On the Wings of Social Media:

Liberating the Portfolio and Education

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Abstract

The emergence of Web 2.0, such as social media, has provided educators with new tools with which to communicate. The internet's transition from a one-way communicative media to a fully interactive platform has changed the way educators use the internet in their curricula. This study investigates how Web 2.0 is used by teachers and students in both secondary and tertiary schools and how it can challenge conventional ways of teaching. It explores, among other things, the production of portfolios and the uses of class and student websites as a means to foster a student-centered approach to learning.

The social constructivist perspective maintains that interplay facilitates reflection and learning whereby we construct our understanding of the world. Learning is achieved through group participation, frequent interaction and feedback. Here, the relationship between language and thinking is central. Learning cannot be seen as independent from the objects that we create. Humans store their collective knowledge and experiences in the form of artifacts that can be shared with others. The use of artifacts allows for students to actively take control of learning and transcend what teachers constitute as valid knowledge. The student-centered approach encourages the selection of information on the basis of interest and relevance.

Some of the findings were that blogs provide a medium for students to reflect over their individual learning processes. By posting preliminary sketches, abandoned and final works to a blog or student web site, students can gain a holistic view of their work. Additionally, the web-based portfolio can act as a forum for teachers and students to access school schedules and assignments. It can also serve as a platform where students can comment on each other's work and discuss lectures that have a high level of abstraction. Web 2.0 allows participants to be a "little less dependent on time and space" and discover "individual solutions."

Whereas this written study constitutes one half of the project, the visual part of this project explores my own learning process during my studies at Konstfack. Through the development of a web-based portfolio, I present a selection of work that was completed during my three years of education. The work is divided into three categories, each of which is linked to a blog on which I have written short, reflective paragraphs about the specific projects. The website is interactive as it allows viewers to post comments about the work.

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1. Introduction

The portfolio has a long tradition among artists. One of its more obvious uses is as a means to present one's body of work when submitting to galleries, competitions or grants. It can also function as a tool for showcasing one's body of work to colleagues, prospective employers, friends and family. In a school environment, the portfolio can serve as a means for students to organize their works-in-progress so that they can easily be shared and discussed with fellow classmates and teachers during critiques and studio seminars. As the student develops his or her body of work, the portfolio grows to include preliminary sketches, abandoned or failed works of art, as well as final works. It can also be used as a tool for reflection, allowing students to step back and reflect holistically on their work, and improve their artistic abilities.[1]

Recent innovation has resulted in Web 2.0, which offers increasingly user-friendly tools that are available online. This means that students and teachers are no longer required to learn complex software packages or install programs. Web 2.0 enables students to post their portfolios to a blog where they can write about their work as it progresses and receive feedback from classmates, teachers and parents. This shifts the balance from speaking to writing and gives an additional means of communication to students who may be shy or hesitant in classroom settings.[2] Online learning environments are interactive and feature hyperlinks[3], which can increase user control and engagement.[4] In addition to online digital portfolios, Web 2.0 also enables students to interact and collaborate with teachers, fellow students, and reflect on their growth. Even the most technically skeptical teacher cannot deny that the tools of the information age pervade all levels of society. Educators often give their students the opportunity to use digital media and internet technology in order to create art, but many do not integrate technology into their courses for the purpose of reflection.[5] This can stem from an uncertainty in how to use it or a conviction that one is not a technically savvy

[1] Fitzsimmons, Debra (2008), 'Digital portfolios in visual arts classrooms', *Art Education* Vol. 61, No. 5, pp. 51-53.

[2] Landow, G. (1997), '*Hypertext* 2.0: *the convergence of contemporary critical theory and technology'*, Baltimore: The Johns Hopkins University Press. pp. 227.

[3] A link in a hypertext document which, when selected or clicked onscreen, causes another related object (esp. a file or program) to be displayed or activated; a word, phrase, or graphic, which may be underlined, highlighted, or otherwise emphasized, to indicate that it is linked in this way. (Soanes, 2001)

[4] Kubey, Robert; Csikszentmihalyi, Mihaly (2002), 'Television addiction is no mere metaphor', *Scientific American*, Vol. 286 No. 2, pp. 74-80.

[5] Overby, Alexandra (2009), 'The new conversation: using weblogs for reflective practice in the studio art classroom', *Art Education*, Vol. 62, No. 4, pp. 19.

person. Web 2.0 challenges the concepts of the traditional classroom, the definition of knowledge, and suggests that the use of technology in education may promote a student-centered learning environment.

