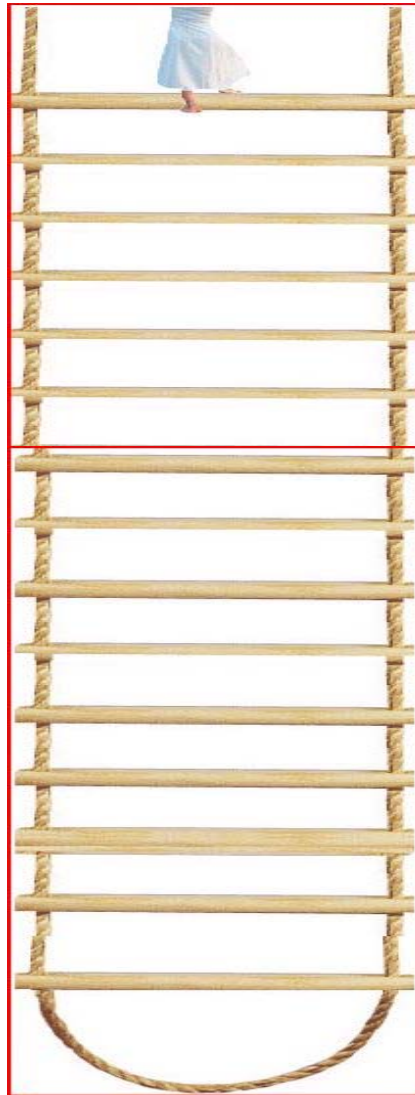
##### *4.1.1 “Rope of Hope” Metaphor*

This visualization is based on the metaphor “Rope of Hope”. My initial idea was to have an image of a rope that extends horizontally across the top of the community’s main page, with various knots on it, each knot represents a category of stories and its thickness represents the number of stories in each category / knot. Since the goal of this online community is to unite and bring women in Science and Engineering from different backgrounds, levels of expertise and stages in life together to support one another and assist with their lack of self confidence, the metaphor of a rope is suitable to give women a sense of belonging, guidance and hope. The goal is to motivate them to build knots on the rope by adding stories for the benefit of all women in Science and



Engineering, so that these knots become thicker, metaphorically representing strength and unity based on the shared stories – experiences; the more stories published, the thicker the knots, the stronger the rope.

However, due to the difficulty of drafting this visualization in a pleasant and appealing way (graphically connecting the rope and knots images), the visualization was replaced by a ladder metaphor.



**Figure 4.1** Initial visualization

#### *4.1.2 Ladder Metaphor*

In this visualization (Figure 4.1), the rope is replaced with a vertical ladder, and knots are replaced by steps. Each step represents an individual story, where the thickness of the step represents the number of comments received for that particular step (story). This visualization is interactive; once a member points to a certain step and clicks on it, a link is made to the corresponding story and it opens up to be viewed.

The posted stories can be represented by one of three different kinds of steps depending on the number of comments each story receives. The first kind of step is the regular thin step image, which represents a story that did not receive any comments. The second step is a bit thicker representing a story that received between one and ten comments. The third step is the thickest, which represents a story that received over ten comments. The ladder also had two static images. On the top of the ladder is an image of a woman stepping up the ladder, with a motivational hint (“Let us collaborate to reach the top together!”), which appears when the user places the mouse over the step or the woman. The bottom of the ladder is a static image of the ending curl of the ladder, with a motivational hint (“Help us make the steps stronger!”), visible on mouse-over.

This visualization, however, had a scalability problem: the more stories the community shared, the longer the ladder got, which made the visualization stretch vertically on the main page in a way that became boring and required scrolling, contradicting the principle of Least Effort. Hence, further brainstorming was done to modify this problem.

## **4.2 First Visualization (used in the first exploratory study)**

#### *4.2.1 Design*

The first (or modified) visualization continues to use the metaphor “Rope of Hope” yet in a different perspective. Since the ladder metaphor had a scalability issue, I decided

to give it a defined structure by limiting the number of steps to five steps, which corresponds to Maslow's Hierarchy of Need (Maslow, 1943), and were rephrased to suit the community, as shown in Table 4.1.

Table 4.1 Maslow's levels of needs and the visualizations' corresponding terms

	Maslow's Hierarch of Needs	Ladder - step
Level 5	Self-Actualization	Achievements
Level 4	Self-esteem / Ego	Personal Reflections
Level 3	Social	Relationships
Level 2	Security – Safety	Safety
Level 1	Physiological	Difficulties

When members log into WISETales to submit a story, they are asked to pick one or more of these levels of needs (listed as categories) which they perceive as representative of their posted story. The users can select more than one category because stories could have many elements in them, and refer to several levels at the same time. Therefore, it is left up to the author to choose where her story fits (Figure 4.2). According to the Self Determination Theory, this decision also helps motivating authors as they get a sense of

control over where they wish their story to be represented. Moreover, it saves them the additional cognitive ‘cost’ of picking just one category best representing their story.

The image shows a web form titled "Submit Story". At the top, there is a "Home" link. Below the title, a paragraph of instructions states: "Thank you for submitting your story. Please allow 2-3 days for review. Kindly note that all stories are subject to review before posting. If you DO NOT wish to receive comments on your story, please select 'Disable Comments' option before submitting your story." The form contains several input fields: a "Title: \*" field, a "Tags: \*" field with a help text "A comma-separated list of terms describing this content. Example: funny, bungee jumping, 'Company, Inc.'", and a "Category:" section. The "Category:" section includes the instruction "Please select one or more of the following categories, where you feel your story belongs too:" and five checkboxes with corresponding labels: "Achievements (as perceived by you)", "Personal Reflections (feelings)", "Relationships (family, friends, colleagues or others)", "Safety (at home or at work, abuse or harassment story)", and "Difficulties (in learning, working or both)". Below the categories is a large "Body:" text area. At the bottom of the form, there is a small text "Insert image or link." with a small icon.

**Figure 4.2** Five categories to choose when submitting a story

In this visualization, the meaning of each visualized step differs from the original one. Instead of the thickness of a step, a level of completion is represented. The steps in the first visualization no longer represent the number of stories in the whole community. Instead, they represent the number of stories that correspond to that category of stories.

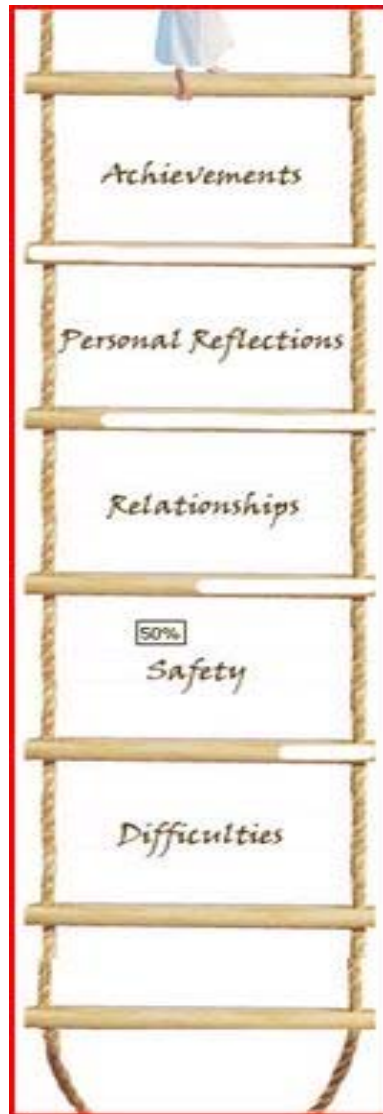
At the first (bottom) level, the physiological level of needs is replaced by “Difficulties” to represent a group of stories that refer to difficulties women experience in learning, working or both. The next level up, the security / safety level is replaced by

“Safety” to represent a group of stories that refer to any safety issues that occur at home, school or work, and includes stories of abuse or harassment. Then, the social level is replaced by “Relationships” to represent a group of stories that are about relationships with family members, friends, colleagues or others. Another level up is the self-esteem / ego level, which is replaced by “Personal Reflections” to represent a group of stories that refer to the author’s feelings, reflections or analysis about a situation or experience at home, school or work. Finally, the self-actualization level is replaced by “Achievements” to refer to a group of stories that reflect the author’s achievements, no matter how small or big, according to her perspective.

#### *4.2.2 Implementation*

Figure 4.3 shows the first visualization which was used in the first exploratory study. Each story adds one unit of filling/completion to the step corresponding to each category under which the story is classified by the user. In the current implementation, to help the user distinguish between different levels of filling / completion, five different degrees of completion on a basis of a total of twenty stories per category (hierarchy of needs-level) were defined. If there are no stories in a given category, the category is represented by a step with no filling (white color) to represent brittleness, with an html hint of (0%). If 25% of all stories belong to a certain category, this category is represented with a step that is 25% filled and the rest is white color, with a hint of (25%), and so on for 50%, 75% and 100%.

Finally, according to the total number of stories submitted, and the total number of stories per category, the percentage of each category is calculated and this value is then compared to 25%, 50%, 75% and 100% to select the corresponding step image to display.



**Figure 4.3** First visualization

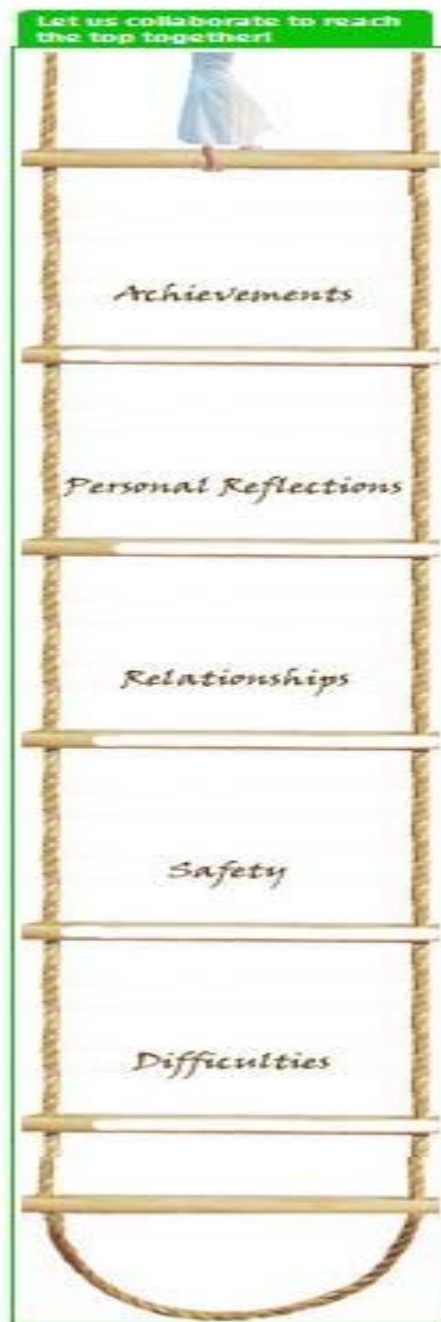
### **4.3 Second Visualization (used in the second exploratory study)**

#### *4.3.1 Need for modifications*

According to feedback from the first exploratory study (which is explained in details in the next chapter), there were problems with the first visualization. First, despite testing the visualization on different browsers, several versions of different browsers did not display the hints (implemented by using html tags), which affected the understandability of the visualization. The second was a scalability issue since this visualization represents up to a maximum of twenty stories per category. Third, the visualization did not link to the stories they represent, i.e. it was not interactive. To address these issues, the second visualization was developed (Figure 4.4).

This second visualization is the final version of WISETales social visualization which at the second stage of the research, was incorporated in the design and evaluated in the second exploratory study. The purpose of this social visualization is to serve three purposes: to be informational, navigational and motivational.

The informational purpose of this visualization is defined by providing social awareness through a visual representation of the number of stories in WISETales, and authors' contributions. The navigational purpose is served by providing links to stories and authors' profiles through the visualization. The motivational purpose of this visualization is achieved through emphasizing the collaborative efforts of all contributing members for the benefit of all women in Science and Engineering (as per the Common Identity Theory). This constant visual would hopefully send subtle messages to users about the importance of participating and sharing more stories, and would intrinsically motivate them to contribute to WISETales. Each of these purposes was evaluated separately, as discussed in Chapter 7 (Second exploratory study).



**Figure 4.4** Second visualization



#### *4.3.2 Implementation*

The differences between the first and second visualization are:

1. The second visualization does not use html tags as hints, i.e. no percentages are shown on each step;
2. The second visualization is more scalable, i.e. the system automatically scales the number of stories per category to the total number of stories in WISETales, so it is no longer limited to a maximum of 20 stories per category;
3. For an easier view, the names of the categories are closer to the steps they represent, to avoid the misconception of relating a category's name to the step above it;
4. The second visualization is interactive.

The second visualization was programmed in PHP, which is programming language that is compatible with Drupal, specifically, WISETales' current theme (called Drupal Fancy theme). An area of the design interface (or a 'block' in Drupal terms) was assigned for the visualization. The code was then copied into Drupal's block. This code initiated direct access to WISETales' database (where all the information is stored), then it retrieved the necessary information to calculate the total number of stories in WISETales, and the total number of stories per category. Automatic calculations then determine the appropriate step image to display from a set of pre-defined images. Since it is interactive, clicking on any of the steps would open a new pop-up window that links to authors and story titles that belong to each category (Figure 4.5). The author's username link directs to her profile, while the story title's link directs to the full story, which can be seen in a new window.

The implementation of this visualization into WISETales interface –Drupal Fancy theme, was not easily done. One main problem encountered was that the code did not execute well in Drupal, so it had to be modified and tested line by line to figure out which line of code was causing the problem, especially since Drupal did not give any

error messages. It simply did not display the whole area of the design, and sometimes it would not display the page (website).



**Figure 4.5** Pop-up window in the second visualization

Furthermore, it was difficult to optimize the code once implemented in Drupal, since it would not execute it properly (specifically with loops). Therefore, and sadly to report, the code has a lot of repetition, but it works.

Feedback from the Drupal community was also scarce and not definite (i.e. suggestions rather than solutions), which is understandable when taking into consideration that Drupal is open source software developed by users who are mostly not professional in software development. I still have a question that has been posted for over a year with no answer.

## CHAPTER 5

### FIRST EXPLORATORY STUDY

Two exploratory studies were planned. The purpose of the first study was to get feedback from a diverse audience on the idea, design, functionality and visualization of WISETales. The second exploratory study is discussed in the next chapter.

#### **First Exploratory Study**

This study served two purposes – evaluate whether the design choices were good, and also learn more about the target audience - the relevance of the goal of the community, and most importantly, their motivation to participate. The first exploratory study was conducted in October 2008. It provided an opportunity to receive feedback from professional women in Science and Engineering about their need for an online community to share personal stories, and if they are likely to become active participants.

The community was launched on January 31, 2008 at <http://wisetales.usask.ca>. Until October 2008, it had received 11 stories. With the two initially seeded stories then followed by three more seeded stories posted in later months (some shared under aliases), there were 16 stories in total. There were no stories posted in the first 3 months after the launch, but 8 stories were shared in May, and 2 in each of June, July and September.

## 5.1 Questions to be answered

For this study the following set of questions were set, which captures the main design decisions:

**Qc. Do women in Science & Engineering need an online community to share their personal experiences?** Since women in Science and Engineering are faced with many obstacles on their road to success, mostly due to gender stereotyping, culture, lack of support networks and lower self confidence, women might appreciate having an online community like WISETales.

**Qd. Is the current interface design of the WISETales community easy to use?** Did users find the interface of WISETales easy to view stories, to create accounts, to post new stories and comment on existing ones?

**Qf. Was focusing the current design of WISETales on the single purpose of sharing stories the right decision?** This design choice could make it easier for users to identify the goal of the community, and allow them to focus their efforts on sharing their experiences, rather than being distracted with other purposes and functionalities (like announcements, discussion forums, chat, or twitter-like status updates).

**Qp. Is maintaining privacy and allowing anonymity important for this kind of community?** While anonymity is generally considered harmful for building a sense of community online (Grohol, 2006), the type of documents shared on WISETales requires the availability of anonymous or pseudonymous to ensure candid accounts of negative experiences. I realized that anonymity may also be in conflict with the users' need to increase their self-esteem/ego by knowing that everyone appreciates and knows that they are reading their story, yet, I believed that if users identify with their online personas, it will be equally rewarding to know that others have enjoyed and learned from their story, even without knowing their real-world identity.

**Qt. What are the main obstacles for participation in WISETales for the participants?** Now that women in Science and Engineering have this niche community to support them, will they participate actively by submitting stories constantly? If not, what are the main reasons?

**Qi. Are personal invitations and “word-of-mouth” a good strategy for attracting women in Science and Engineering to WISETales?** Instead of mass marketing WISETales through popular streams like Google (by optimizing it for certain queries or using Google Ads), which might attract the wrong audience, I attempted to reach the WISETales target audience through personal email invitations and “word-of-mouth”.

## **5.2 Methodology**

The designed online survey contained 53 questions (depending of participants answers). Thirty women in Science and Engineering filled out the survey, which was available for two weeks. Details about the sample and the evaluation tool are provided next.

### *5.2.1 Sample*

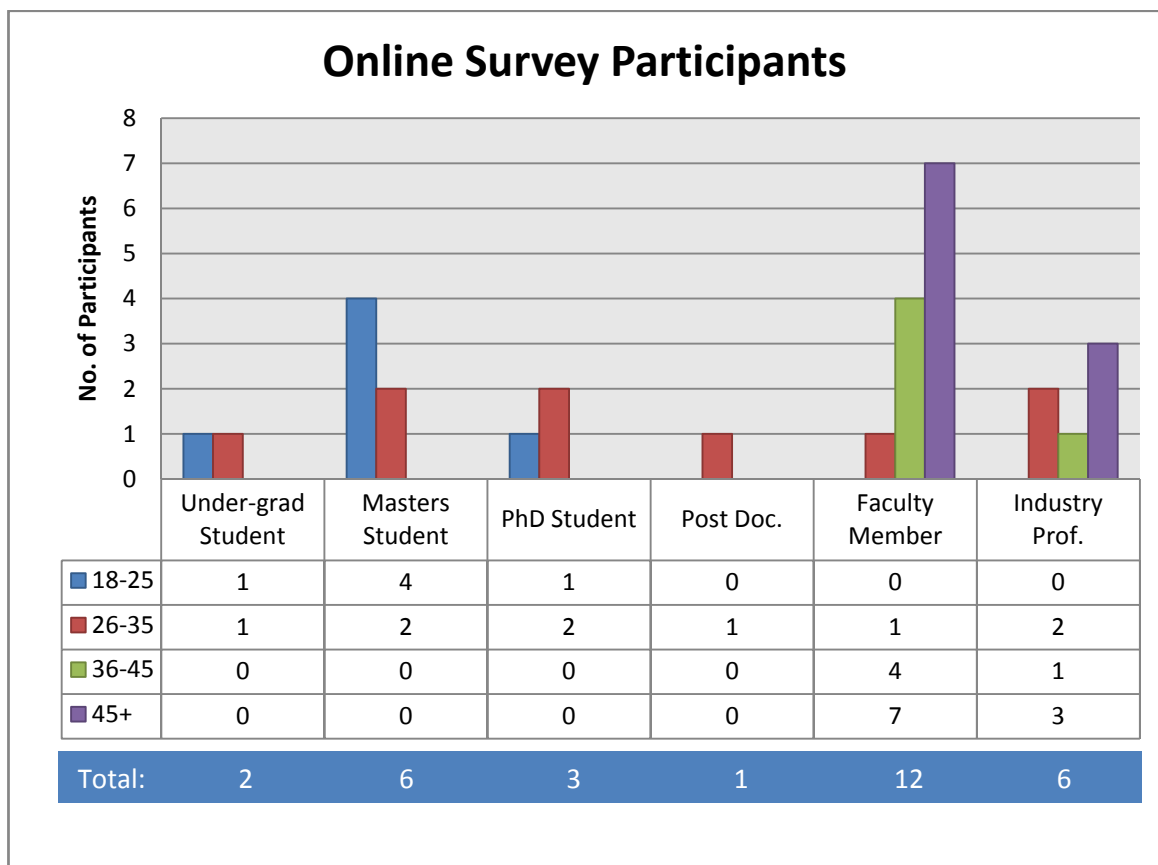
Since WISETales audience is women in Science and Engineering who are at different professional stages in their lives, a diversity of participants in terms of age, educational background and different levels of professional occupation (both academic and industry) were targeted to participate. The duration of the study was limited to two weeks to keep the effect of the invitation fresh.

The participants were recruited through personal email invitations (from me and Dr. Julita Vassileva) which encouraged them to participate and invite other eligible women (e.g. their students or colleagues) to participate. Invitation for the study was also posted

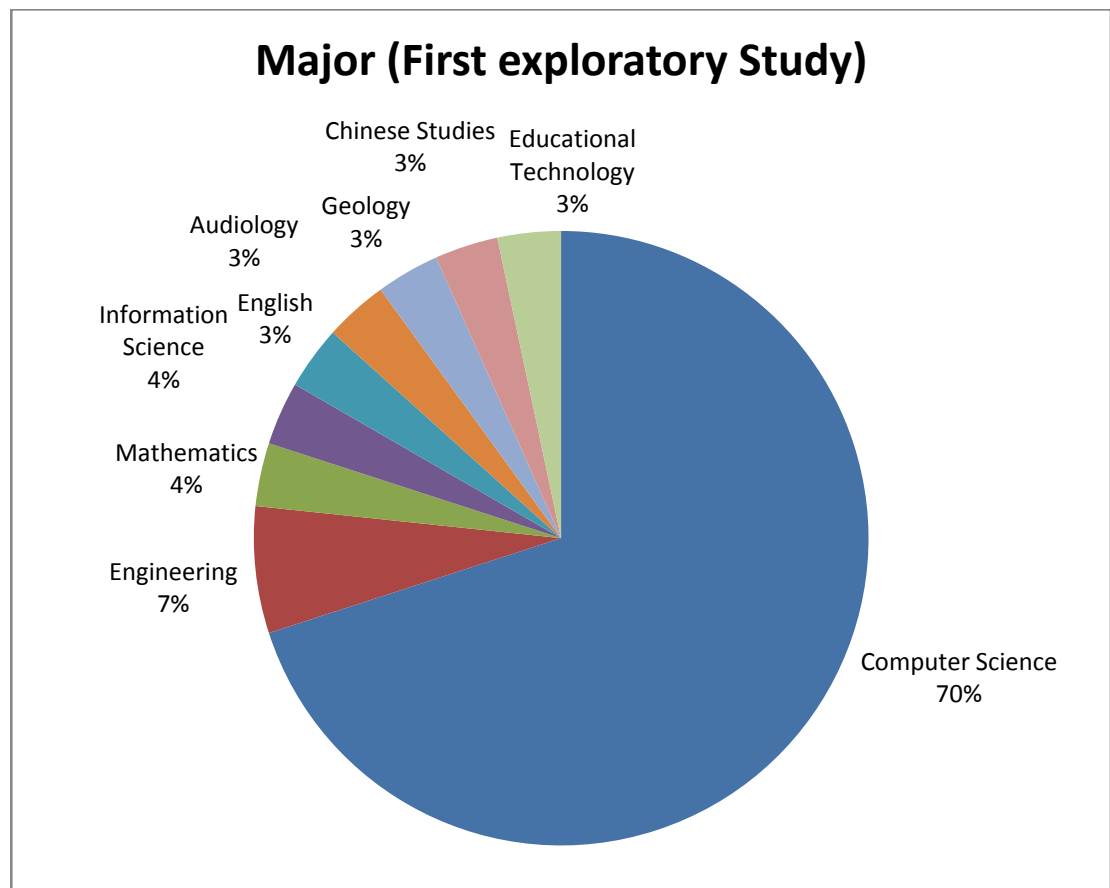
on Facebook – both the personal profile of me and Dr. Julita Vassileva, and on the Facebook group for the Grace Hopper Conference for Women in Computer Science. As incentive for participation, a chance to win one of several iPod shuffles in a draw (with about 10% chances to win) was offered. In order to participate in the draw, the participant had to send a separate email to WISETales account with her email address, since the survey tool makes it impossible to track participants, or associate their answers with their contact information. Thirty (30) women in Science and Engineering participated in the evaluation.