1.1 Background

The need for individuals to externalize their collective knowledge into a form that is accessible for reflection is something that is evident in today's media society. The proliferation of collective sources of information on the internet, such as Wikipedia and YouTube, has been made possible by recent technological innovation. The way in which we use the internet has changed dramatically since its widespread use in 1994. According to Tim O'Reilly, the internet was initially designed as a means for a small number of people within relatively few companies to publish information to a large audience.[6] He explains that this shift in how content is published on the internet means that this large audience is now deciding what is important on the internet.

Tim Berners-Lee, who is attributed with the invention of the World Wide Web, initially intended for the internet to be used for "interactive creativity" which he defines as "creating things on the web together"; but the technical complexity involved in creating pages in a hypertext editor and then uploading them to a server was, until recently, far too complex for non-technical users.[7] A hypertext editor is a program that allows for users to create web content in a programming language such as html.[8] Content is then uploaded to an internet server via File Transfer Protocol (FTP). FTP can be thought of as a middleman that delivers content from the user's computer to the internet where it can be viewed on a web browser. This may sound confusing and it is. Thankfully, the complexity that was the hallmark of the internet prior to 2004 has changed as the internet has become a tool which harnesses the collective intelligence of all users.[9] This innovation has resulted in tools such as social software, which allow for anyone to use the web as a collaborative medium in order to communicate, share ideas and work together.[10] The tools that effectively remove the middleman and make the publishing of content available to anyone with a computer and

[6] O'Reilly, Tim (2007), 'What is web 2.0: design patterns and business models for the next generation of software', *Communications & Strategies*, No. 65, pp.26-7.

[7] Rollett, H., Lux, M., Strohmaier, M., Dösinger, G. and Tochtermann, K. (2007), *'The web 2.0 way of learning with technologies'*, *Int. J. Learning Technology*, Vol. 3, No. 1, pp. 93, 96.

[8] HyperText Markup Language. This is the programming language or code that web browsers can read. HTML determines, among other things, how an image is displayed on a web page and the size and font of a text.

[9] Web 2.0 oreilly p. 26,27

[10] Rollett, H., Lux, M., Strohmaier, M., Dösinger, G. and Tochtermann, K. (2007), 'The web 2.0 way of learning with technologies', Int. *J. Learning Technology*, Vol. 3, No. 1, pp. 93.

internet access are collectively called Web 2.0.[11] Little technical know-how is needed in order to use these user-friendly applications, which do not need to be installed on a computer, but exist online. Examples of Web 2.0 are blogs, Facebook, Google Apps, and Wikipedia.

Since its introduction, the internet has become a much more viable tool for educators as it presents a new forum for learning and allows for educators to complement the resources traditionally available to students. It is important to note that teachers have utilized Information and Communication Technology (ICT) for many years, but the complexity of such tools has often restricted access to technically savvy individuals. ICT encourages new forms of communication and allows for a multifaceted environment for teaching and communication.[12] It is in light of the recent innovation in this field, and the potential it poses for education, that I have chosen to revisit this subject.

1.2 Purpose

The purpose of this qualitative study is to see some of the ways in which secondary and tertiary school teachers utilize Web 2.0 in their curricula in order to foster a student-centered learning approach and aid students in reflecting over their individual learning processes.

Note on Terminology

It is nearly impossible to discuss a technical subject without the use of technical terms. Although the purpose of this study is to present the educational aspects of Web 2.0, it is necessary to give a brief background and explanation of the technical terms used. Brevity will therefore be exercised in the explanation of technical terminology covered here. I invite the reader to seek out other sources for more complete explanations of the terminology used. Terms such as internet and web—as well as—Web 2.0 tools and Web 2.0 technologies/applications are used interchangeably.

1.3 Research Questions

In what way do secondary and tertiary school teachers integrate Web 2.0 into their curricula? What are some of the ways in which these media can be implemented in the creation of collaborative learning platforms and digital portfolios for the purpose of reflection and student-centered learning? What are some of the barriers to implementing these tools?

[11] The term Web 2.0 was originally coined by Tim O'Reilly.
[12] Säljö, Roger (ed) (2002), *'Utmaningar och e-frestelser: it och skolans lärkultur'*, Stockholm: Prisma. pp. 166-7.