All but one of the participants resided in North America (both Canada and United States of America) and identified themselves with different ethnicities (21 participants were Caucasian, 7 Asian, 1 African and 1 Middle Eastern). Table 5.1 presents a breakdown of participants according to their age range and current professional status.

Table 5.1 Demographics of participants



As we can see, the sample is skewed with respect to age and level in their career, probably due to the recruitment method (personal invitations by Dr. Julita Vassileva to her professional network). Furthermore, the analysis of their major is as follows: 21 participants major in Computer Science, two major in Engineering and one is in Mathematics. The remaining participants listed these majors: Information Science, English, Audiology, Earth Sciences, Chinese studies and Education (Figure 5.1). The sample is skewed as well with respect to discipline, with an over-representation of women in Computer Science.



**Figure 5.1** Major of study participants (first exploratory study)

### 5.2.2 *Evaluation Tool*

An online survey was designed as a tool for this study. The questions were created specifically for the study, rather than using a standard usability tool. The reason was the interest in more specific aspects of the design than standard tools allowed to evaluate, and the need for open-ended questions to hear more from the participants. The survey was developed using ITS Web Survey Tools that is available to researchers at the University of Saskatchewan.

This tool can be used only after obtaining an approval for a study from the University of Saskatchewan Behavioural Research Ethics Board. Furthermore, this tool allows participants to answer the online survey while remaining anonymous, since their identifying information is not coupled with their answers. This point was clarified to participants in the Consent Form which they had to read and accept before starting the survey, as part of this research ethics contract.

The online survey was available from October 16<sup>th</sup> to October 29th 2008. The average completion time for the survey was thirty two minutes (excluding the time needed for participants to familiarize themselves with the WISETales community). The survey had a total of 53 questions and was divided into four sections. The questions in the General Section asked participants for general information about their background, educational experience, professional experience, exposure to online communities and introductory information about WISETales (for example, their interest in online communities for professional women in Science and Engineering and their familiarity with WISETales). The questions in the Design Section aimed to obtain feedback on the main idea, goal and design of WISETales. The questions in this section included Likert-scale ranking, close-ended questions and open-ended questions. The Motivation Section contained mostly open-ended questions and Likert-scale questions, with one close-ended question and one ordinal question. Finally, the survey concluded with a Visualization Section that tested the understandability of the first (modified) visualization. This online survey provided a wealth of information that was useful to answer the questions, and brought attention to other interesting questions that need to be considered when



investigating what motivates women in Science and Engineering to participate in a new online community. A copy of this online survey is available in Appendix G.

### 5.2.3 Results

Twenty five (83.4%) of the thirty participants stated that they are interested in joining an online community for professional women in Science and Engineering. Furthermore, twenty seven participants (90%) thought that having a community for sharing personal stories among women in Science and Engineering fields is a great idea, which shows that women in Science and Engineering need an online community to share personal experiences, thus answering the first question. Of the three (10%) remaining participants, two doubted the chances for success of such community and one participant thought it was similar to other online communities.

Regarding the understandability of the goal of the community from WISETales interface/design, 73% were positive (ten participants found it very easy and eleven found it easy to understand), eight thought it was average to understand and one participant thought it was difficult to understand. Twenty-seven (90%) found it easy or very easy to read a story. Twenty-six found it easy or very easy to browse the new stories and twenty-five found it easy or very easy to access archived stories, which supports the question (Qd). Table 5.2 summarizes participants' answers to the open-ended question whether they had any suggestions to improve the design of the community.

Table 5.2 Design suggestions

<b>Suggestion</b>	<b>Total</b>
No Suggestions	11
Shorten the Introduction / Motivational statement	4
Improve the tag-cloud	3

Offer ‘possible related stories’ / ‘most visited story’	2
Explore both men’s and women’s issues	2
Encourage shorter stories	1
More mentoring / coaching	1
View other members	1
Improve the visibility of comments	1
Resolve browser compatibility issues	1
Other	3

To answer the question whether focusing WISETales on one main purpose of sharing stories makes it unique, the participants were asked whether they would like to see any additional features added. This question was carefully crafted in order not to be suggestive. It stated: “Would you like to see any other functionality added to WISETales? If yes, which one(s)?”. The responses were split in three ways; the responses to this question are reported in Table 5.3.

Table 5.3 Add a new feature feedback

<b>Answer Type</b>	<b>Details (Additional comments provided)</b>	<b>Sub</b>	<b>Total</b>
<b>No</b>			10
<b>Not sure</b>			10
<b>Yes</b>	Add events / Q&A / achievements history	3	10
	Improve search	2	

Exposure to other members	2
Add ‘most visited story’ / ‘most commented story’	1
Bilingual support	1
Not stated	1

A third of the participants (ten) replied that they don’t need any other features. Another third of the participants were not sure. The remaining participants suggested adding more features, but most of the suggestions augmented the main purpose of sharing stories.

For example, two people suggested to improve search, two suggested to create a way to view other members (e.g. members’ locations), one suggested to add a “most visited story” (perhaps this participant would be motivated by social comparison) and yet another one suggested adding bilingual support (English and French, the two official languages in Canada). Only three people (10%) suggested adding functionality related to the purposes of other existing communities, like Q&A, events announcements, and a section of historic achievements of women.

When asked whether they think WISETales will be able to attract participation, twenty one participants responded ‘yes’, eight participants were not sure and one responded ‘no’. Twelve participants (40%) elaborated further. Of these, half (six, or 20% of the participants) stated that lack of time makes it difficult for them to participate, five suggested it needed more marketing to raise awareness about WISETales and one suggested doing frequent updates to keep users coming back.

To find out if maintaining privacy and allowing anonymity is important for this kind of community, the participants were asked if WISETales should require registration from the user to submit a story or post a comment. Twenty-three (77%) of the participants supported registration while four (13%) did not and three (10%) were not

sure. When asked whether they liked the anonymity option, 83% chose ‘yes’, 10% didn’t mind and 7% chose ‘no’.

When asked about the type of accounts they created, sixteen participants (54%) chose anonymous accounts, four (14.3%) participants selected an alias/pseudo-name, five (16.7%) participants chose to show their real first name, and another five (16.7%) chose to show their real full name. In total 68.3% selected to use either anonymous or pseudonymous account, which confirms the design assumption that anonymity/privacy is important for this community.

To answer whether a personal invitation and “word-of-mouth” are good strategies for attracting users to contribute to WISETales, participants were asked to rank their preference regarding a list of features that could motivate participation. ‘A’ refers to their most favorite and ‘D’ to their least favorite. The participants could choose also the option ‘None’. Table 5.4 presents the results obtained for this question. Ten participants (33.3%) stated that they were very likely to recommend WISETales to others, eleven (36.7%) stated that they were somewhat likely, six were neutral. Three (10%) selected “somewhat unlikely”; no one selected “very unlikely”.

Table 5.4 Features that would motivate participation

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>None</b>
Personal Invitation	13	6	4	2	5
Visualization of overall progress towards the goal	10	10	2	3	5
Comparison of members’ contributions	4	6	10	4	6
Enforce minimum contribution level	2	2	5	11	10

#### 5.2.4 Discussion of Results

The results of the study support the assumption that women in Science and Engineering need a community to share personal stories (Qc). Not only did the majority (90%) of the participants think that it was a great idea, but nearly 2/3 of them also offered suggestions to help us improve the design. This result, however, cannot be considered as evidence that they do not like the current WISETales design, since most suggestions pointed out areas for minor design improvements, and enhancements rather than questioning the design. With regards to the decision of focusing the design on stories and providing only functionality related to sharing, reading, and commenting stories, the results show that most of the users (2/3) either had no suggestions for new features, or were not sure what to suggest. The suggestions given by the remaining 1/3 of the participants were mostly to improve the existing functionality, rather than adding new functionalities. Only three participants (10%) suggested adding any new types of functionality, so it is safe to say that the remaining 90% were very comfortable with the functionality provided for the main purpose of sharing stories (Qf).

The results of the questionnaire confirmed that the majority of participants preferred to require registration and provide an anonymity option in the community. Furthermore, the majority of the participants (68.3%) created fully or partially anonymous/pseudonymous accounts, which supports (Qp).

The results of the study confirmed that personal invitation was a good method to attract women in Science and Engineering to participate in the community (Qi) (twenty out of the thirty participants chose it as either the first or the second choice among a list of four possible motivators to engage in the community, Table 4.4). This finding confirms other research showing that personal invitations increase participation (Harper, et al., 2007).

It is important to highlight that the other motivator, ranked at either first or second place by 20 participants, is to incorporate a social visualization. The visualization could highlight different aspects, for example, the individual contributions (to facilitate social

comparison), and the collective contributions (the progress towards the goal of the community).

Interestingly, only 13 out of the 30 participants chose to enter the draw for the four iPod Shuffles, a fact, that may speak either to their altruism or mistrust in the anonymity of the survey. Unfortunately, the data received does not provide evidence to explain the participants' behaviour. In WISETales there are no external incentives for user participation that can help to get the community started. It is possible to introduce extrinsic incentives, for example a prize for the best story each month. Yet, it will be unwise to offer extrinsic incentives at the start, since then, WISETales will not appeal to the user's intrinsic motivations (Reeve, 2005).

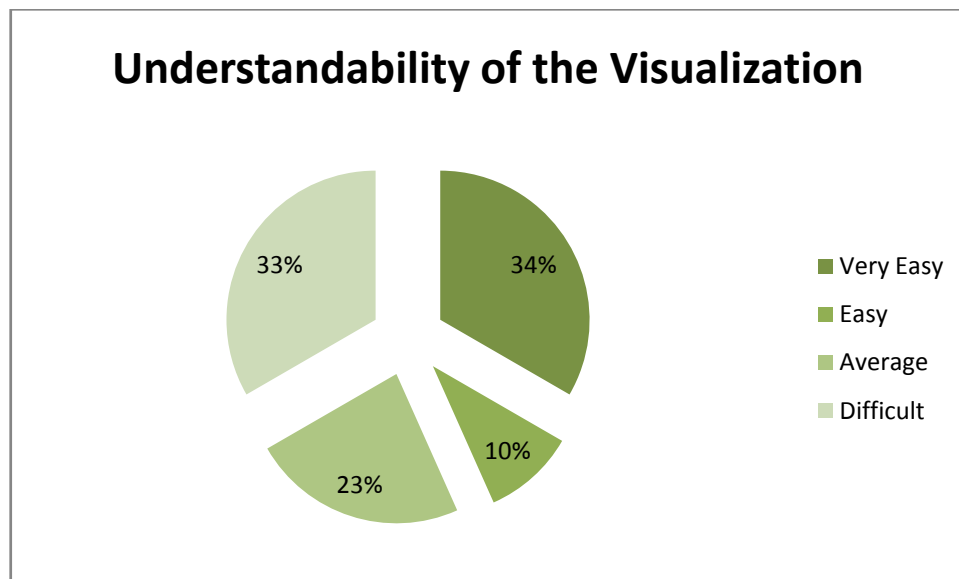
Choosing to use stories as "documents" in WISETales comes with a cost in terms of time and cognitive effort needed. Therefore the biggest concern about obstacles for participation was the lack of time of the intended audience. The comments of 20% of the participants directly confirmed this concern by stating that the lack of time makes it difficult to participate (Qt). Some comments and suggestions given as answers to other questions (e.g. the suggestion to encourage authors to write shorter stories, to shorten the motivational and welcome messages) also provide indirect proof, but it is hard to quantify it. While a general recommendation to write shorter stories can be easily added to the story-editing window, it is often more difficult to write a short story that captures a personal experience than a long one, so it may be discouraging for some users. Therefore, no limit will be set on the story size, but instead publish only a short snippet of the full story on the main page, with a "read more" link, that the user can choose to read the full story.

Unfortunately, there are no high-school students among the population, and only two undergraduate students. So the results are somewhat biased towards women in advanced stages of their careers starting from graduate students. This bias was compensated by the second exploratory study, described in Chapter 7.

### 5.2.5 Visualization Results and Discussion

In this study, the participants saw the first visualization via a direct link from the study (as it was not incorporated in WISETales design) to solicit their feedback. As noted from the previous results, participants chose “visualization of overall progress towards the goal” as their second choice of motivating factors to participate in WISETales. This question was asked before the participants were exposed to the visualization. By itself, this is a good indication that this research is going in the right direction in context of its audience and their motivations.

The last section of the online survey was focused on the visualization. In this set of questions, the participants were provided with an external link that showed the first (modified) visualization (Figure 4.3). None of the participants was exposed to this visualization before the online survey. Twenty-three participants (77%) said they liked it, while the remaining seven participants (23%) did not. Using a Likert-scale question type, participants were also asked if they understood the visualization. Their answers (see Figure 5.2) show that ten participants found it very easy to understand, three participants found it easy, seven participants found it average while ten participants had difficulty understanding it.



**Figure 5.2** Understandability of the Visualization

Participants were also asked about what they understood from the visualization. The ones that did understand it commented as follows:

*That achievements come only after difficulties, a sense of safety, in good relationships (sometimes in bad) and with some personal reflection. And, reflection comes as a result of relationships, difficulties, etc.*

*This visualization is designed partially according to the hierarchy theory of needs. It sets up a very clear goal that will stimulate users to contribute to the online community in order to climb up the ladders, and thus making great achievement.*

When asked whether the hints were useful though, 16 participants (53%) were unfortunately unable to see them! Feedback shows that the simple html hint tags did not appear in some Internet Explorer versions (6 or 7), Mozilla, Google Chrome or Safari. This was absolutely unexpected, simply because the hints were implemented using the supposedly standard html tag `alt= "...">` in `<img>` that worked on older browser versions. Besides, the interface was tested on Explorer, Mozilla and Chrome browsers before being launched. So only fourteen participants saw the hints, eight participants found the hints useful, while four participants found them not useful, and two participants did not know.

The following question asked whether the visualization was relevant to the goal of the community, fourteen participants (47%) chose 'yes', thirteen participants (43%) were not sure, two participants (7%) chose 'no' and only one participant (3%) did not know. Despite these ambiguous results, when asked whether they wanted the visualization to be incorporated in WISETales, nineteen participants (63%) chose 'yes', only three participants (10%) were not sure and the remaining eight participants (27%) chose 'no'.

Finally, it seems that the participants who were familiar with the Maslow's Hierarchy of Needs theory grasped the metaphor easily, while those who were not familiar did not. Of course it was not intended for the audience to be familiar with this theory, so if familiarity is required for the visualization to be understood, this approach is not good.



Another reason could be the inability to view the hints, which was unfortunate. Or, it could be due to the choice of words for categories (i.e. difficulties, safety, relationships, personal reflections and achievements).

The visualization plays an important role in highlighting the overall contributions of WISETales members; however, obviously the first visualization needed to be improved. Some suggestions were to highlight individual contributions along with overall contributions, make it dynamic, and of course, to incorporate it in WISETales.

# CHAPTER 6

## NEW DESIGN OF WISETALES

Following the feedback received from the first exploratory study, WISETales was re-designed with a new logo, incorporated visualization, rearranged and added some content, enhanced member profiles, added sharing functionality and allowed stories to include links/images, as explained next.



Figure 6.1 First and second designs of WISETales

## 6.1 A new logo

The logo on WISETales was the NSERC Cameco Prairie Chair for Women in Science and Engineering logo (Figure 6.2). It showed an image of a woman that could be associated with different ethnical backgrounds. Since informal feedback from people suggested that some users did not like the face shown and its loneliness, this could bring a negative attitude to the site as a whole. As the target audience ranges in their age, a newer and more representative logo had to be developed.



**Figure 6.2** WISETales old logo

With the permission of the NSERC Cameco Prairie Chair, WISETales' new logo includes more images of women of different ethnic background and of different age groups to be more representative of WISETales' target audience. A wider range of images enhances the possibility of attracting more women to WISETales who can relate to some of the faces in the new logo (Figure 6.3). Also, the multitude of faces communicates better the many stories and their diversity.



**Figure 6.3** WISETales new logo

Another important modification was that the new logo also includes a one-line mission statement to highlight the goal of the community. This statement is “Read our stories....Share yours”. In this way, busy professional women would easily and quickly (from a first glance at the logo) grasp what the WISETales community is all about.

## **6.2 Incorporated the Visualization**

In order to incorporate the second visualization (developed and discussed earlier), a new column was introduced in the right part of the screen, as the design of the community changed from 2 columns to 3 columns. The visualization remains visible to all WISETales visitors (both members and non members), to act as an informational, navigational and motivational tool in WISETales. While the visualization provides information to users by visually representing all stories posted on WISETales in terms of the categories to which they belong, it allows users to navigate through stories of interest, and at the same time serves as a subtle motivational reminder to encourage them to contribute more stories in categories that have less stories.

This visualization has the title “Let us collaborate to reach the top together!” to act as another subtle motivational hint for readers to contribute stories. Furthermore, in order to acknowledge active participants and recognize their contributions to WISETales, when any of the steps is clicked, a small window appears with a “thank you” note to all members whose stories belong to that category of stories represented by the step.

Members' names are represented as links to their user profile while titles link to the full corresponding stories. In this way, one can navigate through the contents of WISETales and the contributors' profiles through the visualization.

### **6.3 Rearranged and added some content**

Feedback from the participants in the first exploratory study showed that although they appreciated the mission statement that was located at the top of the screen in a purple box (Figure 3.1), they found that it was too long and took away space that would be better used to display stories. In the new design of WISETales, the mission statement (the purple box) is completely removed from the top of the screen and replaced by a new menu item called "About Us" which is visible at all times.

Moreover, in order to emphasize the importance of the policies for using WISETales, another menu item is added, called "Terms and Conditions" which is always visible (to members and non members).

### **6.4 Enhanced member's profiles**

Participants in the first exploratory study showed interest in knowing more about the authors of the stories. Since maintaining privacy is of high importance to WISETales members, a solution to this issue was found by allowing members to display a few translucent details about themselves, giving a vague indication of who they are without revealing their true identity. It is not mandatory for members to reveal any of these details. The new profile information contains four details:

- a. Continent (in which the member currently resides in) [Africa – Asia – Australia - Europe - North America - South America].
- b. Level (In a member's career) [Entry level, Mid level or Senior level].
- c. Profession [Engineer, Entrepreneur, IT or Student].
- d. Sector (What sector is the member currently in) [Academia – Industry].

## **6.5 Added sharing functionality**

Another useful feature suggested by participants was to be able to share WISE Tales stories with others, which was implemented in several alternative ways, so users can choose according to their preference the most convenient way:

- A. An “Email link” option was added to the end of each story, so members and non-members can share specific stories with their friends, thus spreading the word of the community.
- B. An “Add This” button was added to WISE Tales site, allowing members and non-members to share WISE Tales content on their social networking sites (Facebook, Linked In, Delicious ...etc.).
- C. A “Tell A Friend” option was added to WISE Tales site, allowing members and non-members to tell their friends via email about WISE Tales, with a link to WISE Tales homepage.

## **6.6 Allow stories to include links / images**

To allow linking stories to other websites, the design was enhanced with the possibility for authors to include links and pictures in their stories. On the one hand markets WISE Tales, and on the other hand, gives easier and faster access to its content.

Similar to the launch of WISE Tales, another marketing round (through personal emails, posts on portals and social networking sites, posts on some professional women’s communities and at conferences / meetings) took place for the launch of the new WISE Tales design. The launch was in early April 2009. The second exploratory study was carried out after the launch. This study is described in the next chapter.

## CHAPTER 7

### SECOND EXPLORATORY STUDY

The goal of this exploratory study was to evaluate the usability of the modified design, and get feedback on the incorporated visualization. This study served four purposes:

- Evaluate whether participants like the design modifications listed earlier (which were based on results from the first exploratory study),
- Evaluate whether members are comfortable providing the new “translucent” information in their member profile,
- Investigate reasons that motivate women in Science and Engineering to contribute stories, and what prevents them from contributing more stories,
- Investigate the feedback on incorporating the visualization in the community design, the understandability of its metaphor, and its use as an informational, navigational and motivational tool.

#### 7.1 Questions to be answered

The following set of questions was to be answered by the second exploratory study:

**Qn. Do women in Science & Engineering like the newly implemented features of WISETales?** The new features include the new logo, the visualization, rearrangement / addition of some content, enhancement of members’ profiles, addition of sharing functionality and addition of links and images to WISETales.

**Qr. Are users willing to reveal translucent information about themselves through their members' profiles?** Although women in Science and Engineering need a private and safe online community where they can share their experiences without compromising their identities, they still want to learn more about the authors of posted stories. Providing translucent information (Erickson & Kellogg, 2000), which in WISETales are limited information about the location, profession, career stage and sector strikes a good balance between privacy and social awareness.

**Qv. Do users perceive WISETales' incorporated visualization as a representation of the collaborative efforts of its members?** Inspired by the Common Identity Theory, the WISETales' visualization was intended to highlight the contributions of all members in pursuit of a shared common goal – advancing in their studies and careers to reach their full potential “Let us collaborate to reach the top together!”. How did the users perceive it once it was incorporated in WISETales?

## **7.2 Methodology**

The second exploratory study was in the form of an online survey which contained up to 122 questions (depending on the answers participants provided). Details about the sample and the evaluation tool are provided next.

### *7.2.1 Sample*

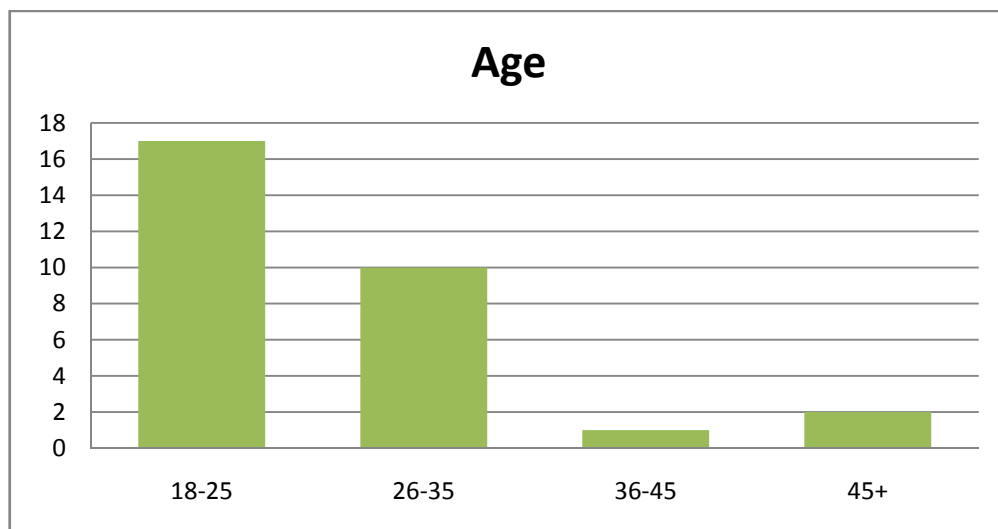
This second exploratory study also targeted women in Science and Engineering from different professional areas, stages and of different age ranges. The duration of the second study was one month.