1.4 Scope

Web 2.0 is a multifaceted subject matter with a wide range of areas of application. This paper focuses therefore on only a few of the ways in which ICT can be used in the field of education. Only those applications used by the informants in this study are discussed. I examine the benefits of Web 2.0 applications, and the role that the conversation plays in a collaborative learning environment. The student portfolio is explored as a tool for facilitating student reflection and interpersonal communication in the classroom. Here, the blog is considered as a means with which students can upload their works-in-progress to a website or blog so as to gain a holistic view of their individual learning processes and make connections.

It may seem logical to go one step further with digital portfolios and utilize student reflections, comments and projects for the purpose of assigning a grade. Formal assessment strategies and criteria for the purpose of assigning a grade are; however, beyond the scope of this study. Finally, this analysis briefly considers some of the potential barriers that informants encounter when using traditional and digital technologies in a school setting.

1.5 Empirical Data

The students and teachers involved in the study came from schools in the greater Stockholm area. A total of five teachers and three students from five different schools volunteered to be interviewed for the study. These included four teachers from secondary schools; one teacher from a tertiary school; and three students from a tertiary school. The aim in choosing a diverse group of informants was not to find persons, whom represent the average teacher or student, but rather learn of some of the different approaches to utilizing ICT and Web 2.0 in an educational environment. While all interview material was analyzed, not all of it was relevant to the scope of this study. This resulted in the use of information from some informants and not others. The teachers herein will be referred to as T1, T2, T3, and T4. The student informant is referred to as S1. In addition, the schools are identified as SK1, SK2, SK3, and SK4. A short introduction of the informants is given below:

T1- is a female teacher with 9 years of teaching experience. Her subjects include Swedish, religion, and business. She is employed SK 1.

T2 – is a female teacher with over 25 years of teaching experience. She educates future teachers at SK2.

T3 – is a female teacher with two years of teaching experience. Her subjects include photography, esthetic orienteering, and film. She is employed at SK3.

T4 – is a male teacher with over 25 years of teaching experience. He is an art teacher at SK4. Over the past year, he has returned to school through a state funded program called Lärarlyftet[13] which enables him to continue his professional education.

S1 – is a female teacher trainee completing her last year SK2.

In addition to interviews, I have availed myself of books as well as articles from peer-reviewed journals. However, because Web 2.0 is a relatively new phenomenon, there is a lack of academic publications on the subject.[14] Moreover, the technological innovation that has taken place since its inception in 2004[15] render articles on the subject, published only a few years ago, nearly obsolete. I have therefore explored the Web 2.0 applications used by my informants as a means to gain a better understanding of them. In many cases, this has involved signing up for free services, such as Google Apps, and exploring the applications' features.

1.6 Methodology

1.6.1 Interviews

The method for gathering data was based on qualitative interviews, which are conducted in such a way as to make the interviewee comfortable so that he or she does not need to conceal or disguise his or herself under a feigned appearance.[16] With this method, the interviewer is interested in understanding how the interviewee thinks and to learn about his or her experiences and hopes while bearing in mind the purpose of furthering the cause of research and maintaining confidentiality.[17] The questions asked during the interviews were open-ended so as to give some structure to the discussions. The same questions were not posed to

[13] http://www.sweden.gov.se/sb/d/9400
[14] Rollett, H., Lux, M., Strohmaier, M., Dösinger, G. and Tochtermann, K. (2007), 'The web 2.0 way of learning with technologies', *Int. J. Learning Technology*, Vol. 3, No. 1, pp. 89.
[15] 2004 was the first year that the Web 2.0 conference was held.
[16] Trost, Jan (1993/1997), 'Kvalitativa intervjuer', Lund: Studentlitteratur, pp. 24-25.

[17] Ibid., 24.

all informants, but were tailored to suit each person. The questions did; however, cover approximately the same topics and were comparable in terms of their content.[18]

Because there are many aspects to Web 2.0 and so many approaches to using them, I have utilized the semi-structured interview as a means to gather information on this subject. This type of interview structure focuses on eliciting narratives. The most common type of semi-structured interview involves the asking of a few "open" questions whereby the interviewee is allowed to give a lengthy response without being interrupted.[19] Because the interviewer does not know how the informant will respond to the questions, follow-up questions and prompts may be invented during the interview. The interviewer must; however, be prepared to respond to the informant's answers.[20] It is important to note that it is better to ask too few questions and thereby accumulate too little information than too much as the material will need to be analyzed later on.[21] All interviews were conducted on a one-on-one basis and recorded on a Dictaphone. The recorded material was then transcribed so that it could later be analyzed.