Participants were invited through methods similar to those used in the first exploratory study. Personal email invitations along with invitation posts were published

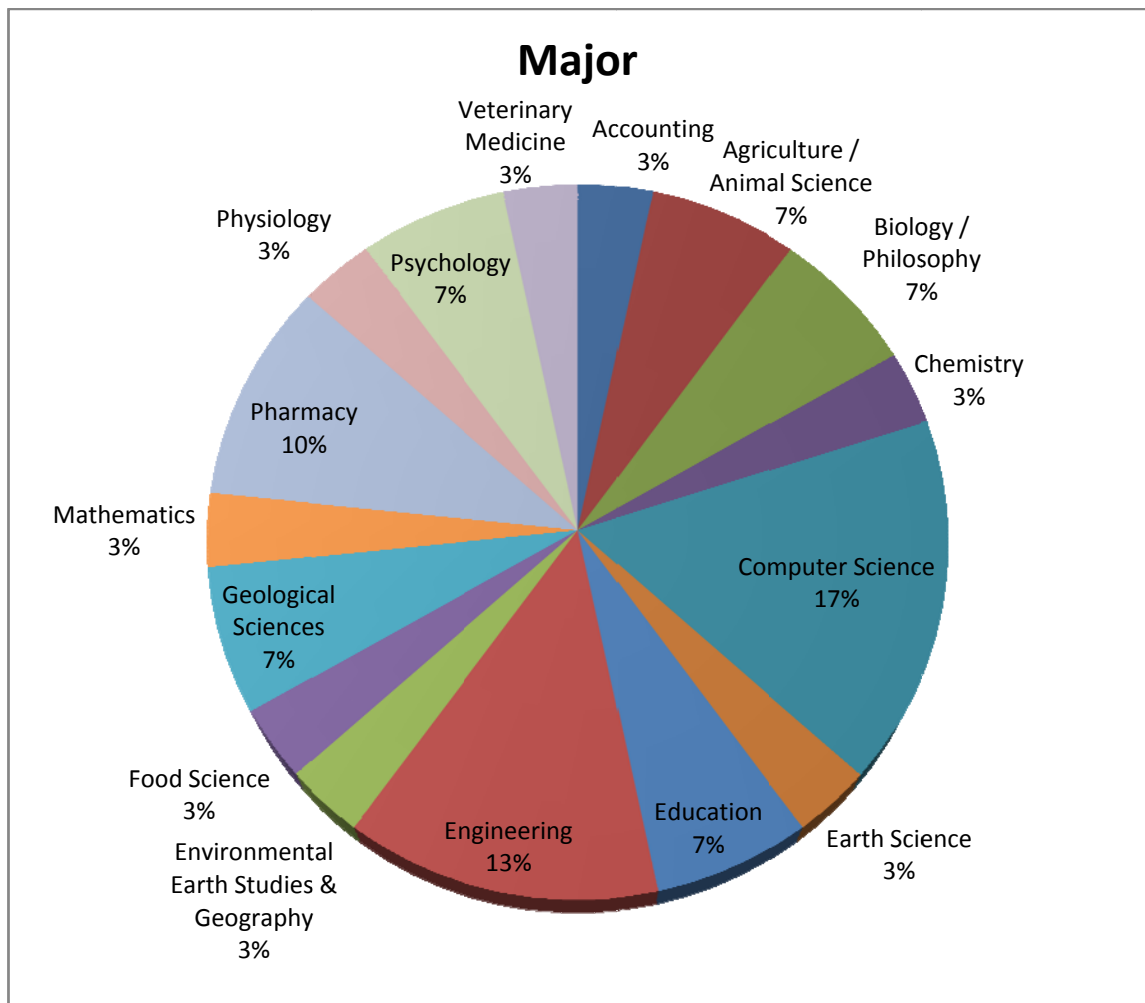


on Facebook – both the author’s personal profiles and on the Facebook group for the Grace Hopper Conference for Women in Computer Science. In addition, the second exploratory study was advertised on the University of Saskatchewan’s PAWS (Personalized Access to Web Services) portal system. As an incentive for participation, a chance to win one iPod Touch in a draw was offered. Similar to the first exploratory study, in order to maintain the anonymity of participants and to participate in the draw, the participant had to send a separate email to WISETales account with her email address, since her study answers could not be related to her email address. Thirty (30) women in Science and Engineering participated in the evaluation.

Figure 7.1 presents a breakdown of participants according to their age range and Figure 7.2 presents their major. As seen from these figures, the participants in this exploratory study are younger than those from the first exploratory study and from a wider range of disciplines.



**Figure 7.1** Participants’ age range



**Figure 7.2** Participants' major

Furthermore, 50% (fifteen participants) were undergraduate students, 17% (five participants) were Masters students, 10% (three participants) were PhD students, and 23% (seven participants) were professionals, probably because most of the participants learned about the study from the University PAWS system. They were mostly undergraduate students who were taking some science or engineering classes.

### *7.2.2 Evaluation Tool*

Another online survey was designed as a tool for this study. The survey was implemented using ITS Web Survey Tools that is available to researchers at the University of Saskatchewan, the same tool used to develop the online survey used in the first exploratory study.

The online survey was available from 15<sup>th</sup> April 2009 to 15<sup>th</sup> May 2009. The average completion time for the survey was twenty three minutes (excluding the time needed for participants to familiarize themselves with the WISETales community).

The survey had approximately 122 questions and was divided into four sections. The questions in the General Section asked participants for general information like the questions asked in the previous study. The questions in the Design Section aimed to obtain feedback on the main idea, goal and modified design of WISETales, along with questions aimed at testing some ideas for three possible future functionality extensions (recording a story instead of typing it, listening to a voice recorded story rather than reading it, and whether WISETales' audience are interested in accessing WISETales through a smart phone). Furthermore, it had specific questions asking about each of the new features (whether they like it, relate to it and would use it in future). The questions in this section included Likert-scale ranking, close-ended questions and open-ended questions. The Motivation Section contained another set of Likert-scale ranking and some open-ended questions. This section investigated the motivations and deterrents regarding contributing for two types of participants – active members and lurkers. Finally, the survey concluded with a Visualization Section that tested the usability of the second visualization and the understandability of its goal and metaphor. A copy of the online survey is available in Appendix G.

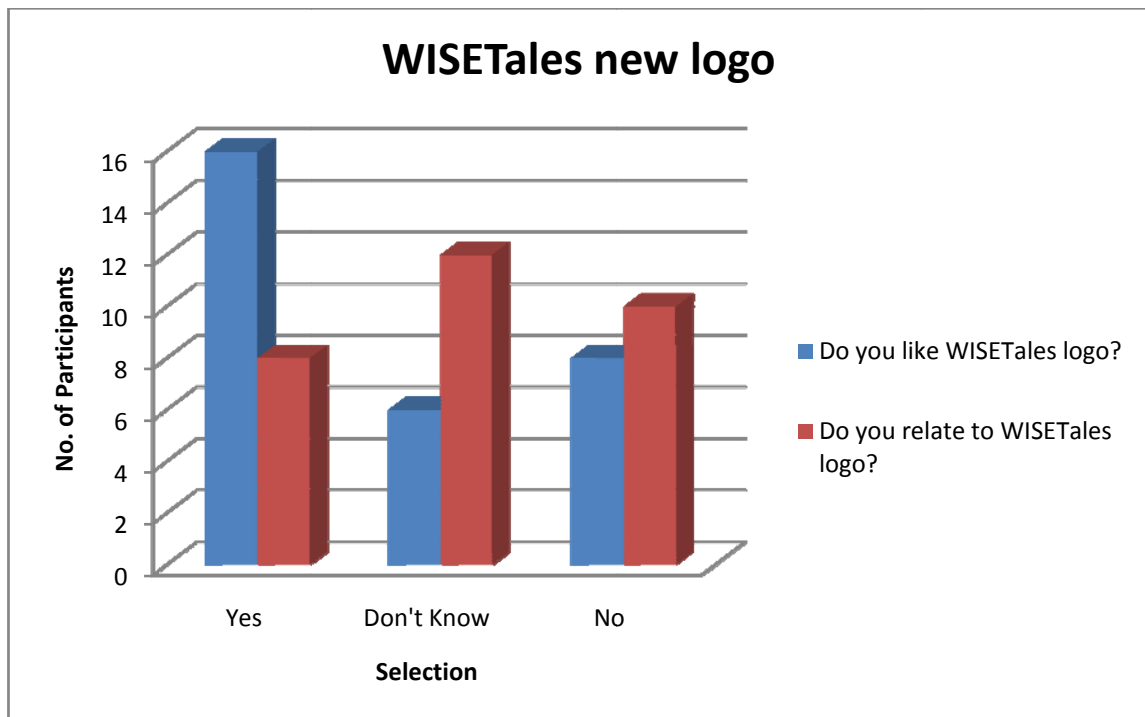
### 7.2.3 Results

The modified design of WISETales included a set of new features. Next, the participants' feedback on each new feature is presented:

#### A. Change of the logo:

Participants were asked whether they liked the new logo or not. While 53% (sixteen participants of 30) liked the new logo, 27% (eight participants) did not and 20% (six participants) chose 'don't know'.

However, when asked whether they related to it, 27% (eight participants) chose 'yes', 33% (ten participants) chose 'no', and 40% (twelve participants) chose 'don't know'.



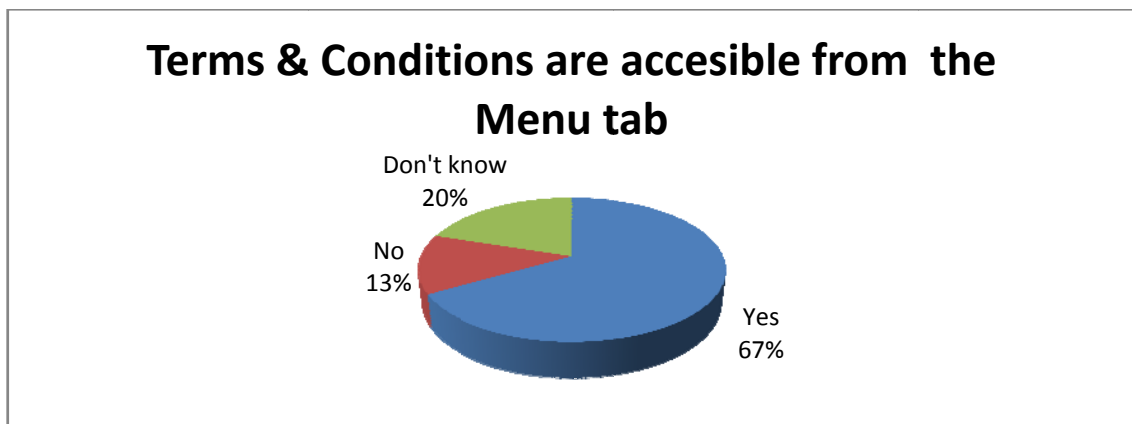
**Figure 7.3** WISETales new logo feedback

B. The visualization:

Results on the visualization are provided and discussed in details in the next section (Section 7.2.5).

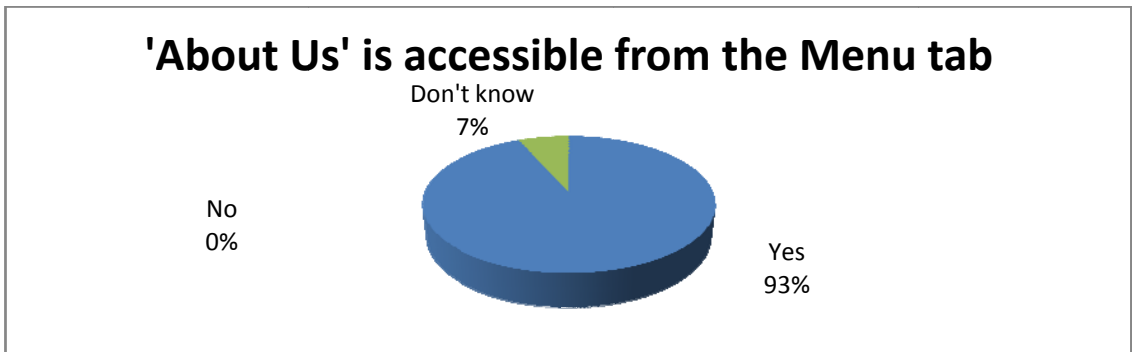
C. Rearranged and added content:

- Do you like that you can access WISE Tales' 'Terms and Conditions' at anytime from the Menu tab?
  - While 67% (twenty participants) chose 'yes', 13% (four participants) chose 'no', and 20% (six participants) chose 'don't know'.



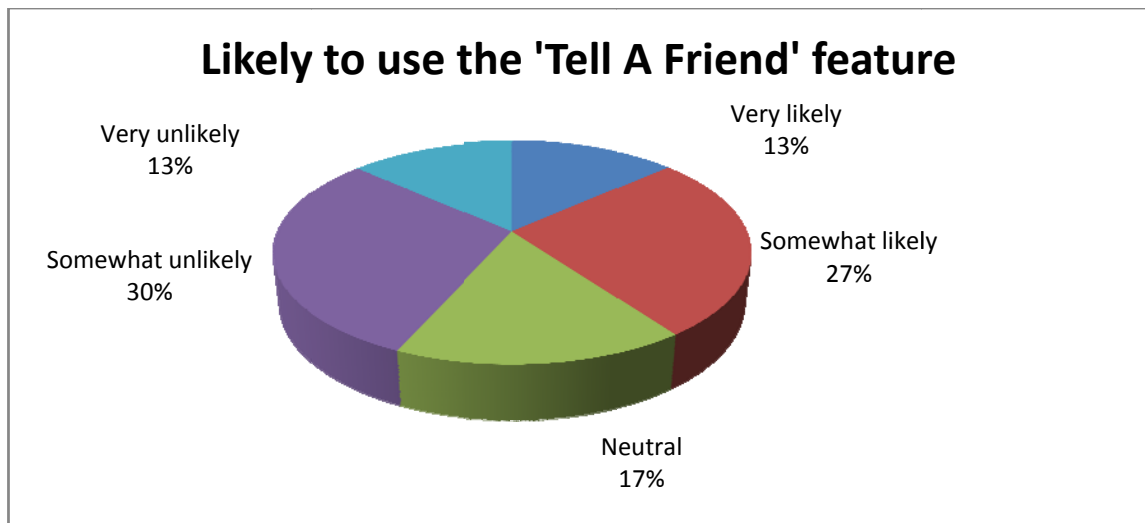
**Figure 7.4** Terms & Conditions feedback

- Do you like to have 'About Us' details in the Menu tab:
  - While 93% (twenty eight participants) chose 'yes', none chose 'no', and 7% (two participants) chose 'don't know'.



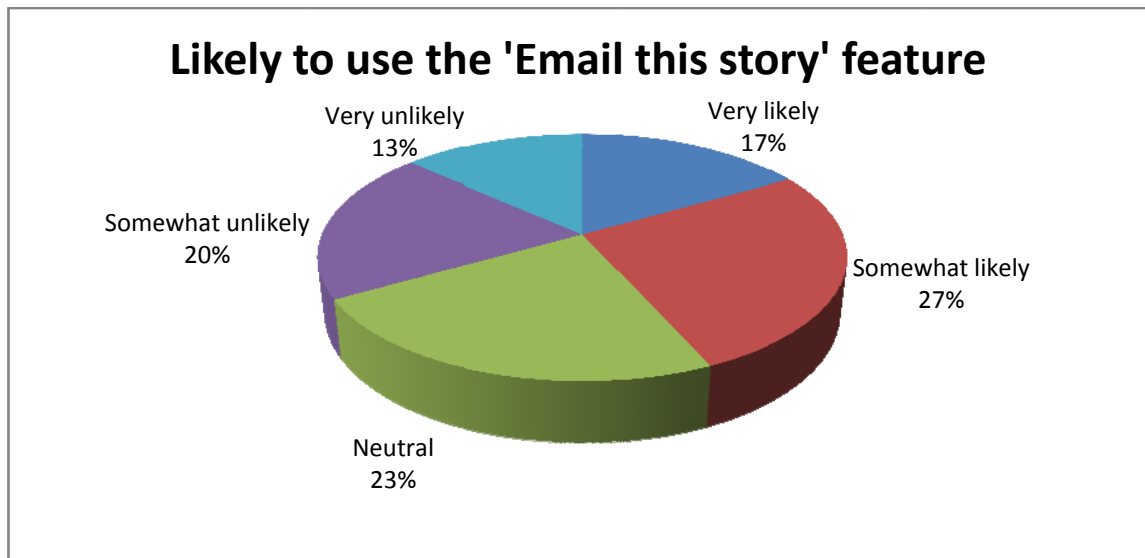
**Figure 7.5** 'About Us' feedback

- Do you like 'Tell A Friend' feature?
  - 77% (twenty three participants) chose 'yes', 6% (two participants) chose 'no', and 17% (five participants) chose 'don't know'.
  - When asked about the likelihood of using this feature, the results are shown below:



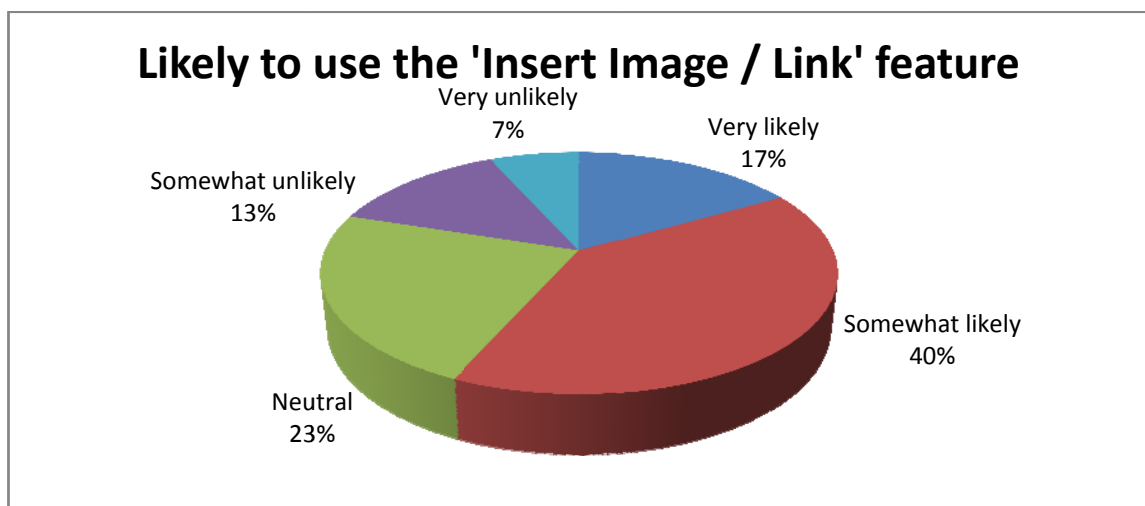
**Figure 7.6** Likelihood to use the 'Tell A Friend' feature

- Add an 'Email this story' feature:
  - When asked whether they like this feature, 77% (twenty three participants) chose 'yes', 10% (three participants) chose 'no', and 13% (four participants) chose 'don't know'.
  - When asked about the likelihood of using this feature, the results are shown in Figure 7.7.



**Figure 7.7** Likelihood to use the 'Email this story' feature

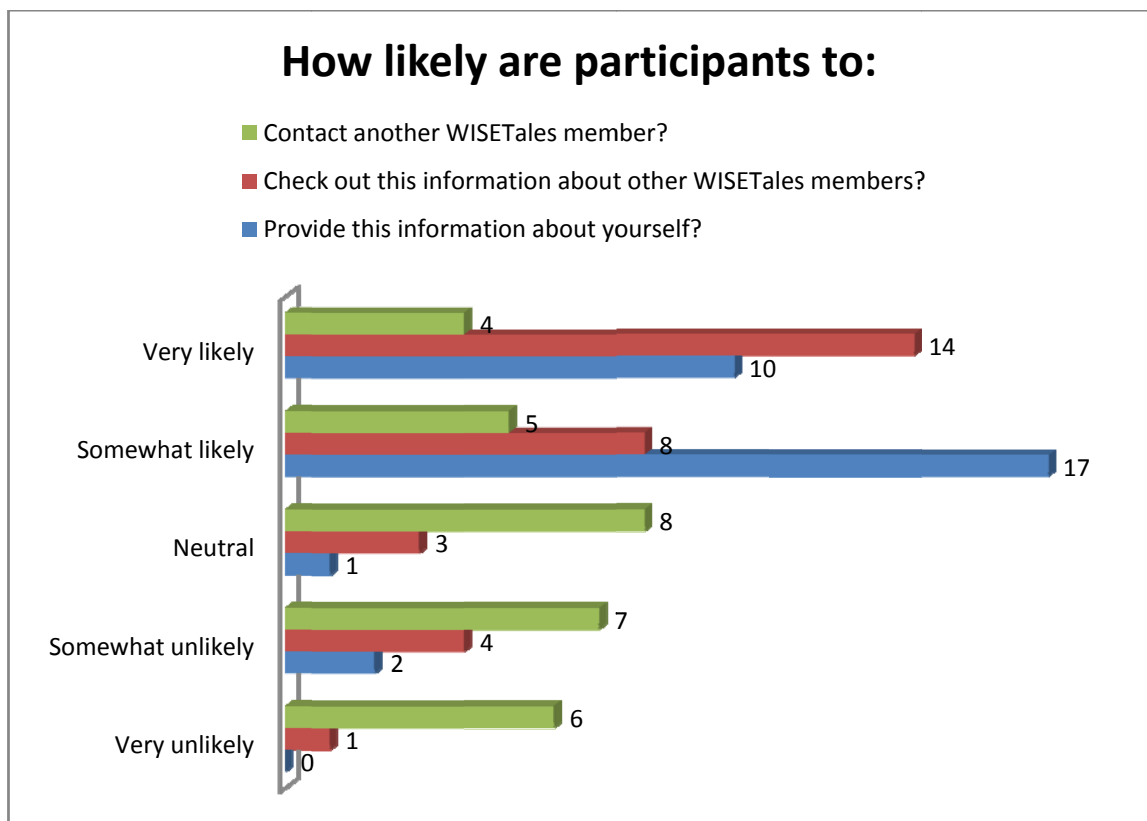
- Add an 'Insert Image / Link' feature:
  - When asked whether they like this feature, 87% (twenty six participants) chose 'yes', 3% (one participant) chose 'no', and 10% (three participants) chose 'don't know'.
  - When asked about the likelihood of using this feature, the results are shown below:



**Figure 7.8** Likelihood to use the 'Insert Image / Link' feature

D. Enhanced member's profile:

- 97% (twenty nine participants) liked this feature, and 3% (one participant) chose 'don't know'.
- Participants were then asked to rate their likelihood of doing three tasks: contact another WISETales member, checkout the profile information about another WISETales member, and provide profile information about themselves on their own profile (Figure 7.9).



**Figure 7.9** New user profile feature

The participants were asked whether they like to reveal translucent information about themselves, which they confirmed by 90%, supporting question (Qr). Figure 7.9 above provides further support, as we find twenty two participants would check out this

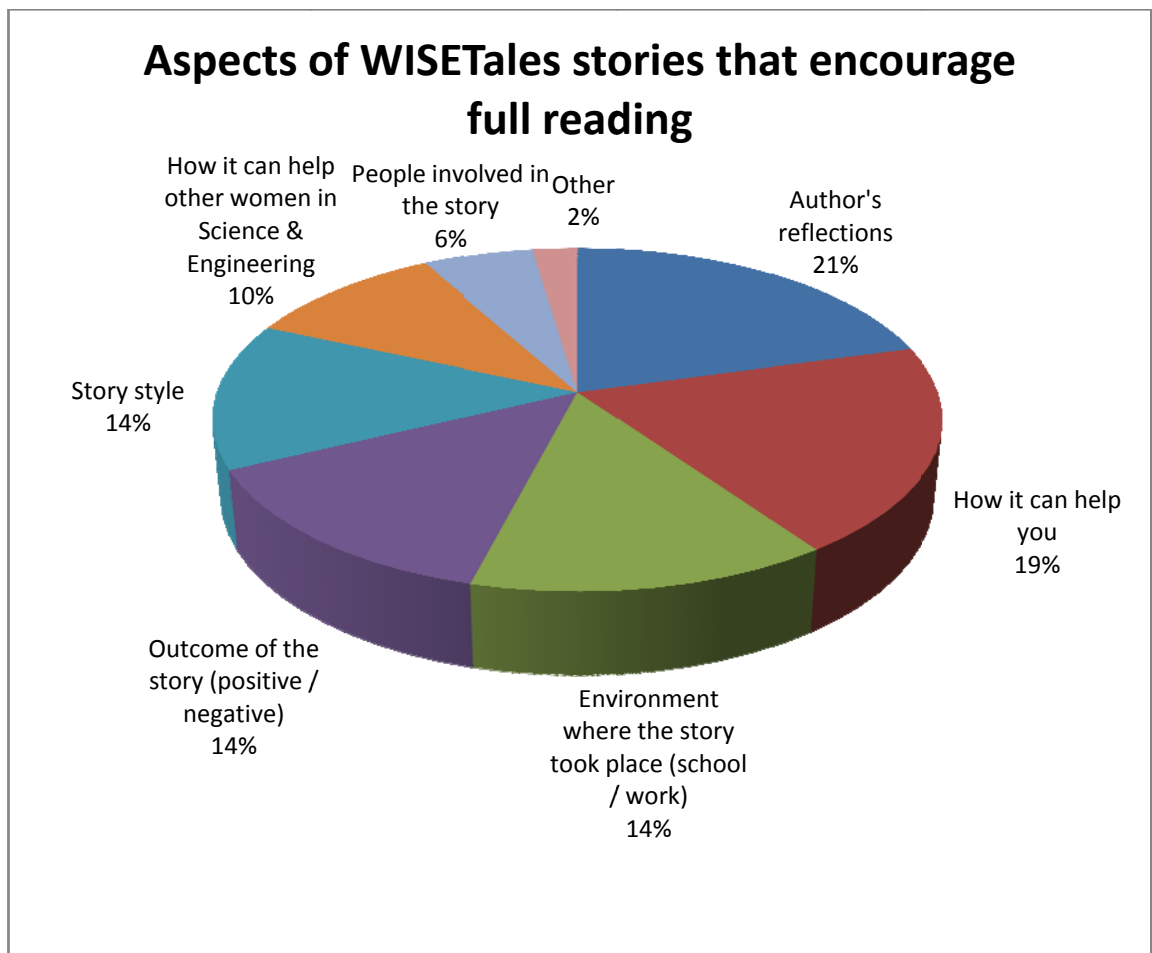


information about other WISETales members. However, they are unlikely to contact other members.

E. Investigate the motivation of active members and lurkers:

The second exploratory study was also an opportunity to investigate what really draws women in Science and Engineering to read WISETales stories. It was also a chance to learn why participants who have posted stories to WISETales did so, and what prevents them (and lurkers) from posting more stories.

When asked about what aspects of a story that encourages women in Science and Engineering to read a story in full, their answers were as follows (Figure 7.10):



**Figure 7.10** Part of WISETales story that encourages full reading

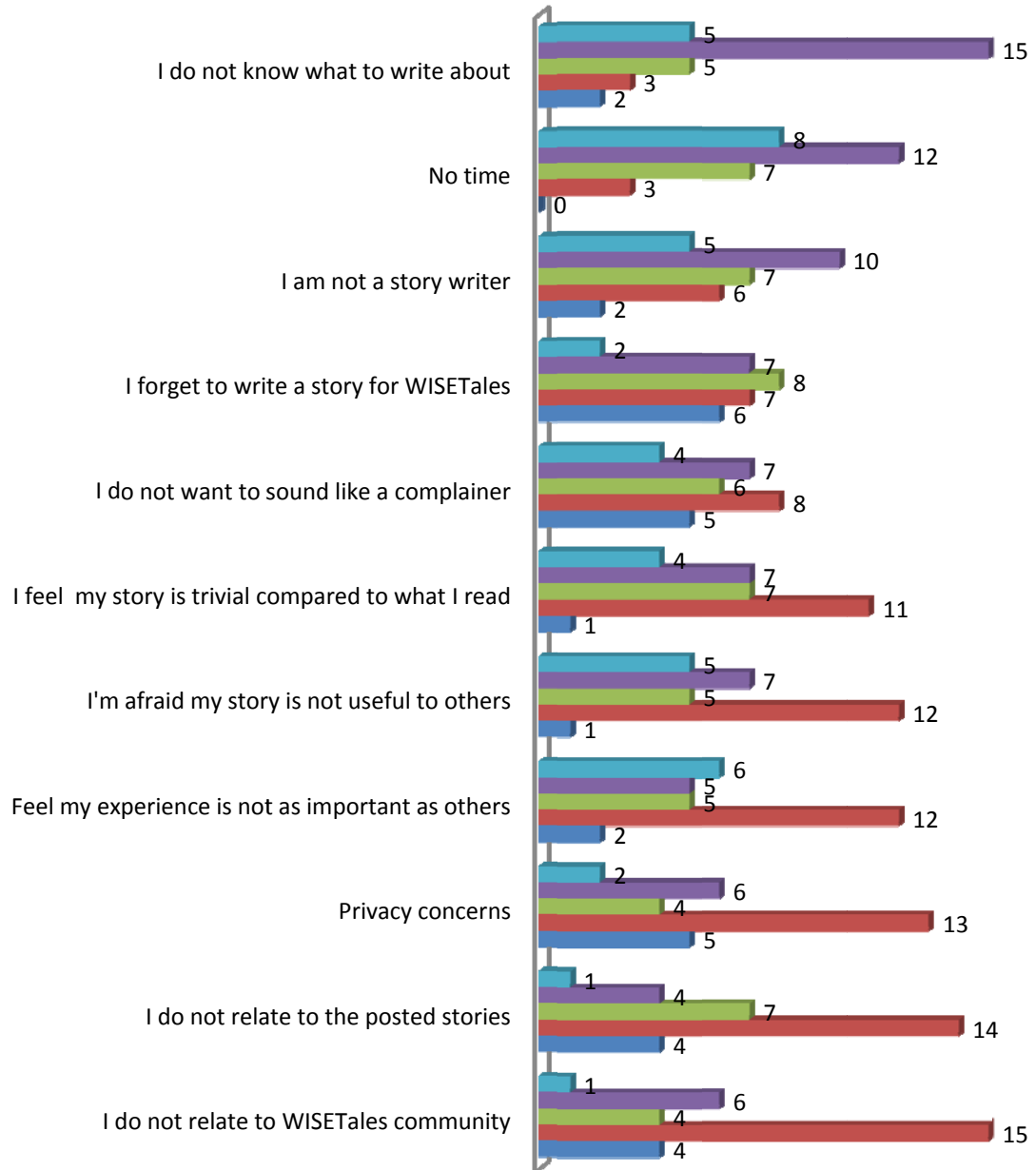
The 'Other' category had two comments; one was stories that are interesting, and the other specified interesting facts in stories.

Unfortunately, out of thirty participants, only three participants had submitted stories to WISETales (i.e. only three active participants, who have submitted at least one story to WISETales). All three participants strongly agreed that the main reasons for their story submissions was to reflect upon their experiences and to show women in Science and Engineering they are not alone in their experiences.

All participants (both active and lurkers) were asked to rate statements about what is preventing them from posting stories to WISETales. Figure 7.11 next shows the results.

## What is preventing you from submitting a story?

Strongly agree Agree Neutral Disagree Strongly disagree



**Figure 7.11** Reasons that prevent story submission to WISETales

In addition, two more reasons were mentioned by a couple of participants; not knowing about WISETales before participating in the study, and the need to spend time to go over all the stories before contributing, in order not to repeat similar stories.

These results show that along with not having time to submit stories to WISETales, a finding which is similar to the participants in the first exploratory study, the younger generation of WISETales audience are faced with another concern: not knowing what to write about. This reason is quite understandable since younger women may feel that they do not have enough experience or wisdom to share with others.

F. Feedback on ideas for future functionalities to be added:

Three questions were asked to get an insight into the future direction of WISETales. The answers to these questions were as follows:

- ‘Would you be interested in recording a story using a microphone rather than typing it?’ Only 3% (one participant) chose ‘yes’, 83% (twenty five participants) chose ‘no’, and 14% (four participants) chose ‘don’t know’.
- ‘Would you be interested in listening to stories by voice rather than reading text?’ Only 13% (four participants) chose ‘yes’, 64% (nineteen participants) chose ‘no’, and 23% (seven participants) chose ‘don’t know’.
- ‘Would you like to access WISETales on your smart phone?’ Only 10% (three participants) chose ‘yes’, 63% (nineteen participants) chose ‘no’, and 27% (eight participants) chose ‘don’t know’.

#### 7.2.4 *Discussion of Results*

Participants of the second exploratory study liked some features more than others. While 97% liked the enhancements to the user profile and 90% stated that they are likely to provide their information, only about half of the participants stated that they were likely to use some of the features provided, with the ‘Insert Image/Link’ feature (57%) being the most likely to use. Overall, 73% (twenty two participants) like the current

design of WISETales. Therefore, some features were supported in (Qn) more than others.

It was interesting to find out that the participants in the second study chose the statement ‘I do not know what to write about’ to be the main reason that prevents them from contributing stories to WISETales, followed by lack of time which was the main reason for the participants in the first study. Next came the statement ‘I am not a story writer’, which is understandable in context of the age range of the second set of participants. They could perceive story writing as a difficult task and could be explained by their lack of self confidence; i.e., their writing might not be well received by readers. Other reasons could be that they do not have an experience which they can reflect upon (21% chose author’s reflections on an experience to motivate them to read a story in full), or they have no confidence that their stories can help other women in Science and Engineering (19% of participants chose how a story can help them as the second top reason to read a story in full).

#### *7.2.5 Visualization Results and Discussion*

The first design of WISETales did not incorporate any social visualization. The first exploratory study had a link to an earlier version of the visualization, which was separate from the design. In the new design of WISETales, a modified version of the visualization was incorporated in the design. To investigate what participants thought of the visualization and how well they understood it, they were asked questions about the visualization in two sections; the Design Section and the Visualization Section. The purpose was to understand their first impression of the visualization, before going into more details in the Visualization Section.

In the Design Section, participants were asked in an open-ended question, “What did they think the purpose of the steps in the visualization was”. While thirteen participants did not know, five participants responded that it helps categorize stories by topic and two participants responded that it helps understand the purpose/goal of WISETales. The

remaining participants gave varying answers, like: “gives a sense of appreciation to authors”, “show that WISETales has stories from real women”, “shows that everyone faces challenges”, “gives a quick overview of challenges for women in Science and Engineering”, “makes WISETales more interesting”, “we can reach our goals by steps”, “gives a visual overview of some features”, “helps strengthen EQ”, and “shows steps involved in the process of leveraging and that women in science and engineering can come together with similar values to reach a mutually shared goal”.

Participants were then asked what they thought the steps represent. While fifteen participants thought they represent the concerns/challenges faced by women in Science and Engineering to reach success or their career goals, ten participants did not know, three participants thought they represent the types of stories submitted, one participant thought it summarizes the goal of WISETales and one participants responded “together we can reach the top of the ladder”. Below are three different quotes from participants:

*It represents that giving voice and gaining visibility, for women in a male dominated field, is an 'uphill battle'. A struggle to get to the top of the ladder. However, through recognizing the steps needed and linking together, reaching the top of the ladder is made an achievable goal.*

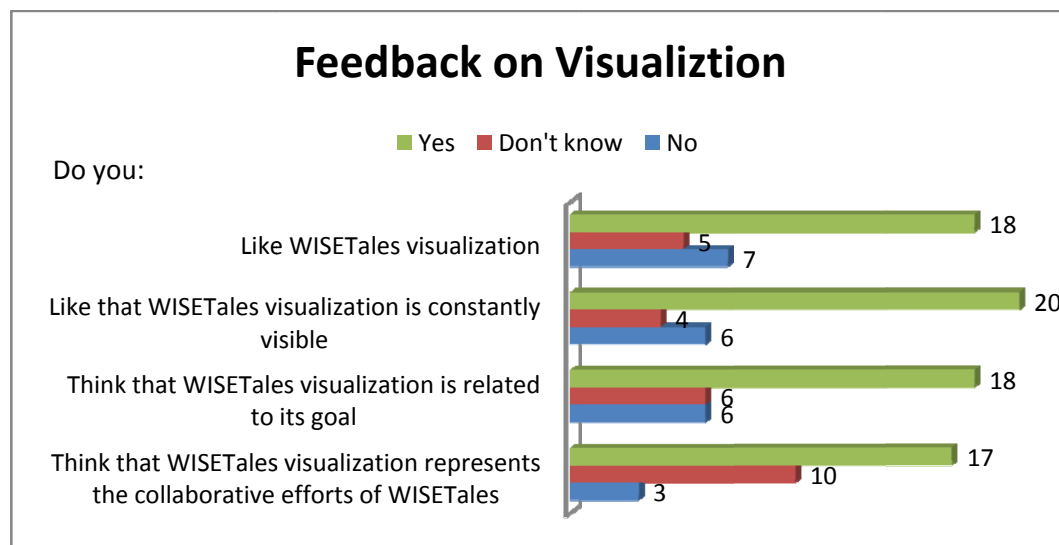
*To me, it meant that as women we experience different challenges in our lives (i.e. the rungs), and as we make it through each one together we "climb higher" and find our happiness by seeing the sights along the way! To me, higher on the ladder means more experience.*

*The types of stories are interconnected and build upon one another. They have been put into a somewhat hierarchical structure with the most positive story themes placed on top (achievements) and the greatest stumbling blocks on the bottom (difficulties). I also noticed that you could click on the rungs (although it didn't go to another screen - presumably yet). Eventually you will be able to click on a particular topic and be able to read all the stories that have been identified as including elements of that particular topic.*

Apparently, the author of the last comment did not see the pop-up window appear in her browser when clicking on the step (in some browsers, the participants need to scroll to see it, and they were warned about it in the beginning of the study). While 60% (eighteen participants) liked WISETales’ visualization, 23% (seven participants) did not, and 17% (five participants) chose ‘don’t know’. Participants were then asked if they

liked WISETales' visualization to be constantly visible (as implemented in the modified design). 67% (twenty participants) chose 'yes', 20% (six participants) chose 'no', and 13% (four participants) chose 'don't know'.

Sixty percent (eighteen participants) thought that WISETales' visualization is related to its goal. Finally, when asked whether they thought that WISETales' visualization represents the collaborative efforts of WISETales members (Qv), 57% (seventeen participants) chose 'yes', 10% (three participants) chose 'no' and 33% (ten participants) chose 'don't know'. (Figure 6.12)



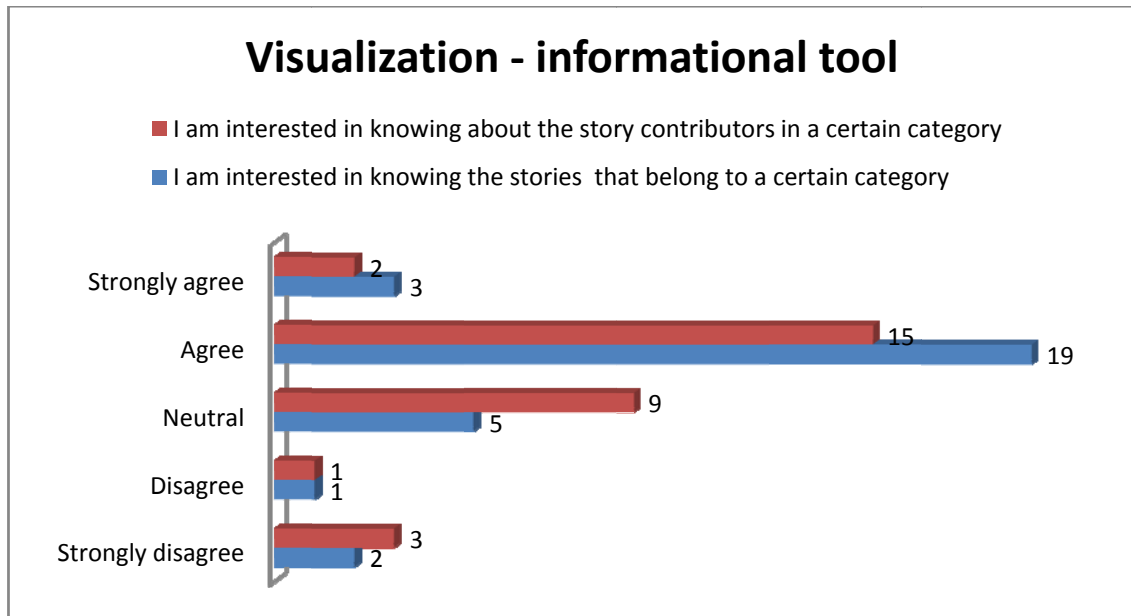
**Figure 7.12** Feedback on visualization

The results of this study categorize the participants' answers with regards to the visualization in terms of it being informational, navigational and motivational:

#### A. Visualization as an informational tool

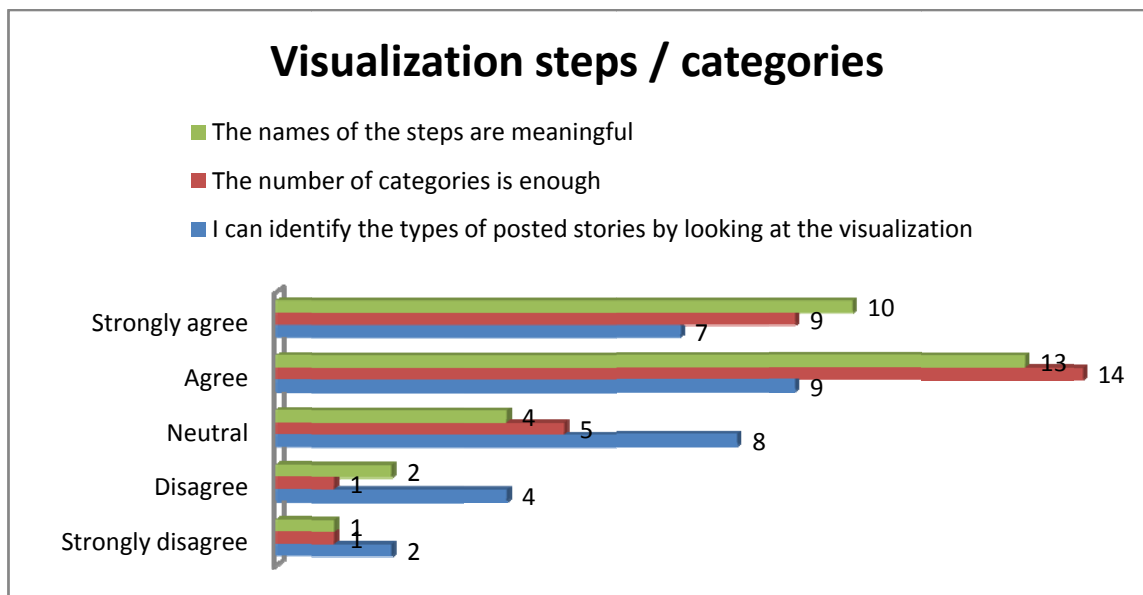
Participants were asked to rate general statements about the visualization. Seventeen participants were interested in knowing about story authors in a certain category while

twenty two participants agreed that they are interested in knowing the stories that belong to a certain category (Figure 7.13).



**Figure 7.13** Visualization – informational tool

The participants were also asked to rate statements related to the overall design of the visualization. Results of their ratings are shown in Figure 7.14:

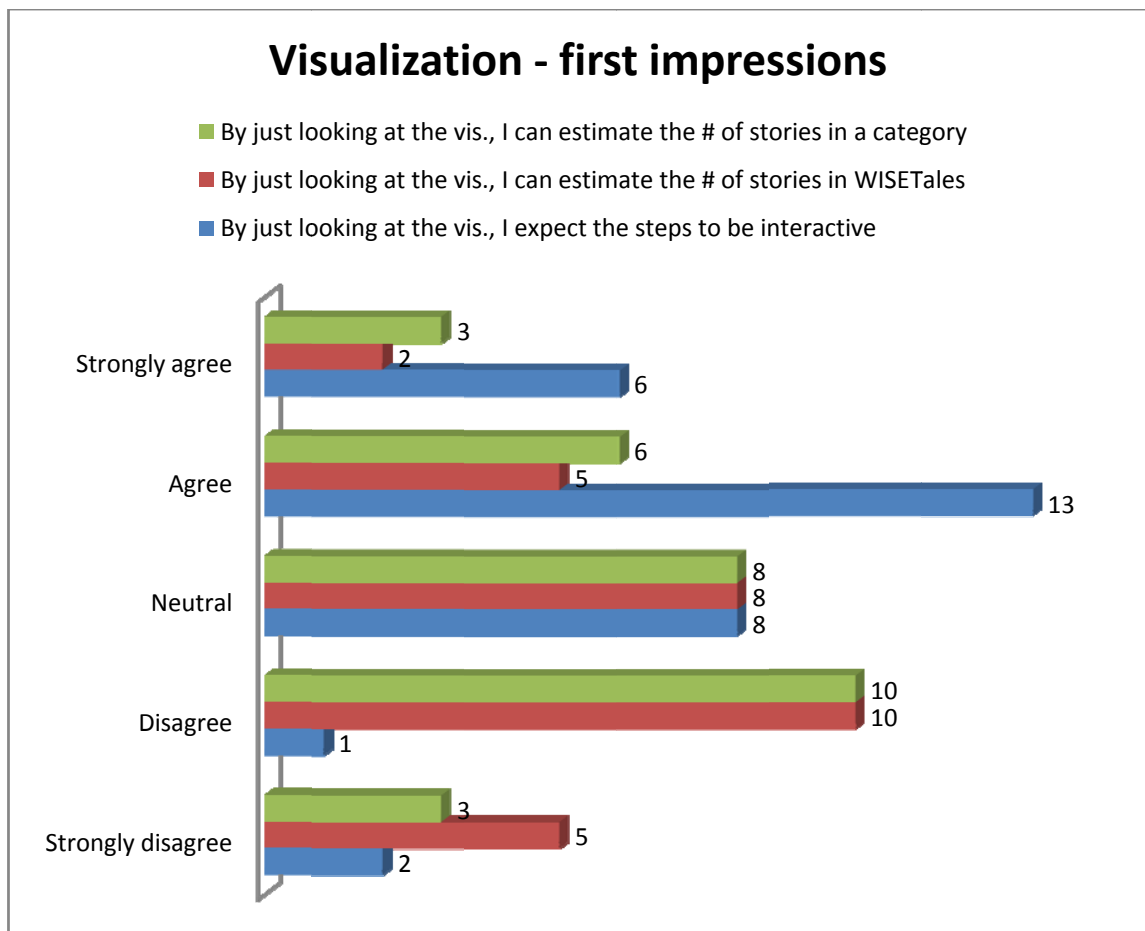


**Figure 7.14** Visualization steps/categories



While twenty three participants found that the names of the categories (steps) are meaningful, twenty three participants also found that the number of categories is enough in the visualization. Sixteen participants could identify the types of posted stories by looking at the visualization.

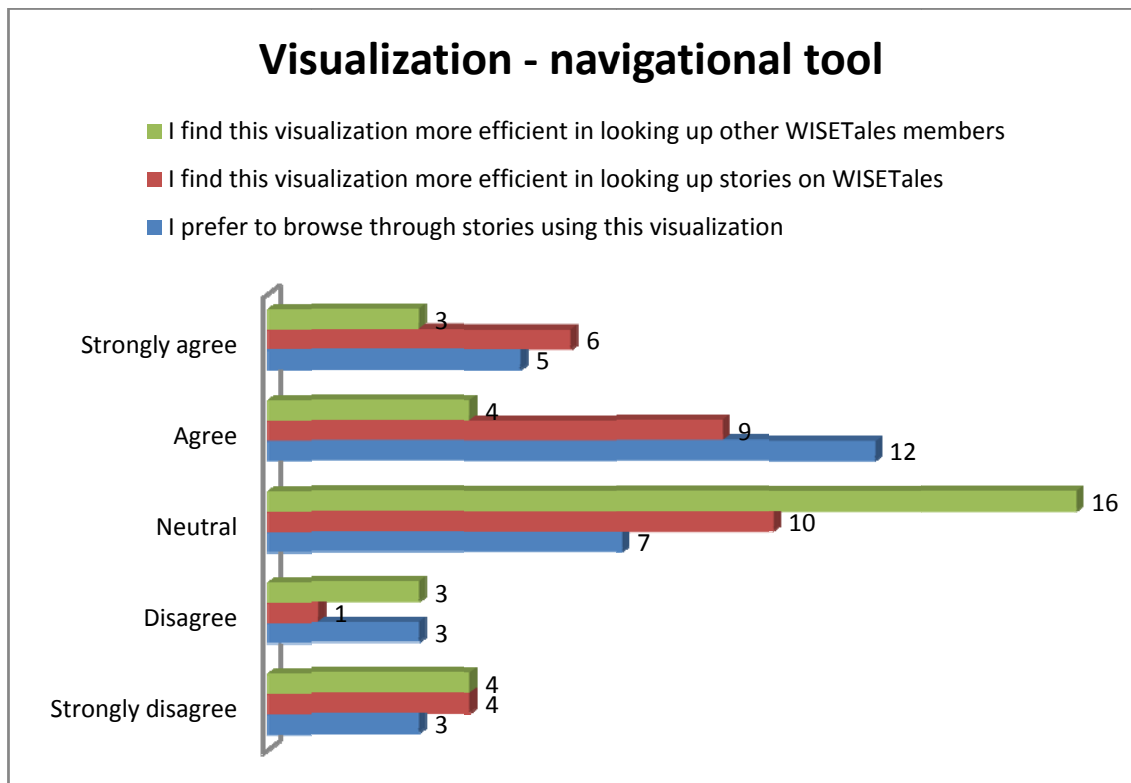
While the majority of users expected the visualization to be interactive, only nine participants could estimate the number of stories per category, and only seven participants could estimate the number of stories in WISETales (Figure 7.15), which will be discussed later.



**Figure 7.15** Visualization – first impressions

## B. Visualization as a navigational tool

When asked about using the visualization as a navigational tool, seven participants found it more efficient in looking up other WISETales members, while fifteen participants found it efficient in looking up stories. Nevertheless, seventeen participants prefer to browse through stories using the visualization (Figure 7.16):

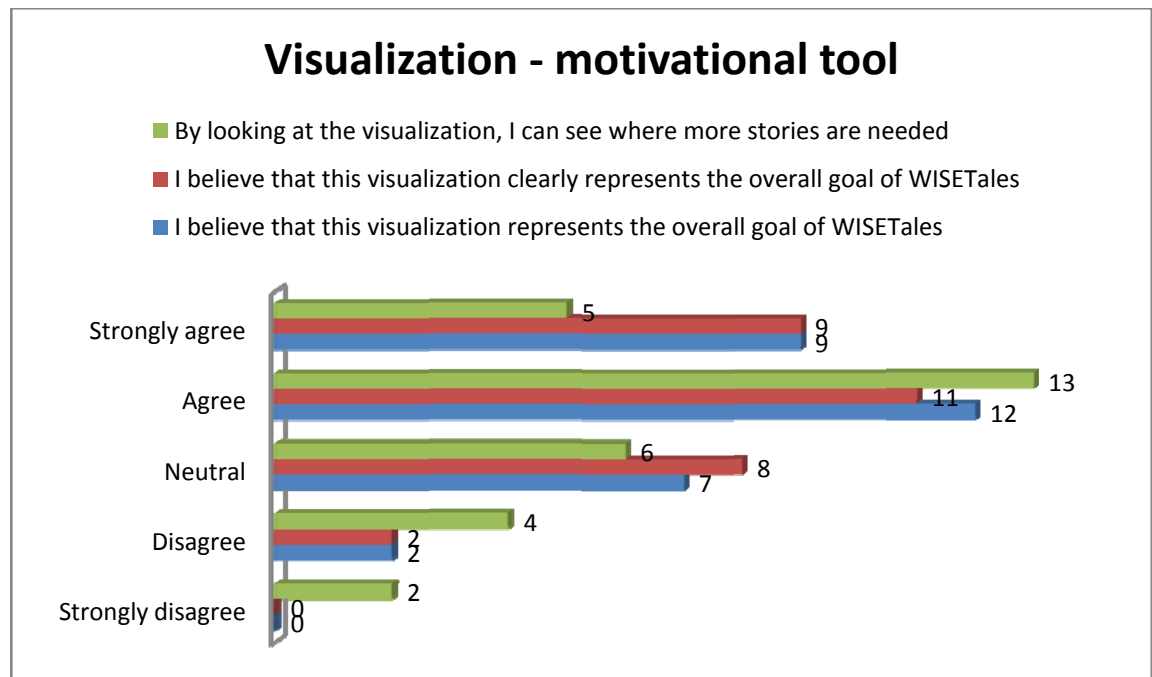


**Figure 7.16** Visualization – navigational tool

## C. Visualization as a motivational tool

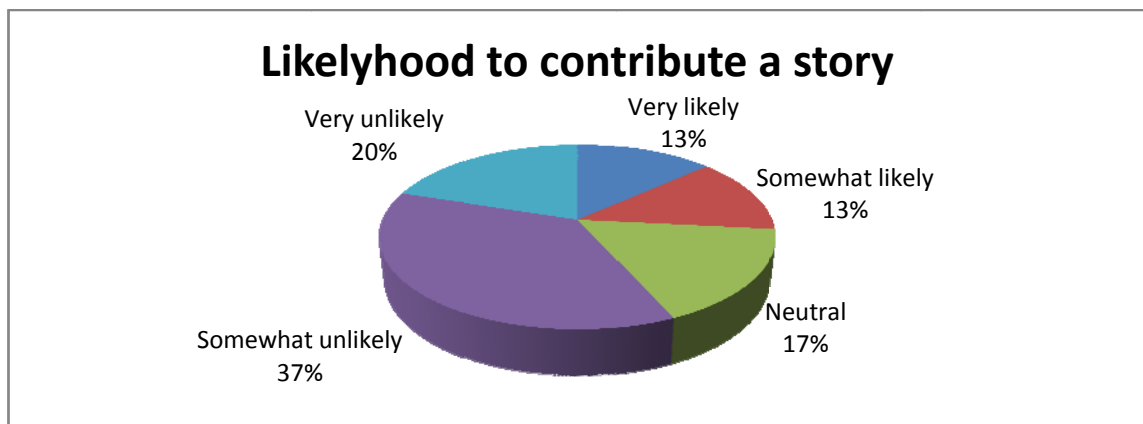
To investigate the use of this visualization as a motivational tool, participants were asked if they could see where more stories are needed, and if the visualization represents the overall goal of the community. Eighteen participants could see where more stories are needed. While twenty one participants believed that the visualization represents the

overall goal of WISE Tales, twenty participants believed it represented it clearly (Figure 7.17).



**Figure 7.17** Visualization – motivational tool

Finally, to check if the visualization motivated the participants, they were asked about their likelihood to contribute a story to help fill the steps. Results are shown in Figure 7.18, showing that the majority are unlikely to contribute (57%).



**Figure 7.18** Likelihood to contribute a story to fill up the steps

In the new design of WISETales, the visualization is permanently visible to serve as a social visualization tool with three purposes: to be informational, navigational and motivational. The informational purpose of WISETales' visualization is described by having a social visualization that provides an overall visual representation of stories posted on WISETales, and from a quick glance at the visualization, be able to see where the collaborative efforts of the contributing authors are. While twenty three participants thought that the names of the steps are meaningful and enough, less than ten participants could estimate the number of stories in each category and in WISETales in general. This result is not surprising, since the hint percentages (html tags) had to be removed because they turned to be not visible in many newer versions of browsers. From a first impression, nineteen participants expected the steps to be interactive. Therefore, the visualization seems to partially fulfill the purpose of being an informational tool, according to the participants' results.

The second purpose of the visualization is to be navigational, i.e. be able to browse through stories and authors. Although users can browse through stories on WISETales by tags or through the archives, results show that fifteen participants found it an efficient tool for looking up stories, while seventeen participants preferred to browse through stories using the visualization. Perhaps it is due to participants being of a younger age and more exposed to visual and interactive sites.

The third purpose of the visualization is to be motivational, i.e. encourage users to contribute more stories to WISETales. Based on the Common Identity Theory, the visualization was designed to stimulate users' intrinsic motivation towards WISETales in a subtle way, by showing the collaborative efforts of active participants, and the areas where more stories are needed to help other women in Science and Engineering. Although 60% of participants believe that the visualization represents the overall goal of WISETales, only 26% of participants responded that they were likely to contribute a story to WISETales by looking at the visualization. According to the results, the visualization does not seem to fulfill the motivational purpose to encourage the contribution of more stories, although participants perceive it as a tool to represent the collaborative efforts of WISETales members. One explanation could be that the

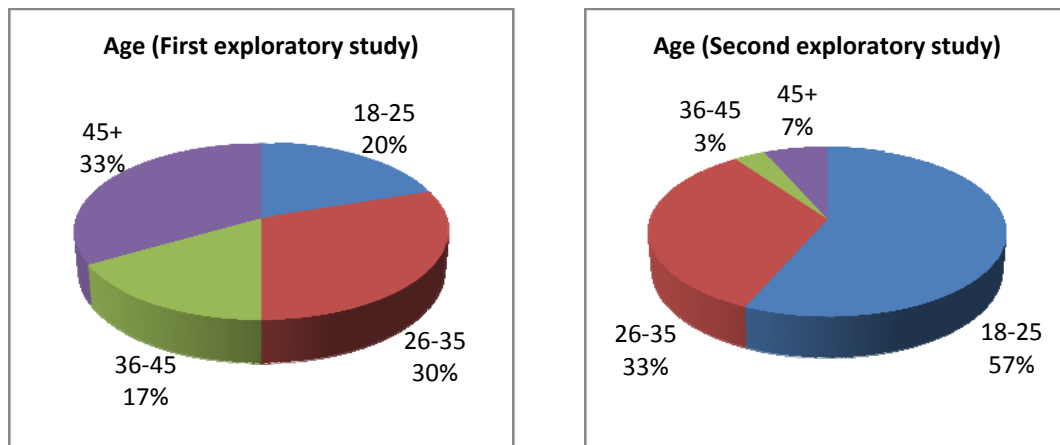
visualization provides a very subtle reminder of the goal and efforts of its active members, which targets intrinsic motivation rather than providing tangible extrinsic rewards for contributions. Users might not immediately feel motivated to participate, because intrinsic motivation takes a longer time to take effect, but its results are long lasting (as seen from the literature review). I question whether these participants even realize that they feel intrinsically motivated. It is difficult though to ask participants directly about it. It would be interesting to study the effect of this visualization as a motivational tool over a longer period of time, and see if it affects the number of contributions from lurkers, or increases contributions from the current active participants.

### **7.3 Similarities and differences between participants of both exploratory studies**

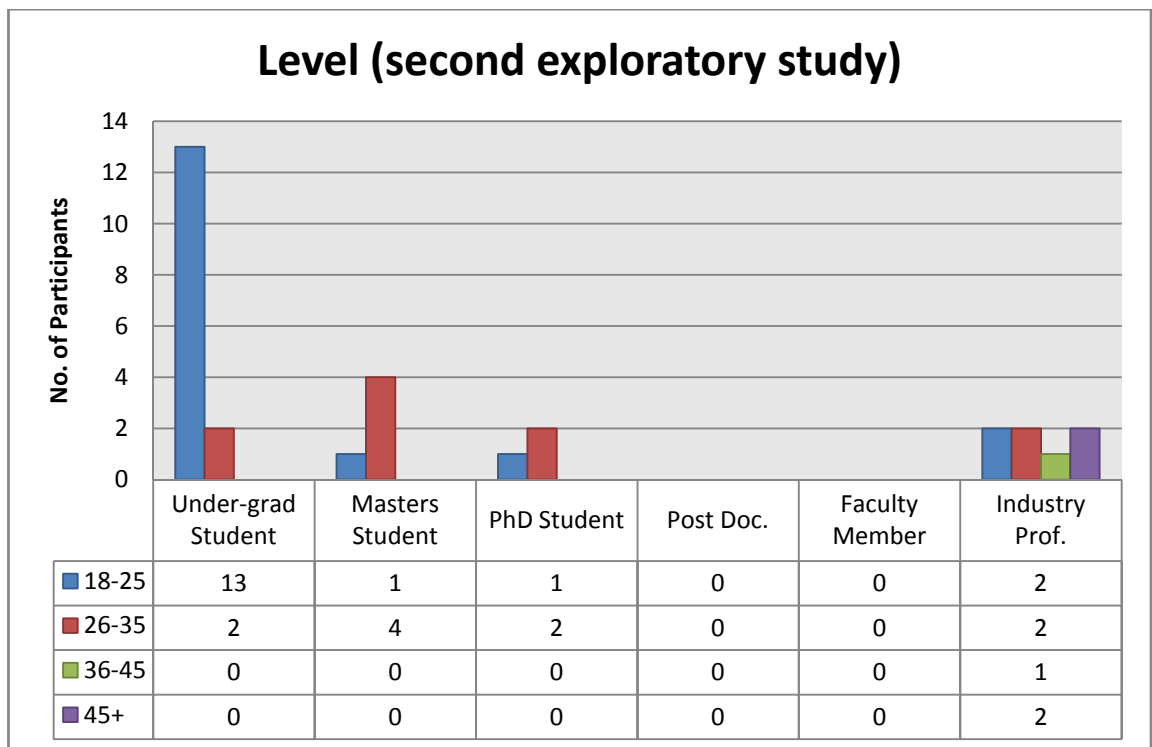
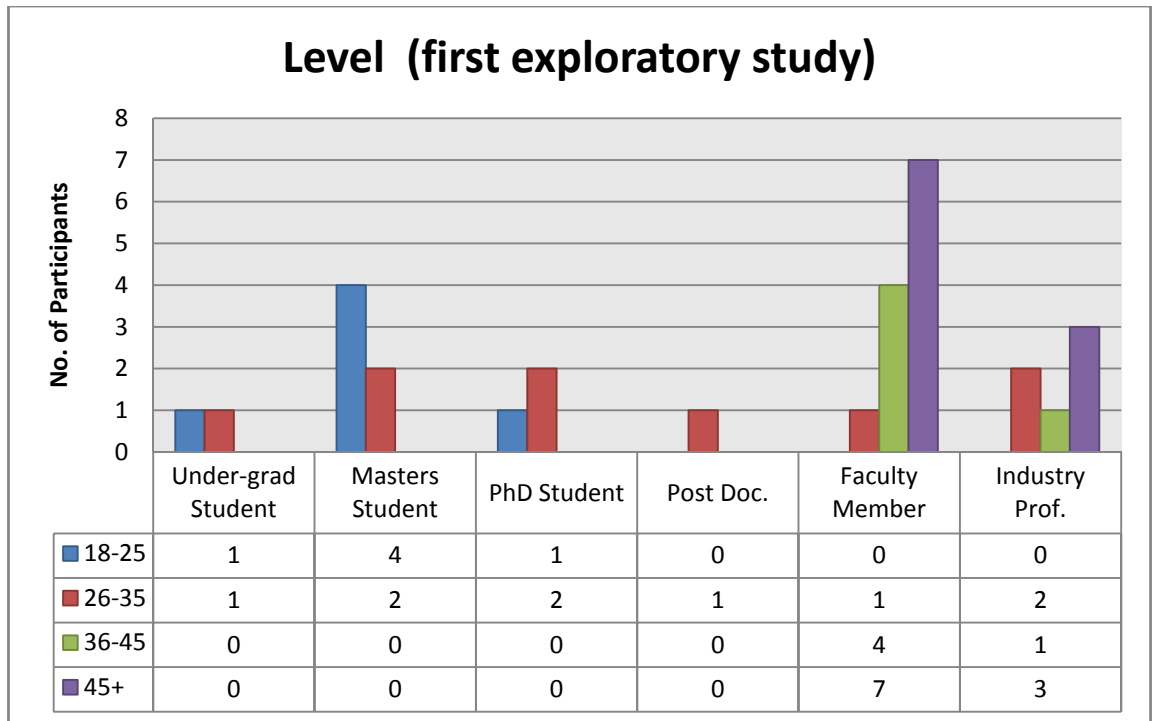
In contrast to the data provided from the first exploratory study which had a higher number of professional participants, the second exploratory study provided a wealth of information from a younger generation of women in Science and Engineering. This data gives the advantage to learn more about another sub-group of the WISETales audience, and understand the similarities and differences between generations of women in Science and Engineering.

The first exploratory study had a maximum of 53 questions, with a 32 minutes average completion time, while the second exploratory study had a maximum of 122 questions with a 23 minutes average completion time. So the participants of the first exploratory study spent almost 0.6 minutes (or 36 seconds) per question, and the participants of the second exploratory study spent almost 0.19 minutes (or 11.4 seconds) per question. Therefore, participants in the second exploratory study spent almost three times less time per question. While the first exploratory study had more open-ended questions, the majority of questions in the second exploratory study were of a Likert-scale type to compensate for the longer set of questions.

While participants of the first study were more familiar with the community (among the thirty participants there were fifteen registered members), there were only three registered members among the participants in the second study. This lower number made it hard to evaluate directly the effect of the design changes. Yet, it provided a good opportunity to evaluate the new design with a younger user group who major in areas other than Science and Engineering (Figure 7.19, 7.20).

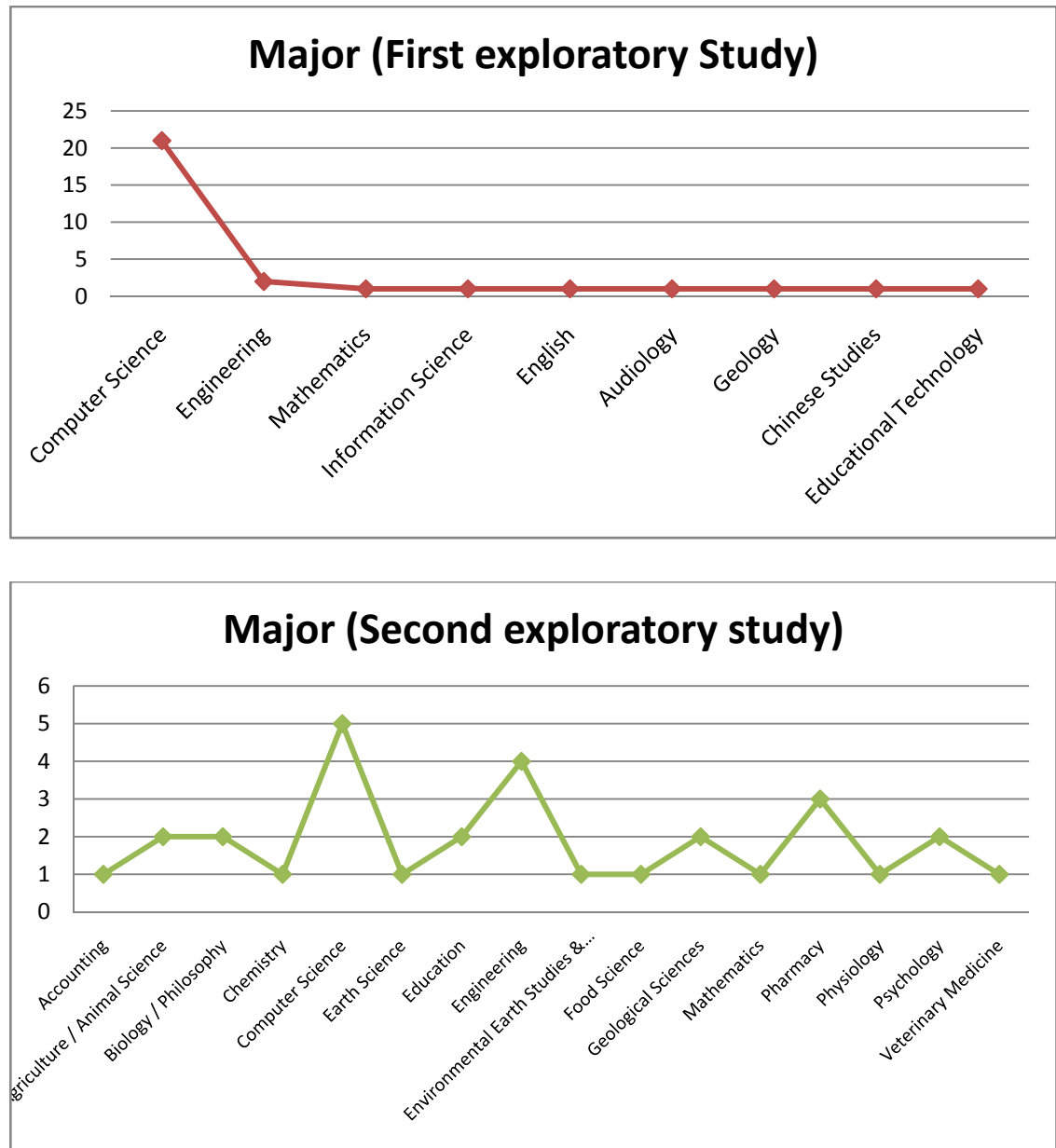


**Figure 7.19** Age difference between participants of both studies



**Figure 7.20** Level differences between participants of both studies

Only 36% of the participants in the second exploratory study are from areas where women are strongly underrepresented (Computer Science, Engineering, Mathematics and Chemistry), while the rest are from life-sciences, education or accounting, or geo-sciences where women have a much stronger presence (especially at an undergraduate / graduate student level), as shown in Figure 7.21.



**Figure 7.21** Major difference between participants of both studies



Similar to the first study, the majority of participants in the second study (also 90%, or 27 participants) thought that WISETales is a great idea, particularly for those eleven participants (or 100%) who majored in under-represented fields (Computer Science, Engineering, Mathematics and Chemistry).

While 83% of participants from the first exploratory study liked the previous design of WISETales, only 73% participants in the second exploratory study liked the new WISETales design (there were only four participants who participated in both studies.) Looking to the results from the eleven participants (who major in one of the disciplines with under-representation of women - Computer Science, Engineering, Mathematics and Chemistry), 92% of them liked the new design of WISETales, in comparison to 63% of participants who majored in other disciplines. These results show that participants who belong to these under-represented fields in both studies do like WISETales design, despite evaluating different versions of WISETales' interface. Possibly their liking of the design is biased by their stronger liking of the community.

The results show differences between different generations and disciplines of women represented in the two study groups. For example, in the second study, 67% (twenty participants) stated that they were interested in joining a community for women in Science and Engineering, in contrast to 83.4% (twenty five participants) from the first exploratory study. Looking further into the answers from the eleven participants in areas of under-representation, 82% of them were interested, compared to 58% from the remaining nineteen participants, who were majoring in disciplines that had a stronger representation of women, like education, pharmacy, veterinary, physiology, psychology, biology and accounting, and where the need for such a community is not so high. The percentage of participants who state that they would like to join the community is consistent across both studies, if we consider only the proportion in areas where women are underrepresented.

## **7.4 Summary of Google ClustrMaps and Google Analytics statistics on WISETales**

Apart from the exploratory studies discussed earlier, third party software was used to monitor the growth of WISETales. One is ClustrMaps, which tracks visitors to WISETales. For the period of time from 5<sup>th</sup> of August 2008 –when it was implemented in WISETales – until the 21<sup>st</sup> of June 2009; the community attracted 2,588 visits all around the globe (Appendix H).

WISETales was launched on January 31, 2008. As of July 1<sup>st</sup>, 2009, there are thirty two stories posted on WISETales, including our (me and Dr. Julita Vassileva) two initial seeded stories and seven additional stories contributed by us in later months, some of them under different aliases. As of July 1, 2009, WISETales has 62 members who have registered and accessed the site afterwards, and another thirty members who registered, but did not access the site afterwards. Of the sixty two members, twelve (19.3%) are active contributors (including me and Dr. Julita Vassileva), who have posted stories and/or comments at least once. One of the active contributors (not one of us) shared ten stories.

Google Analytics was used as a tool to monitor WISETales' traffic statistics. From June 15<sup>th</sup> 2009 until July 15<sup>th</sup> 2009, WISETales had 291 visits, where the highest number of visits per day was twenty five. The average time spent on WISETales was two minutes and fifty seven seconds. The visits came from twenty nine countries. Of all visits, 156 were from new visitors, while 135 were from returning visitors. Of all the visits, 126 were visits resulting from search via 87 keywords. The top 10 keywords were: 'shocking stories of the world', 'wisetales', 'female compliments', 'female empowerment', 'shocking stories', 'why we chose mathematics', 'work from home/tell a friend/', 'have a baby phd', 'I want a phd and a baby' and 'tell a friend adventure'.

Some pages were viewed more than others. Specifically, 155 links on WISETales were viewed a total of 2,152 times. The top ten pages visited were: the WISETales homepage (not surprising), the story 'Shocking stories from around the world' (probably because 'shocking' is a common search word), the pages 'wisetales', 'content' and 'users', the story 'stress at graduate school', 'PhD with a baby', 'Two sisters, two

degrees, two different lives’, stories posted in the month of June 2009 and the story ‘conflict at work’.

WISETales’ traffic came from five main sources: Google, ourwisetales.com, direct access to the community (probably saved in the favorites/bookmarks), yahoo mail (probably following regular invitations that I send using my personal email address on yahoo when a new story is published) and through Google’s popular blog system: blogspot.com. This translates to 43.30% access from search engines, 38.14% access from referring sites and 18.56% access from direct traffic. So, setting up appropriate tags for stories and optimizing the site keywords for Google search is the best way to bring more traffic to the site, even though most of the visitors will never come back. Also this data shows that posting stories on social websites, personal or organizational websites and blogs (accounting for the access to WISETales from referring sites) is more effective than personal invitations and “word-of-mouth” (accounting for direct access) in terms of attracting lurkers. However, all of the contributing members were recruited through personal invitations and “word-of-mouth”.

## CHAPTER 8

### CONCLUSIONS AND FUTURE WORK

This thesis aimed to answer the following question:

*What is an effective way to motivate women in Science and Engineering to participate and share personal stories in the new WISETales community?*

#### 8.1 Summary

I attempted to answer this research question by investigating four different aspects which I believe are interrelated. These four components (which were identified through the literature review) are: human motivation, online communities, the “cold start” problem and visualization. Examining these four aspects allowed a better understanding of the target audience – women in Science and Engineering – and their needs and motivations.

Since no online community exists for women in Science and Engineering to share experiences through stories alone, I had to create WISETales to serve as a test application for the research question. This research approach presented several difficulties. Unlike a regular controlled study, investigating a new online community is challenging since the number of users could not be controlled, thus potentially jeopardizing the success of the research. Despite the challenges, I preferred this approach as it gives “real world” results, and serves a genuine purpose of supporting women in Science and Engineering by sharing their experiences through stories. Below

is a brief discussion of each of the four components which were addressed in this research:

### *Human Motivation*

In Chapter 2 I reviewed many theories that investigate human motivation from different fields of science. In this research work, I chose the Common Identity Theory (which states that users can commit to the community as a whole, as opposed to committing to certain users in the community as in the Common Bond Theory). Since the goal of WISETales is to provide an online support group for all women in Science and Engineering, who work together to help each other, the Common Identity Theory seemed suitable. Results of both evaluations also support this choice since fifty four participants (out of sixty participants) thought WISETales is a great idea, meaning they understand the need for such a community and relate to its goal rather than individual users.

Furthermore, I did not offer any extrinsic incentives for women to contribute stories to WISETales, as I wanted to investigate how intrinsically motivated these women are to support each other. Although intrinsic incentives last longer than extrinsic incentives, they need more time to develop results. Since its launch on 31<sup>st</sup> of January 2008 and up to 21<sup>st</sup> of June 2009, WISETales has a repository of twenty nine stories and fifty three members. These numbers of users and stories are small, but it would be unrealistic to expect WISETales to be as popular as Facebook for example, because WISETales is a niche community geared towards a much smaller and more specific group of users. Yet, WISETales has been gaining popularity across the globe, judging from the visit counter of 2,588 visits (from 5<sup>th</sup> of August 2008 till the 21<sup>st</sup> of June 2009). This number of visits indicates quite a large lurking audience, which may eventually produce more active participants and story contributors, given that the activity of the community continues.

### *Online Communities Design*

An online community has to ensure a constant flow of quality content to keep users interested, coming back and actively participating in the community. Research in the

area of online communities indicates three main factors need to be considered in the design of a community: documents, media and human. In WISETales, stories represent documents. Stories give WISETales its unique niche over other support communities for women in general. The media used in WISETales is Drupal Content Management System. WISETales' design went through two iterations and it was evaluated by sixty users in two exploratory studies. The human factor is clearly identified in WISETales as women in Science and Engineering of different educational and professional levels.

Research from Gender Studies shows that there are fewer women in Science and Engineering mainly due to gender stereotyping and lack of confidence. Women in these fields feel alone and isolated from others who go through similar experiences, thus thinking they are alone and at fault. WISETales brings these professional women together, provides them with online support environment where they can share their experiences to reflect upon, vent out or simply share successes through stories. These experiences allow the younger generation of WISETales' members to learn and become aware of certain situations they may encounter at school or work. In addition, WISETales offers a repository of personal stories that can be useful for researchers in Gender Studies as a resource for studying the experiences of professional women in areas where they are under-represented.

### *Social Awareness*

In WISETales, the aim of the visualization (graphical representation of data) is to emphasize the goal of the community by visually representing the overall effects of individual contributions, which is also in line with the Common Identity Theory. The design of the visualization was based upon Maslow's Hierarchy of Needs. The final version of the visualization had a ladder design with five steps that correspond to Maslow's Hierarchy of Needs. Although I did not expect women in Science and Engineering to fully comprehend Maslow's Theory, a few participants in the first study correctly interpreted the visualization as a hierarchy of needs and most participants liked the visualization. The findings also support the suggestion that a social visualization, apart from providing awareness of what is happening in the community, can be useful as a navigation tool.

### *The “cold start” problem*

Starting a new online community is hard because there is a “Chicken and egg” problem: If there is content, it attracts users to view it, and they can contribute more content, which attracts new users etc... But at the beginning, when the community is just starting, there is no content, so users have no reason (there is no attraction) to come and contribute. In WISETales, I address this problem through several steps; first, I set realistic expectations. I assume that having 2-4 posted stories a month would be sufficient. Next, WISETales was seeded with two stories to show the type of stories expected. Additional stories were seeded in “slow-down” periods to maintain interest. Then, WISETales was extensively marketed through personal email invitations and frequent posts on other social networking sites related to the target audience. The other step was to allow WISETales members who have no time to post a complete story, to contribute by commenting on others’ stories, and by forwarding stories to their friends by email, thus spreading the word. Finally, WISETales is built upon various design principles geared towards the success of online communities. Yet, it remains to be seen if the community will sustain itself with this level of contributions.

## **8.2 Conclusions**

To answer the main research question addressed by the thesis: I found that a community design and visualization based on triggering intrinsic motivation emphasizing the goal of the community (according to The Common Identity Theory) has worked well in the context of WISETales. However, it is hard to generalize this finding to other communities for the following reasons:

1. WISETales is a small niche community, and it is hard to know what success means in terms of the quantity of contributions, i.e., was the goal of having 2-4 stories posted a month enough or was it too high/too low or maybe just right?
2. Although WISETales was launched over a year and a half ago, time limitations of this study (constraints by the timeline to finish a M.Sc. thesis) makes it hard to

predict whether this level of participation is going to be sustained over the years to come.

3. As seen from the second exploratory study, the majority of participants did not perceive WISETales' visualization as a motivational tool. Yet, this is not a strong negative result. It is hard to isolate the visualization and test its motivational role apart from the other factors in WISETales, e.g. its design, esthetics, etc. Strong results regarding the role of the visualization can be obtained in a controlled experiment involving many users, which unfortunately is impossible in such a small niche community. Yet, if the community grows or there is a longer time available to collect data, a controlled experiment may be possible in the future.

### **8.3 Contributions**

1. WISETales was created as a new online community that provides online support to women in Science and Engineering by sharing their experiences through stories.
2. WISETales offers a repository of real experiences of women in Science and Engineering. Along with the data from both exploratory studies, this research offers a wealth of information that is useful to other researchers, especially from Gender Studies.
3. This research provides an insight into how to build a new niche online community with a particular purpose. Such experiences are rarely shared, if at all, in the research literature.

### **8.4 Future Work**

While the evaluations' results of WISETales are encouraging, there is always room for improvements and different directions to investigate. Some are outlined below.

The participants of the second exploratory study were asked three questions as to possible future considerations. First, they were asked whether they would be interested in recording a story using a microphone rather than typing it. The majority responded



negatively. Their main reasons were the fear of having their voices identified which contradicts their preference to remain anonymous. Also the difficulty of correcting errors and editing recorded stories was mentioned as an argument against the idea. Some participants questioned if a story can be spontaneously told, suggesting that an author will always write it first and then record it herself reading from the typed text. Others said that typing is much faster and that by recording, they will miss the joy of writing.

Second, participants were asked whether they would be interested in listening to a recorded story rather than reading text. Again, the majority of participants responded negatively. The reasons they stated were that they preferred reading and found it more convenient; they thought it is “too weird” and that they do not like automatic voices.

Last, participants were asked whether they would like to access WISETales on their smart phones. Only three participants chose ‘yes’, nineteen participants chose ‘no’ and eight participants were not sure. The reasons stated were “feeling uncomfortable reading or writing personal stories on the run”, “not owning a smart phone”, “it is easier to read large pieces of text on a bigger monitor”. Some participants found data transfer fees too expensive. So it seems that for now, women in Science and Engineering prefer more conventional means of interacting with the WISETales community.

Other directions for development of WISETales are:

A. Enhance WISETales marketing:

The current WISETales theme design did not allow for the proper implementation of RSS feeds or automatic email reminders. It would be very useful to further investigate this issue in another implementation of WISETales or in a different theme.

B. A unique story Q&A feature:

Since professional women in Science and Engineering have more experience than younger students, and students on the other hand have a lot of unanswered questions, it would be interesting to study the effects of collaboration between both generations of women in Science and Engineering

in WISETales, as well as its overall effect on the number of members and stories, by having members post a question, and they would get their answer in a form of a story. So the member who asked the question can see how the situation was handled in context of its environment.

C. Introduce a “Topic of the month” feature:

To address the barrier stated by younger women in Science and Engineering of not knowing what to write about, it would be useful to suggest a specific topic for women to discuss each month. This feature would remind them of past experiences and makes it easier to write a story. Also, a function can be added to allow for one more participation method in addition to contributing stories, comments and forwarding WISETales or a particular story to a friend. Members can be allowed to suggest topics and also to vote for suggested topics. In this way, the community can express what kind of stories they are most interested to hear about. Suggesting a topic of story invokes reflection in the person who gives the suggestion and is half way to writing a story. It may encourage others to write a story on the topic, but it may also encourage the person who made the suggestion.

Hopefully, the addition of new, less-time consuming forms of participation will energize the community and steer more involvement and commitment to the common identity and purpose of WISETales.

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## APPENDICES



## **A – Pilot Study for WISETales**

### **Materials & Methods**

#### **i. Evaluation Plan:**

- ***Goal(s) of evaluation:***

1. Do users find this online community easy to understand and use?
2. Can the users navigate the interface easily?
3. Do users understand the policies of the community?
4. What do the users think of the community?

- ***Rationale for type of evaluation:***

Since all evaluation methods have advantages and disadvantages, and based upon my reading of the Data Gathering techniques, I decided to compare these techniques with regards to our online community and as per my understanding of them. I would like to try three methods in particular (Think Aloud, Questionnaire and Interview) to benefit from the advantages of each technique.

- ***Participant pool***

I plan to have 10-12 women participants for this study. The target participants' pool includes female graduate students from various departments at the University of Saskatchewan, and professional women.

Invitations to participate will be sent out via email, to check prospective participants' availability and interest in participation.

A sample story will be provided to participants so they can upload it to the community during the evaluation, if they do not already have one. Participants will also be given \$10/- each for their participation.

- ***Brief overview of evaluation protocol***

A. I estimate the study time to be 50 minutes as follows:

- Brief introduction and overview of study process (5 minutes)
- Participants explore the system and upload a story following a scenario (30 minutes)
- Participants answer a quick questionnaire (5 minutes)
- Participants attend a brief interview (10 minutes) - Wrap-up and thanks

B. The location of the evaluation will be either at the participant's cubicle / office, my cubicle or in a computer lab, whichever is quieter and suitable to participants at the chosen time.

- C. I expect to be with the participant throughout the time of study, first to take notes on the Think Aloud technique, and then I hand in a printed questionnaire. Once completed, a short interview follows, and then I conclude the evaluation.

- *Evaluation scenario*

1. Open your browser and visit: [wisetales.usask.ca](http://wisetales.usask.ca)
2. Read the content of the centered boxes to get an idea of what this community is about and the motivational questions to get involved.
3. Browse through the stories on the main page.
4. Access and previous stories from the archives.
5. Create an account to be able to submit a story. (If you chose to be anonymous, were you able to do so?)
6. Carefully read the terms and conditions.
7. Log on as a member.
8. Submit your story.
9. Log out.

Note: stories will not be published immediately, as all stories go through a moderator

## **B – Pilot Study for WISETales**

### **Consent Form**



UNIVERSITY OF  
SASKATCHEWAN

DEPARTMENT OF COMPUTER SCIENCE

UNIVERSITY OF SASKATCHEWAN

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You are invited to participate in a study entitled *(here the title of the actual study will be listed, e.g. “Usability evaluation of WISETales”, or “ Evaluation of Motivation Visualization Effect on Participation in WISETales”)* . Please read this form carefully, and feel free to ask the researchers any questions you might have.

Researchers: **Julita Vassileva**, Department of Computer Science (966-2073),  
jiv@cs.usask.ca

**Zina Sahib**, Department of Computer Science

The purpose of the study is to evaluate the usability of the new online community, to see if users can navigate the interface easily, understand the policies and what they think of the community.

In the study, you will explore the functionality of the community and answer some questions about your overall experience. The estimate of the total time to participate in this study is 45 minutes.

There are no known risks in this study.

*(the following paragraph describes in brief the purpose and method of the particular study, in this case Usability Evaluation of WISETales)*

Findings from the study will be used to enhance the interface of the community to improve the clarity and the policies governing the community. You will be able to try and use the WISETales community, which allows women in science and engineering to share stories of personal experiences from their study or work. A sample story will be provided for you to submit during the study, so there will be no eventual privacy risks related to publishing your own story. You will be observed during your use of the community, and then you will need to fill a short questionnaire and participate in a brief interview about your experience with the system.  
You will receive a \$10 honorarium for your participation in the study.

The research data will be stored on a password-protected computer system and will be available only to the researchers. Personally identifying information will be destroyed

upon completion of data collection, and pseudonyms (alias) will be used to refer to the participants. The data will be kept by the researchers for a minimum of five years upon the completion of this study in a secure storage.

Aggregate results will be used in a M.Sc. thesis and articles published in peer reviewed conferences and scientific journals. However, any information that can be linked to a specific participant will be removed or altered.

Your participation is voluntary, and you may withdraw from the study for any reason, at any time, without penalty of any sort. You may refuse to answer individual questions. If you withdraw from the study at any time, any data that you have contributed will be destroyed at your request.

If you have any questions concerning the study, please feel free to ask at any point; you are also free to contact the researchers if you have questions at a later time. This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Research Ethics Board on (insert date). Any questions regarding your rights as a participant may be addressed to that committee through the Ethics Office (966-2084). Out of town participants may call collect. You may find out about the results of the study through the MADMUC website (<http://madmuc.usask.ca>) or by contacting the researchers.

I have read and understood the description provided above; I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time. A copy of this consent form has been given to me for my records.

---

(Name of Participant)

---

(Date)

---

(Signature of Participant)

---

(Signature of Researcher)

## **C – Pilot Study for WISETales**

### **Scenario**

1. Open your browser and visit: [wisetales.usask.ca](http://wisetales.usask.ca)
2. Read the content of the boxes in the center of the screen to get an idea of what this community is about and the motivational questions to get involved.
3. Browse through the stories on the main page.
4. Access and previous stories from the archives.
5. Create an account to be able to submit a story. (If you chose to be anonymous, were you able to do so?)
6. Carefully read the terms and conditions.
7. Log on as a member.
8. Submit your story.
9. Log out.

## D – Pilot Study for WISETales

### Questionnaire



I hope you have enjoyed exploring [wisetales.usask.ca](http://wisetales.usask.ca). Please complete this survey and return it to me once done. You have 5 minutes to complete it before moving on to the final interview section. Thank you!

1. Gender	<input type="radio"/> Male <input type="radio"/> Female
2. Age	<input type="radio"/> Below 40 <input type="radio"/> Above 40
3. Are you currently (and mainly)	<input type="radio"/> A student <input type="radio"/> A professional
4. How many hours a day do you spend on the internet on a regular weekday?	<input type="radio"/> 0 – 2 hours <input type="radio"/> 3 – 5 hours <input type="radio"/> 6 – 8 hours <input type="radio"/> over 8 hours
5. How many hours a day do you spend on the internet in a weekend?	<input type="radio"/> 0 – 2 hours <input type="radio"/> 3 – 5 hours <input type="radio"/> 6 – 8 hours <input type="radio"/> over 8 hours
6. How comfortable are you with computers?	<input type="radio"/> Very basic skills <input type="radio"/> Take time to learn <input type="radio"/> Comfortable <input type="radio"/> Skilled
7. Which applications are you currently a member of (in no particular order)? Please check all that applies	<input type="checkbox"/> Email applications <input type="checkbox"/> Facebook <input type="checkbox"/> Picasa <input type="checkbox"/> You Tube <input type="checkbox"/> De-li-cious <input type="checkbox"/> Flickr <input type="checkbox"/> Other
8. Where do you most often access the Internet from? Please check all that applies	<input type="checkbox"/> Home <input type="checkbox"/> Work <input type="checkbox"/> University <input type="checkbox"/> Recreation Centre <input type="checkbox"/> Other
9. Whom do you mainly contact when online? Please check all that applies	<input type="checkbox"/> Family <input type="checkbox"/> Students <input type="checkbox"/> Co-workers <input type="checkbox"/> Teachers / Professors <input type="checkbox"/> Friends <input type="checkbox"/> Strangers <input type="checkbox"/> Others



Please tick one box for each question:

	Very easy	Easy	Average	Difficult	Very difficult
10. How easy was it to understand the goal of the community?					
11. How easy was it to register as a new member?					
12. How easy was it to browse through the website to access recent / new stories?					
13. How easy was it to browse through the website to access archived stories?					
14. How easy was it to read the whole story of your choice? (If only part of it was showing)					

Please tick one box for each question:

	Very satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Dissatisfied
15. Were you satisfied with the overall look of the community?					
16. Were you satisfied with the overall functionality of the community? (did all links work)					

□



Please tick one box for each question:

	Very likely	Somewhat likely	Neutral	Somewhat unlikely	Very unlikely
17. Are you likely to become an active member of the community?					
18. Are you likely to recommend this community to other women?					

Please tick one box for each question:

		Yes	Maybe	No	
19. Do you think WISE Tales has the right to publish posted stories?					
20. Do you think WISE Tales share your account details with others?					
21. Do you trust that your privacy will be preserved if you post a story or a comment?					





Please tick one box for each question:

		Yes	Maybe	No	
22. Do you like the idea of registering before being able to submit a story?					
23. Would you like the stories be open to the public to read? Or,					
24. Would you like the stories to be open for registered users only?					
25. Would you like the comments on stories be open to the public to read? Or,					
26. Would you like the comments on stories to be open for registered users only?					
27. Do you feel comfortable participating in this online community?					
28. Do you support the idea behind this community? (sharing stories to help each other)					



Please tick one box for each question:

		Yes	Maybe	No	
29. Did you find it easy to contribute content?					
30. Did you enjoy the stories already posted?					
31. Did you like the design of the community?					
32. The community currently supports <del>only one functionality</del> sharing stories.					
33. Did you think the community is currently motivational enough for women to participate?					

**E – Pilot Study for WISETales**  
**Interview Questions**

1. What do you think of the idea of having such a community?
2. Did you like the design?
3. Any suggestions to improve the design of the community?
4. Do you think one should register in order to submit a story or post a comment?
5. Do you think the community was motivational enough to encourage women to participate? (If no, please explain)
6. Did you feel it is a community where you could share your story safely and remain anonymous?
7. Were you able to create an anonymous account?
8. Do you like the anonymity option? i.e. authors do not reveal their true identify
9. Would you prefer the community to be more exclusive? i.e. not to reveal any stories to non- registered users?
10. Would you like to see any other functionality added to the community?
11. What do you think would motivate women to submit stories or comment on stories?
12. Do you have any other remarks or suggestions on how to improve the interface, policies or functionality?

## F – First Exploratory Study Online Survey Questions

Question #	Question Text
L1	<p>Thank you for participating in this multiple-page web survey on the "Evaluation of Usability and Visualization Effect on Participation in WISETales".</p> <p>*****</p> <p>*****</p> <p><b>IMPORTANT:</b></p> <p>In order to be able to complete this survey successfully, please note the following:</p> <ol style="list-style-type: none"> <li>1. The Survey must be completed in one session. You CANNOT save it mid-way then continue completing it at a later date.</li> <li>2. Surveys are completely anonymous. Even when you log in to take the survey, your identifying information is not tied to the answers you provide.</li> <li>3. You CANNOT use the browser "back" or "refresh" buttons when using the survey.</li> <li>4. For required questions: if you do not have anything to add, please type in "none" or "N/A" so you can continue to the following question.</li> <li>5. This online survey will be active from 16th October 2008 till 26th October 2008 midnight CST and we are looking for 50 participants only.</li> </ol> <p>*****</p> <p>*****</p> <p>Before beginning the survey, please take some time to familiarize yourself with the online community that is being surveyed: (The link below will open WISEtales in a new browser window)</p> <p>It is highly recommended that you register (to be able to access the full functionality of the community, and because the registration process might take some time -depending on your email provider-since you would</p>

	<p>receive an automated email with a temporary password that you can change later on.)</p> <p><a href="#">WISETales</a></p> <p>When you are ready, please hit "next page" to read the consent form then start the survey.</p> <p>Thank you for your participation.</p>
	%NEWPAGE%
L2	<p>BY CLICKING "NEXT PAGE", YOU AGREE TO TO THE FOLLOWING:</p> <p>CONSENT FORM:</p> <p>You are invited to participate the following web survey entitled "Evaluation of Usability and Visualization Effect on Participation in WISEtales".</p> <p>Please read this form carefully, and feel free to ask the researchers any questions you might have.</p> <p>Researchers:  Julita Vassileva, Department of Computer Science (966-2073),  jiv@cs.usask.ca  Zina Sahib, Department of Computer Science</p> <p>The purpose of the survey is to evaluate the usability of the new online community (WISEtales.usask.ca), to see if users can navigate the interface easily, understand the goals, policies and what they think of the community. Moreover, get their feedback on a special visualization designed specifically for this online community.</p> <p>In the survey, you will answer some questions about your overall experience with WISETALES.usask.ca.</p> <p>The estimate time to participate in this survey is 30 minutes (excluding the time you need to familiarize yourself with the community).</p> <p>There are no known risks in this study.</p> <p>Findings from the study will be used to enhance the interface of the community to improve the visualization.</p> <p>The research data will be stored on a password-protected computer</p>

	<p>system and will be available only to the researchers. Personally identifying information will not be collected, and pseudonyms (alias) will be used to refer to the participants. The data will be kept by the researchers for a minimum of five years upon the completion of this study in a secure storage.</p> <p>Aggregate results will be used in a M.Sc. thesis and articles published in peer reviewed conferences and scientific journals.</p> <p>Your participation is voluntary, and you may withdraw from the study for any reason, at any time, without penalty of any sort. You may refuse to answer individual questions. Incomplete survey data will be destroyed.</p> <p>If you have any questions concerning the study, please feel free to contact the researchers.</p> <p>This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Research Ethics Board on (6th August 2008). Any questions regarding your rights as a participant may be addressed to that committee through the Ethics Office (966-2084). Out of town participants may call collect. You may find out about the results of the study through the MADMUC website (<a href="http://madmuc.usask.ca">http://madmuc.usask.ca</a>) or by contacting the researchers.</p> <p>I have read and understood the description provided above; I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time, and I confirm that I am 18 years or older.</p>
	%NEWPAGE%
L3	General:
1	Gender:
2	Age:
3	Ethnicity:
4	Major: » There are other questions that depend on this one
	%NEWPAGE%
5	Please enter your major: <b>Dependencies:</b> » Hide if question 4 is: Mathematics, Computer Science,

	Engineering, Chemistry, Physics » Show if question 4 is: Other
6	Highest degree you currently hold: » There are other questions that depend on this one
	%NEWPAGE%
7	Please enter your degree: <b>Dependencies:</b> » Hide if question 6 is: Bachelors, Masters, PhD., Post Doc. » Require if question 6 is: Other
8	You are currently a: » There are other questions that depend on this one
	%NEWPAGE%
9	Please specify: <b>Dependencies:</b> » Hide if question 8 is: Undergraduate student, Masters student, PhD student, Professional, Faculty Member » Require if question 8 is: Other
10	Do you have an account on at least one online community (for example: Facebook, Linked In or My Space)? » There are other questions that depend on this one
	%NEWPAGE%
11	Why don't you have an online community account? » There are other questions that depend on this one <b>Dependencies:</b> » Hide if question 10 is: Yes » Require if question 10 is: No
	%NEWPAGE%
12	Please specify your reason: <b>Dependencies:</b> » Hide if question 11 is: Privacy concerns, Too busy, Waste of time » Require if question 11 is: Other
13	Approximately how many hours a week do you spend on online communities? <b>Dependencies:</b> » Hide if question 10 is: No
14	From where do you most often access online communities?

	» There are other questions that depend on this one <b>Dependencies:</b> » Hide if question 10 is: No
	%NEWPAGE%
15	Please specify: <b>Dependencies:</b> » Hide if question 14 is: Home, Work, School, On the Way » Require if question 14 is: Other
16	Do you belong to an online community for women in particular? » There are other questions that depend on this one <b>Dependencies:</b> » Hide if question 10 is: No
	%NEWPAGE%
17	Which online community do you belong to? » There are other questions that depend on this one <b>Dependencies:</b> » Show if question 16 is: Yes » Hide if question 16 is: No
	%NEWPAGE%
18	Please specify which other online communities for women you belong to? <b>Dependencies:</b> » Hide if question 17 is: University specific, Discipline specific » Show if question 17 is: Other
19	Would you be interested in belonging to an online community for professional women?
20	How familiar are you with WISETales?
21	What do you think of the idea of having an online community for women in science and engineering to share personal stories?
	%NEWPAGE%
L4	Design:
22	Did you like the design of the community?
L5	
23	How easy was it to understand the goal of the WISEtales community?
24	How easy was it to read the whole story of your choice? (If only part of it was showing)



25	How easy was it to browse through the website to access recent / new stories?
26	How easy was it to access archived stories?
L6	
27	Any suggestions to improve the design of the community?
28	Do you think one should register in order to submit a story or post a comment? Why?
	%NEWPAGE%
L7	Motivation:
29	Do you think the community will be able to attract participation? Why?
30	Do you think the design of the community attracts participation? Why?
L8	
31	Are you likely to become an active member of WISETales?
32	Are you likely to recommend WISEtales to other women?
L9	
33	Did you create an account on WISETales? » There are other questions that depend on this one
	%NEWPAGE%
34	What type of account did you create? <b>Dependencies:</b> » Show if question 33 is: Yes
35	Did you feel that WISETales is a community where you could share your story safely and remain anonymous?
36	Do you like the anonymity option? Why?
37	Would you prefer WISETales to be more exclusive? (not revealing any stories to non-registered users) Why?
38	Would you like to see any other functionality added to WISETales? If, yes, which one(s)
39	Did you try to post a comment? If yes, was it easy? What would motivate you to post a comment to an existing story?
40	Do you find it easy to submit stories to WISETales? Why?

	%NEWPAGE%
41	Did you enjoy the stories already posted?
42	Did you learn anything from the stories you read? If yes, please elaborate.
43	<p>Which of the following would motivate you most to provide content to WISETales?</p> <p>A. Showing a comparison of your contribution with those of other members.</p> <p>B. Receiving a personal invitation.</p> <p>C. Showing a visualization of the overall progress towards the goal of the community.</p> <p>D. Enforcing a minimum contribution level (story or comment) to maintain membership.</p> <p>Please arrange the factors according to your preference starting with one that you perceive as mostly effective till the least effective. (e.g. of sample answer: A,B,C,D)</p>
44	Do you have any remarks or suggestions on how to improve the interface, functionality or policies?
45	What else would you like to tell us about your experience with WISETales?
	%NEWPAGE%
L10	Visualization:
L11	<p>The final set of questions relates to what you think of the visualization available at:</p> <p>Kindly note that clicking on the link below would open a new browser. Please do NOT close the survey browser so you do not lose your session.</p> <p><a href="#">WISEtales Visualization</a></p>
46	Do you like the metaphor used in the visualization?
	%NEWPAGE%
47	How easy was the visualization to understand?
L12	
48	While hovering over the visualization with your mouse, were the hints useful in helping you comprehend the visualization? Please comment
49	What did you understand from the visualization?
50	Do you think the visualization is relevant to the goal of the community?

	Please comment.
51	Would you like to see this visualization incorporated on the main page of WISETales? Please comment.
52	If incorporated, would this visualization motivate you to contribute content in WISETales? Why?
53	Any remarks about the visualization?

**G – Second Exploratory Study**  
**Online Survey Questions**

Question Number	Question Text
L1	<p>Thank you for participating in this multiple-page web survey on your feedback on WISETales' newly modified interface and visualization.</p> <p>IMPORTANT:</p> <p>In order to be able to complete this survey successfully, please note the following:</p> <ol style="list-style-type: none"> <li>1. The Survey must be completed in one session. You CANNOT save it mid-way then continue completing it at a later date.</li> <li>2. Surveys are completely anonymous. Even when you log in to take the survey, your identifying information is not tied to the answers you provide.</li> <li>3. You CANNOT use the browser "back" or "refresh" buttons when using the survey.</li> <li>4. For required questions: if you do not have anything to add, please type in "none" or "N/A" so you can continue to the following question.</li> <li>5. This online survey will be active from 15th April 2009 till 15th May 2009 midnight CST.</li> </ol>
	%NEWPAGE%
L2	<p>Before beginning the survey, please take some time to familiarize yourself with the online community that is being surveyed: (The link below will open WISETales in a new browser window)</p> <p>It is highly recommended that you register (to be able to access the full functionality of the community, and because the registration process</p>

	<p>might take some time -depending on your email provider-since you would receive an automated email with a temporary password that you can change later on.)</p> <p><a href="#">WISETales</a></p> <p>IMPORTANT:</p> <p>If you are using a FIREFOX browser, we are aware of an existing display issue, therefore, you need to scroll right to be able to view the full visualization.</p> <p>When you are ready, please hit "next page" to read the consent form then start the survey.</p> <p>Thank you for your participation.</p> <p>Your WISETales Team.</p>
	%NEWPAGE%
L3	<p>BY CLICKING "NEXT PAGE", YOU AGREE TO THE FOLLOWING:</p> <p>CONSENT FORM:</p> <p>You are invited to participate in this Survey to get your feedback on WISETales' newly modified interface and visualization.</p> <p>Please read this form carefully, and feel free to ask the researchers any questions you might have.</p> <p>Researchers:</p> <p>Dr. Julita Vassileva, Department of Computer Science 1-306-966-2073) or <a href="mailto:jiv@cs.usask.ca">jiv@cs.usask.ca</a></p> <p>Zina Sahib, Department of Computer Science</p> <p>In this Survey, you will answer questions about your overall experience with WISETales. The estimated time to complete the Survey is 15-20 minutes (excluding the time you may need to familiarize yourself with the community).</p>

	<p>There are no known risks in this study.</p> <p>Findings from this study will be used for research purposes.</p> <p>Your answers will be stored on a password protected computer system and will be available only to the researchers. Personally identifying information will not be collected, and pseudonyms (alias) will be used to refer to the participants. The data will be kept by the researchers for a minimum of five years upon the completion of this study in secure storage.</p> <p>Aggregate results will be used in a M.Sc. Thesis and articles published in peer reviewed conferences and scientific journals.</p> <p>Your participation is voluntary, and you may withdraw from the study for any reason, at any time, without penalty of any sort. You may refuse to answer individual questions. Incomplete survey data will be destroyed.</p> <p>If you have any questions concerning the study, please feel free to contact the researchers.</p> <p>This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Research Ethics Board on 6th August 2008. Any questions regarding your rights as a participant may be addressed to that committee through the Ethics Office (966-2084). Out of town participants may call collect. You may find out about the results of the study through the MADMUC website (<a href="http://madmuc.usask.ca">http://madmuc.usask.ca</a>) or by contacting the researchers.</p> <p>I have read and understood the description provided above; I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time, and I confirm that I am 18 years old or older.</p>
	%NEWPAGE%
L4	<b>GENERAL SECTION</b>
1	Gender:
2	Age:
3	Ethnicity:
4	Major:

	» There are other questions that depend on this one
	%NEWPAGE%
5	<p>If Other, please specify:</p> <p><b>Dependencies:</b></p> <p>» Hide if question 4 is: Mathematics, Computer Science, Engineering, Chemistry, Physics</p> <p>» Require if question 4 is: Other</p>
6	<p>Highest degree you currently hold:</p> <p>» There are other questions that depend on this one</p>
	%NEWPAGE%
7	<p>If other, please specify:</p> <p><b>Dependencies:</b></p> <p>» Hide if question 6 is: High school, Bachelors, Masters, PhD., Post Doc.</p> <p>» Require if question 6 is: Other</p>
8	<p>You are currently a:</p> <p>» There are other questions that depend on this one</p>
	%NEWPAGE%
9	<p>If other, please specify:</p> <p><b>Dependencies:</b></p> <p>» Hide if question 8 is: Undergraduate student, Masters student, PhD student, Post Doc, Professional, Faculty member</p> <p>» Require if question 8 is: Other</p>
10	<p>Do you have an account on at least one online community? (for example: Facebook, Linked In, or MySpace)</p> <p>» There are other questions that depend on this one</p>
	%NEWPAGE%
11	<p>Why don't you have an online community account?</p> <p>» There are other questions that depend on this one</p> <p><b>Dependencies:</b></p> <p>» Hide if question 10 is: Yes</p> <p>» Require if question 10 is: No</p>
	%NEWPAGE%
12	<p>If other, please specify:</p> <p><b>Dependencies:</b></p> <p>» Hide if question 11 is: Privacy concerns, Too busy,</p>

	Waste of time » Require if question 11 is: Other
13	Approximately how many hours a week do you spend on online communities? <b>Dependencies:</b> » Require if question 10 is: Yes » Hide if question 10 is: No
14	Where do you access online communities most of the time? » There are other questions that depend on this one <b>Dependencies:</b> » Require if question 10 is: Yes » Hide if question 10 is: No
	%NEWPAGE%
15	If other, please specify: <b>Dependencies:</b> » Hide if question 14 is: Home, Work, School, On the way » Require if question 14 is: Other
16	Do you belong to an online community for women in particular? » There are other questions that depend on this one <b>Dependencies:</b> » Require if question 10 is: Yes » Hide if question 10 is: No
	%NEWPAGE%
17	Which online community do you check most often? <b>Dependencies:</b> » Require if question 16 is: Yes » Hide if question 16 is: No
18	Would you be interested in belonging to an online community for women in Science and Engineering?
19	How familiar are you with WISETales?
20	What do you think of the idea of having an online community for women in Science and Engineering to share personal stories?
21	Have you participated in a WISETales study before?
	%NEWPAGE%
L5	<b>DESIGN SECTION</b>
22	Do you like the current design of WISETales?
23	In your own words, what do you think the goal of WISETales is?



24	How easy was it to understand the goal of WISETales community?
25	How easy was it to read the whole story of your choice? (If only part of it was showing)
26	How easy was it to browse through the website to access recent / new stories?
27	How easy was it to access archived stories?
28	Do you think one should register in order to submit a story or post a story? Why?
	%NEWPAGE%
L6	New feature: <b>Logo</b> (located at the top of the screen)
29	Do you like WISETales logo?
30	Do you relate to WISETales logo?
31	Do you think WISETales logo is useful in attracting women in Science & Engineering to join it?
L7	New feature: <b>Visualization</b> (the steps located to the right of the screen)
32	What do you think is the purpose of having this visualization? (It was not available in the initial design)
33	What do you think this visualization represents?
	%NEWPAGE%
34	Do you like WISETales visualization?
35	Do you like that WISETales visualization is constantly visible?
36	Do you think that WISETales visualization is related to its goal?
37	Do you think that WISETales visualization is useful in attracting women in Science & Engineering to join it?
L8	New feature: <b>Menu tab</b> (located below the logo, aligned to the left)
38	Do you like being able to access WISETales' Terms and Conditions at anytime, from the Menu tab? (was not visible before)
39	Do you like having the 'About Us' details accessible from the Menu tab?

	%NEWPAGE%
L9	<p>New feature: <b>User Profile</b> Members can now provide more details about themselves, if they wish to. Now they can provide the following information:</p> <p>a. Continent (Which continent the member currently resides in?) [Africa - Asia - Australia - Europe - North America - South America]</p> <p>b. Level (Which level the member is currently at in their career?) [Entry level - Mid level - Senior level]</p> <p>c. Profession (What is the member's profession?) [Engineer - Entrepreneur - IT - Student]</p> <p>d. Sector (What sector the member is currently in?) [Academia - Industry]</p>
40	Do you like this feature?
41	How likely are you to provide this information about yourself?
42	How likely are you to check out this information about other WISETales members?
43	How likely are you to contact another WISETales member?
	%NEWPAGE%
L10	<p>New feature: <b>Tell A Friend</b> WISETales visitors (both members and non-members) can tell their friends about WISETales via email. (Located in a separate module to the left of the screen.)</p>
44	Do you like this feature?
45	How likely are you to use this feature?
L11	<p>New feature: <b>Email this Story</b> WISETales visitors (both members and non-members) can tell their friends about specific stories on WISETales via email. (Located below each story.)</p>
46	Do you like this feature?
47	How likely are you to use this feature?
	%NEWPAGE%

L12	New feature: <b>Insert Image or Link</b> WISETales authors can insert an image or link to their stories. (Located below the story submission box.)
48	Do you like this feature?
49	How likely are you to use this feature?
50	Do you have any remarks / suggestions about the design of WISETales?
51	Would you be interested in recording a story using a microphone rather than typing it?
52	Please comment:
53	Would you be interested in listening to stories by voice rather than reading text?
54	Please comment:
55	Would you like to access WISETales on your smart phone? » There are other questions that depend on this one
	%NEWPAGE%
56	IF yes, please provide the type of phone you use (the brand and model). <b>Dependencies:</b> » Require if question 55 is: Yes » Hide if question 55 is: Don't Know » Hide if question 55 is: No
57	Please comment - why not/ don't know? <b>Dependencies:</b> » Hide if question 55 is: Yes » Require if question 55 is: Don't Know » Require if question 55 is: No
	%NEWPAGE%
L13	<b>MOTIVATION SECTION</b>
58	What part of a story on WISETales encourages you to read it in full? » There are other questions that depend on this one
	%NEWPAGE%

59	If other, please specify: <b>Dependencies:</b> » Require if question 58 is: Other
60	Have you submitted at least one story to WISE Tales? » There are other questions that depend on this one
	%NEWPAGE%
L14	What motivated you to post a story? <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
61	Get advice from others. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
62	Benefit other women in Science & Engineering. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
63	Vent out my frustrations. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
64	Reflect upon my experiences. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
65	Share my success story. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
66	See if other women in Science & Engineering have shared this experience. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
67	An already posted story echoed an experience I have been through too. <b>Dependencies:</b>

	» Require if question 60 is: Yes » Hide if question 60 is: No
68	Create dialog with other members. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
69	My story will become part of a repository of real experiences to support women in Science & Engineering. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
70	I related to a posted story and wanted to share my point of view. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
71	I wanted to share a new experience with women in Science & Engineering. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
72	If you have any other reason, please specify: <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
	%NEWPAGE%
L15	What would help you post more stories on WISETales? <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
73	A challenge posted on WISETales to publish stories with a particular theme or addressing a particular issue. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
74	Positive stories. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
75	Negative stories.

	<b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
76	Generic reminder emails from WISETales team. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
77	Reading comment(s) from other members on my story(ies). <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
78	See my individual story contribution in the visualization (by providing a link to my profile and my story in the corresponding category.) <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
79	Read more stories about women in Science & Engineering at a student level rather than professional level. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
80	Read more stories about women in Science & Engineering at a professional level rather than student level. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
81	Feel a sense of community for women in Science & Engineering. <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
82	If other, please specify: <b>Dependencies:</b> » Require if question 60 is: Yes » Hide if question 60 is: No
	%NEWPAGE%
L16	What is preventing you from submitting your story(ies) or more stories to WISETales?
83	Privacy concerns.

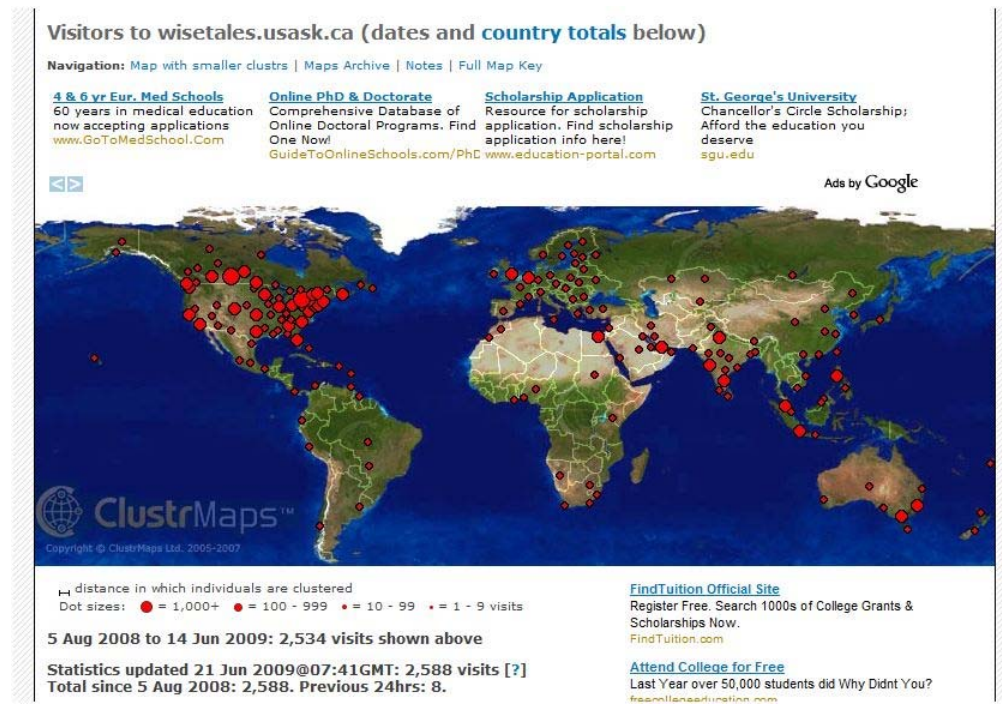
84	No time.
85	Feel that my experience is not as important as others'.
86	I'm afraid my story is not useful to others.
87	I feel that my story is trivial compared to what I read on WISETales.
88	I do not relate to the posted stories.
89	I do not relate to WISETales community.
90	I do not know what to write about.
91	I am not a story writer.
92	I do not want to sound like a complainer.
93	I forget to write a story for WISETales.
94	If other, please specify:
95	How likely are you to contribute comments to others' stories?
96	how likely are you to contribute a new story?
97	How likely are you to recommend WISETales to other women in Science & Engineering?
	%NEWPAGE%
L17	<b>VISUALIZATION SECTION</b>  IMPORTANT: If you are using a FIREFOX browser - we are aware of a known display issue. Kindly remember to scroll to the right to be able to see the pop up window upon clicking on the steps.
98	I can see the visualization (located to the right hand side of the screen) » There are other questions that depend on this one
	%NEWPAGE%
99	If no, please specify your browser type and version: <b>Dependencies:</b> » Hide if question 98 is: Yes » Require if question 98 is: No
L18	Please keep this window open, and open a different browser to access  <a href="http://ourwisetales.com">http://ourwisetales.com</a>  to continue with this section. <b>Dependencies:</b>

	» Hide if question 98 is: Yes » Require if question 98 is: No
	%NEWPAGE%
100	I can click on a step and a pop up window appears. (You might need to scroll to the right to view it)
L19	Please rate the following statements:
101	The names of the categories are meaningful.
102	The number of categories is enough.
103	I expect the steps to be interactive.
104	By just looking at the visualization, I can estimate how many stories there are in WISETales in general.
105	By just looking at the visualization, I can estimate how many stories there are in the categories.
106	I can identify the types of stories posted on WISETales by looking at the visualization.
	%NEWPAGE%
L20	Questions related to the visualization's pop up window. Please click on any of the steps in the visualization to begin this section.
107	I can see a list of stories that belong to this category.
108	I can see a list of story contributors that belong to this category.
109	I can click on a story contributor's name to access her user profile.
110	I can click on a story to access it.
	%NEWPAGE%
L21	Questions about the visualization in general:
111	I am interested in knowing the stories that belong to a certain category.
112	I am interested in knowing about the story contributors in a certain category.
113	I prefer to browse through stories using this visualization.
114	I find this visualization more efficient in looking up stories on WISETales.
115	I find this visualization more efficient in looking up other WISETales members.
116	I believe that this visualization accurately represents the overall goal of WISETales.
117	I believe that this visualization clearly represents the overall goal of



	WISETales.
118	By looking at the visualization, I can see where more stories are needed.
	%NEWPAGE%
119	How likely are you to contribute a story to help us fill up the steps?
120	How likely are you to contribute a story by being able to see the posted stories linked to the visualization?
121	How likely are you to contribute a story by being able to see story contributors linked to the visualization?
122	Do you think that WISETales visualization represents the collaborative efforts of WISETales members?

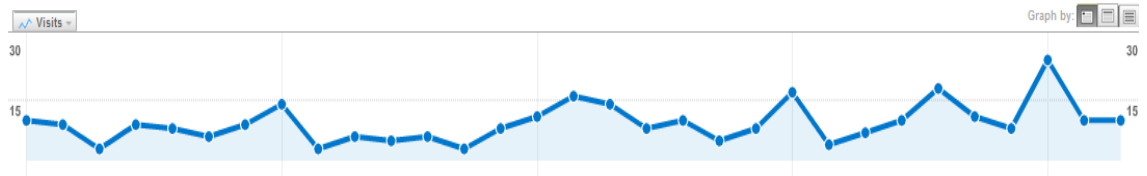
## H – WISETales Site Analysis from Google ClustrMaps



## I – WISETales Site Analysis from Google Analytics

### Dashboard

Jun 15, 2009 - Jul 15, 2009



#### Site Usage

291 Visits

2,152 Pageviews

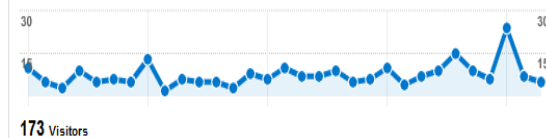
7.40 Pages/Visit

3.44% Bounce Rate

00:02:57 Avg. Time on Site

53.61% % New Visits

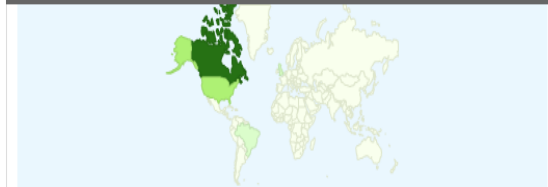
#### Visitors Overview



173 Visitors

[view report](#)

#### Map Overlay

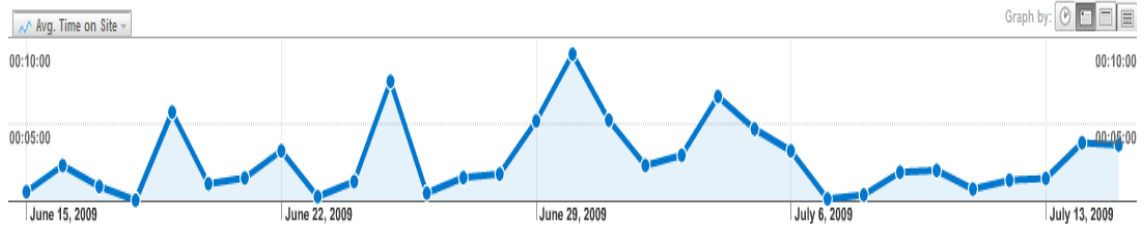


[view report](#)

Overview

### Time on Site for all visitors

Jun 15, 2009 - Jul 15, 2009



00:02:57 Avg. Time on Site

Overview »

## Map Overlay

Jun 15, 2009 - Jul 15, 2009 ▾

Visits ▾



291 visits came from 112 cities

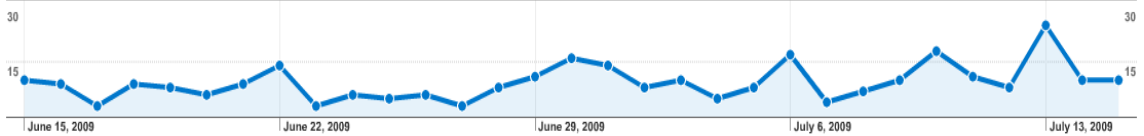
Overview »

## New vs. Returning

Jun 15, 2009 - Jul 15, 2009 ▾

Visits ▾

Graph by:

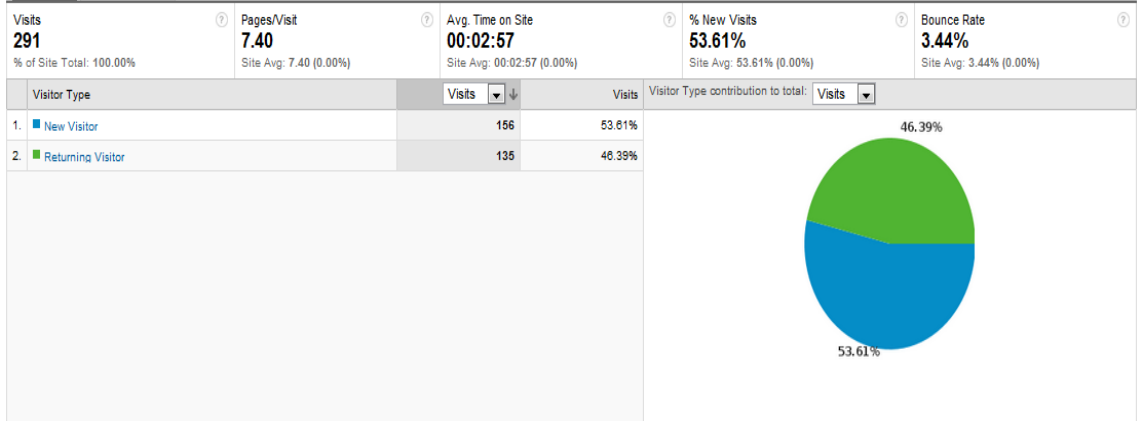


291 visits from 2 visitor types

Site Usage

Goal Conversion

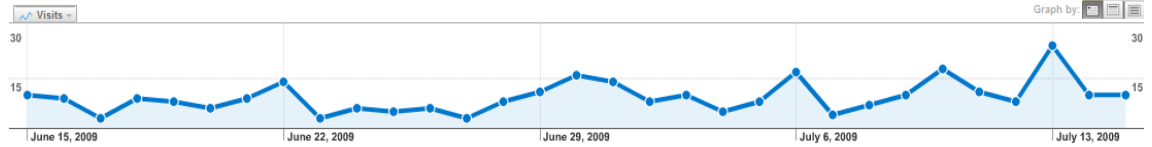
Views:



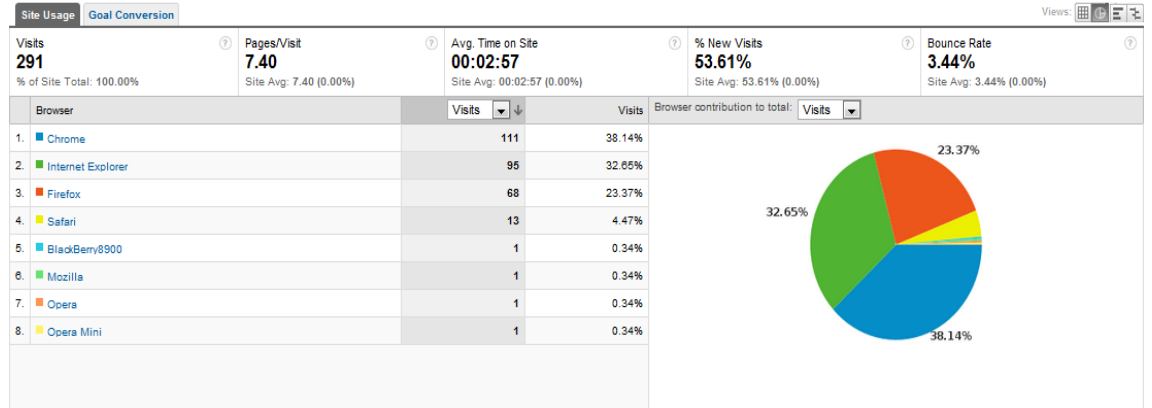
Overview »

## Browsers

Jun 15, 2009 - Jul 15, 2009



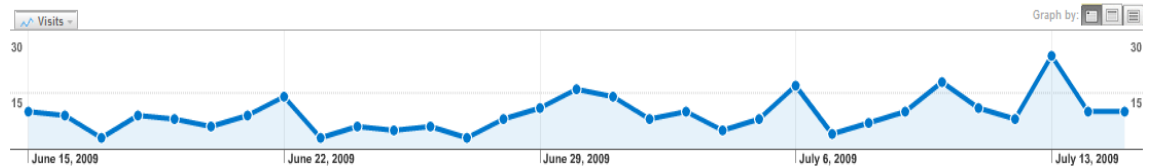
### 291 visits used 8 browsers



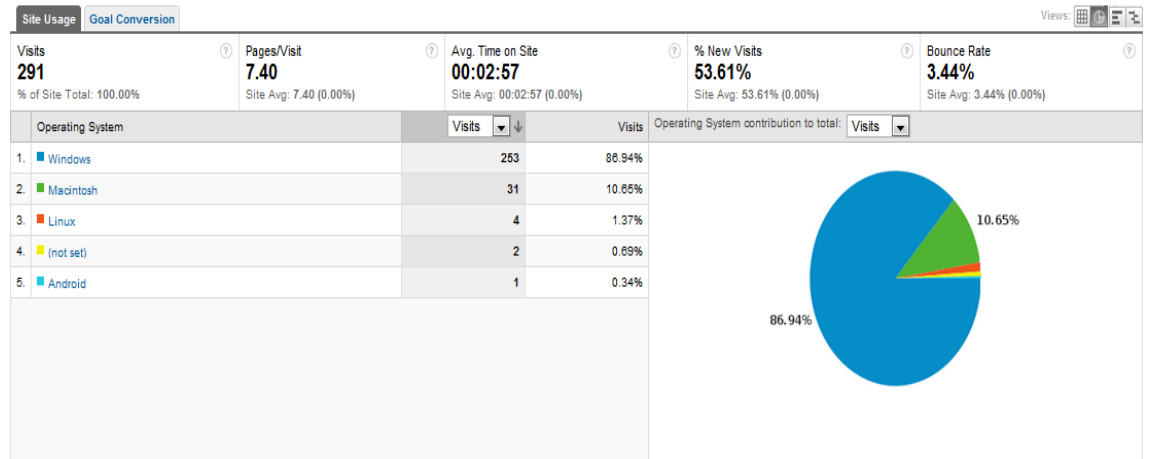
Overview »

## Operating Systems

Jun 15, 2009 - Jul 15, 2009



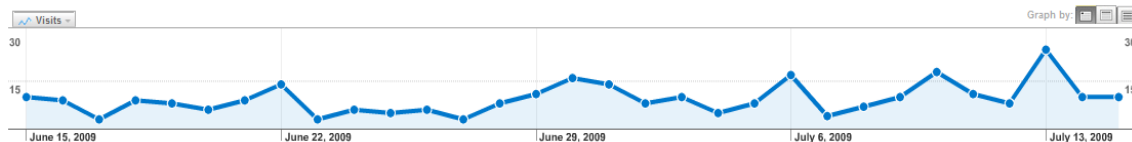
### 291 visits used 5 operating systems



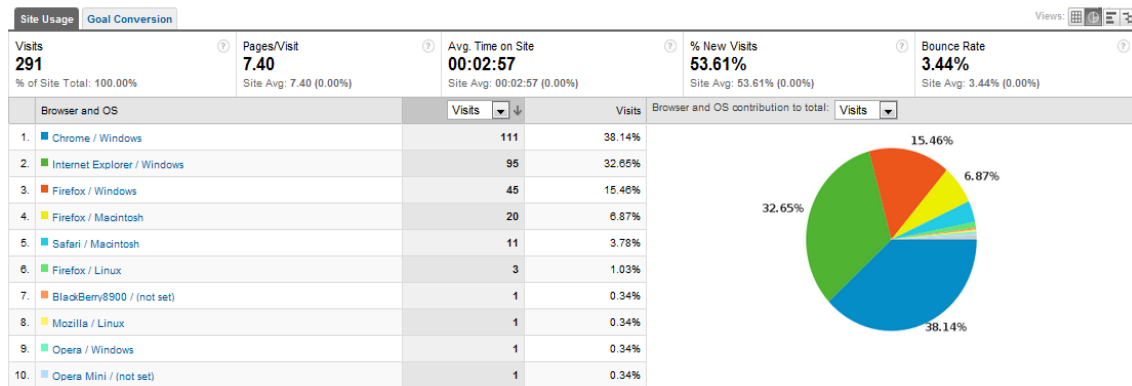
Overview »

## Browsers and OS

Jun 15, 2009 - Jul 15, 2009



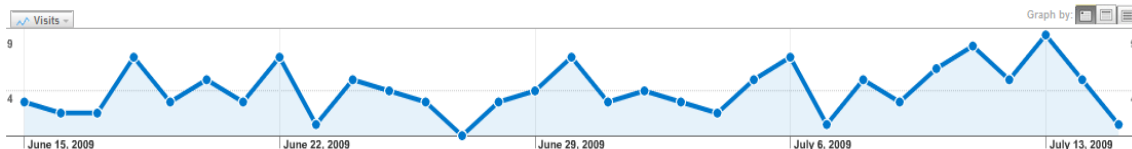
291 visits used 12 browser and OS combinations



Overview »

## Keywords

Jun 15, 2009 - Jul 15, 2009



Search sent 126 total visits via 87 keywords

Show: total | paid | non-paid

Site Usage Goal Conversion

Views: [Table] [Line] [Area] [Bar]

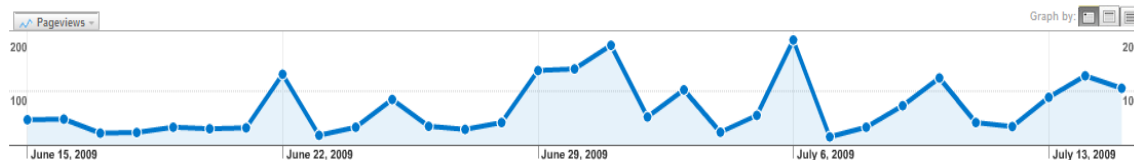
Visits <b>126</b> % of Site Total: 43.30%	Pages/Visit <b>3.16</b> Site Avg: 7.40 (-57.29%)	Avg. Time on Site <b>00:00:44</b> Site Avg: 00:02:57 (-75.08%)	% New Visits <b>95.24%</b> Site Avg: 53.61% (77.66%)	Bounce Rate <b>0.00%</b> Site Avg: 3.44% (-100.00%)
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Dimension: Keyword	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
1. shocking stories of the world	31	3.16	00:00:49	100.00%	0.00%
2. wisetales	5	6.00	00:00:50	60.00%	0.00%
3. female compliments	3	3.33	00:00:09	100.00%	0.00%
4. female empowerment	2	2.00	00:00:00	100.00%	0.00%
5. shocking stories	2	2.00	00:00:01	100.00%	0.00%
6. why we chose mathematics	2	2.00	00:00:00	50.00%	0.00%
7. work from home /tell-a-friend/	2	4.00	00:00:12	50.00%	0.00%
8. "have a baby" phd	1	2.00	00:00:00	100.00%	0.00%
9. "i want a phd and a baby"	1	2.00	00:00:00	100.00%	0.00%
10. "tella friend"adventure	1	2.00	00:00:00	100.00%	0.00%

Overview »




## Content by Title

Jun 15, 2009 - Jul 15, 2009



155 page titles were viewed a total of 2,152 times

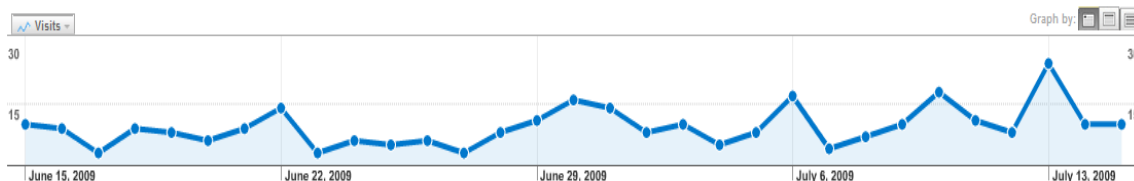
Content Performance

Views:   

Pageviews 2,152 % of Site Total: 100.00%	Unique Pageviews 1,021 % of Site Total: 100.00%	Avg. Time on Page 00:00:28 Site Avg: 00:00:28 (0.00%)	Bounce Rate 3.44% Site Avg: 3.44% (0.00%)	% Exit 13.52% Site Avg: 13.52% (0.00%)	\$ Index \$0.00 Site Avg: \$0.00 (0.00%)	
Page Title	Pageviews ↓	Unique Pageviews	Avg. Time on Page	Bounce Rate	% Exit	\$ Index
1. WISETales	862	279	00:00:32	0.00%	13.23%	\$0.00
2. Shocking Stories from Around the World   WISETales	84	39	00:00:24	0.00%	30.95%	\$0.00
3. WISETales	62	25	00:00:23	0.00%	19.35%	\$0.00
4. Content   WISETales	55	53	00:00:11	0.00%	1.82%	\$0.00
5. Users   WISETales	50	18	00:00:52	0.00%	4.00%	\$0.00
6. stress at graduate school   WISETales	43	23	00:00:14	0.00%	6.98%	\$0.00
7. PhD with a baby   WISETales	42	22	00:00:46	0.00%	33.33%	\$0.00
8. Two sisters, two degrees, two different lives...   WISETales	39	25	00:00:37	0.00%	5.13%	\$0.00
9. Month of June, 2009   WISETales	38	16	00:00:14	0.00%	13.16%	\$0.00
10. conflict at work   WISETales	33	17	00:00:36	0.00%	9.09%	\$0.00

## Traffic Sources Overview

Jun 15, 2009 - Jul 15, 2009

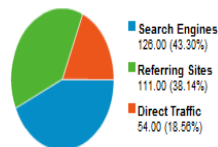


All traffic sources sent a total of 291 visits

18.56% Direct Traffic

38.14% Referring Sites

43.30% Search Engines



### Top Traffic Sources

Sources	Visits	% visits	Keywords	Visits	% visits
google (organic)	118	40.55%	shocking stories of the world	31	24.60%
ourwisetales.com (referral)	57	19.59%	wisetales	5	3.97%
(direct) ((none))	54	18.56%	female compliments	3	2.38%
ca.mq3.mail.yahoo.com (referral)	19	6.53%	female empowerment	2	1.59%
notebooks-brasil.blogspot.com (referral)	10	3.44%	shocking stories	2	1.59%

All traffic sources sent 291 visits via 16 sources and mediums

Show:

Source Medium

Site Usage

Goal Conversion

Views:

<div>Visits</div> <div>291</div> <div>% of Site Total: 100.00%</div>	<div>Pages/Visit</div> <div>7.40</div> <div>Site Avg: 7.40 (0.00%)</div>	<div>Avg. Time on Site</div> <div>00:02:57</div> <div>Site Avg: 00:02:57 (0.00%)</div>	<div>% New Visits</div> <div>53.61%</div> <div>Site Avg: 53.61% (0.00%)</div>	<div>Bounce Rate</div> <div>3.44%</div> <div>Site Avg: 3.44% (0.00%)</div>	
Source/Medium	Visits ↓	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
1. google / organic	118	3.10	00:00:44	94.92%	0.00%
2. ourwisetales.com / referral	57	10.75	00:04:23	33.33%	0.00%
3. (direct) / (none)	54	10.17	00:05:06	9.26%	0.00%
4. ca.mq3.mail.yahoo.com / referral	19	10.26	00:04:02	0.00%	0.00%
5. notebooks-brasil.blogspot.com / referral	10	1.00	00:00:00	0.00%	100.00%
6. julita.usask.ca / referral	8	29.88	00:14:53	0.00%	0.00%
7. facebook.com / referral	5	6.40	00:02:21	80.00%	0.00%
8. bing / organic	4	3.50	00:00:27	100.00%	0.00%
9. wise.usask.ca / referral	4	6.50	00:01:36	25.00%	0.00%
10. paws.usask.ca / referral	3	21.33	00:07:10	100.00%	0.00%
11. yahoo / organic	3	4.67	00:01:02	100.00%	0.00%
12. zuzascorner.blogspot.com / referral	2	10.00	00:02:06	100.00%	0.00%
13. google.com / referral	1	2.00	00:00:01	100.00%	0.00%
14. new.facebook.com / referral	1	2.00	00:00:00	0.00%	0.00%
15. search / organic	1	4.00	00:01:15	100.00%	0.00%
16. search.windstream.net / referral	1	2.00	00:00:00	100.00%	0.00%

Overview »

Visitor Loyalty

Jun 15, 2009 - Jul 15, 2009

Most visits repeated: 1 times

Count of visits from this visitor including current	Visits that were the visitor's nth visit	Percentage of all visits
1 times	156.00	53.61%
2 times	18.00	6.19%
3 times	6.00	2.06%
4 times	5.00	1.72%
5 times	5.00	1.72%
6 times	4.00	1.37%
7 times	3.00	1.03%
8 times	3.00	1.03%
9-14 times	16.00	5.50%
15-25 times	29.00	9.97%
26-50 times	39.00	13.40%
51-100 times	7.00	2.41%



[Overview »](#)

## Depth of Visit

Jun 15, 2009 - Jul 15, 2009 ▾

Most visits tracked: 2 pageviews

Pageviews in the visit	Visits with this many pageviews	Percentage of all visits
1 pageviews	10.00	3.44%
2 pageviews	137.00	47.08%
4 pageviews	32.00	11.00%
5 pageviews	4.00	1.37%
6 pageviews	16.00	5.50%
7 pageviews	33.00	11.34%
8 pageviews	3.00	1.03%
9 pageviews	4.00	1.37%
10 pageviews	7.00	2.41%
11 pageviews	2.00	0.69%
12 pageviews	4.00	1.37%
13 pageviews	3.00	1.03%
14 pageviews	6.00	2.06%
15 pageviews	5.00	1.72%
16 pageviews	3.00	1.03%
20+ pageviews	22.00	7.56%