1.6.2 Snowball Sampling

Because this study works with a population that was difficult to locate, the majority of the individuals interviewed were found with the help of an accidental sampling technique. The researcher collects information from members of the population that can be located and those members then help in locating other members of the population whom they know.[22] This technique is called snowball sampling as it leads to an accumulation of data.[23]

About the Interviews

The majority of the interviews in this study were held in Swedish. While I have attempted to preserve my informants' original remarks, I deemed that the use of direct translations would have resulted in confusing or inadequate sentence structure. I have therefore made decisions during translation.

[18] Ibid., 47-48.
[19] Wengraf, Tom (2001), '*Qualitative research interviewing: biographic narrative and semi-structured methods*', London: Sage. pp. 59-60.
[20] Ibid.
[21] Trost, Jan (1993/1997), 'Kvalitativa intervjuer', Lund: Studentlitteratur, pp. 47.
[22] Babbie, Earl (2007/2010), *'The practice of social research'*, Belmont: Thomson Learning, inc., pp. 193.
[23] Ibid.

1.7 Theoretical Framework

1.7.1 Social Constructivism

Human activity takes place within an historical and social context. In the social constructivist perspective, it is not possible to see the learning process as an isolated, individual phenomenon, but as the result of social interaction between people. Discourse is instrumental in human interplay as it facilitates reflection and learning. Social constructivism also suggests that learning cannot be seen as independent from the objects that we create as these objects mediate our actions (see artifacts).[24]

1.7.2 Artifacts

Humans have the unique ability to transmute ability and insight into tools that can later be used to perform tasks.[25] This ability is shared by few other animals. Examples of artifacts include calculators, books, bicycles and computers. Artifacts are External Symbolic Storage Systems (ESS) and are not completely passive tools, but become relevant only after one relates them to problems in the natural world and decides how to use them to accomplish a specific task.[26] A single match, in and of itself, will not warm a shivering person. Only after a thinking person gathers the tinder required to sustain a fire can a match yield a flame capable of creating warmth.

1.8 Earlier Research

As noted above, there is little research available on the use of Web 2.0 in educational settings. This inquiry builds on studies made as early as the late 1990's. Many of the earlier articles on this subject discuss learning tools created by technicians. This resulted in systems that were cumbersome and, most likely difficult and time consuming to navigate and update. In one study, conducted in 2001, the author describes their "web based learning portfolio" as follows: "since it takes a rather long time for each student to produce [sic] personal portfolio, the implementation time for this system must be long enough /…/ to reflect the genuine usage of the system."[27] This indicates that immediacy was not a common feature in 2001. Other studies discuss the digital portfolio as being a collection of works archived on compact discs or even floppy discs (!). Many of the examples of digital portfolios or computer aided

[24] Säljö, Roger (ed) (2002), *'Utmaningar och e-frestelser: it och skolans lärkultur'*, Stockholm: Prisma, pp. 213-14.
[25] Ibid., pp. 16-17.
[26] Säljö, Roger (2005),*'Lärande & kulturella redskap: om lärprocesser och det kollektiva minnet'*, Falun: Norstedts Akademiska Förlag, pp. 51,190-91.
[27] Chang, Chi-Cheng (2001), 'A study on the evaluation and effectiveness analysis of web-based learning portfolio (WBLP)', *British Journal of Educational Technology*, Vol. 32 No. 4, pp. 439.

learning environments are not available via an internet connection, but are a piece of software that must be installed. Many of the ICT presented in articles, are pre Web 2.0 (Web 1.0) and do not include the social aspects common today.

2. Data Analysis

This section explores two different approaches to learning as well as the benefits of interactive learning and how ICT may help in facilitating such an environment. The informants of this study present some of their experiences with working with Web 2.0 and how the use of blogs and student websites can facilitate the development of student portfolios. Moreover, some of the conditions of learning, as posited by the social constructivist approach, are also explored in this section.

2.1 Interactive Learning

The introduction of Web 2.0 has made the internet a much more viable tool for educators as it presents a new environment for interaction and learning. The majority of Web 2.0 tools were not specifically designed as educational tools, but they can be used as a means to that end. With Web 2.0, Berners-Lee's original intention for the web as being a platform for "interactive creativity" is finally possible. It allows for students and teachers alike to transcend their role as passive consumers on the internet and become active producers of content. Among the Web 2.0 resources used by the informants in this study, Google Apps, iWeb, and blogs were the tools most readily used. These media allow students and teachers to create personal platforms on which they can post portfolios, course related information, reflections, etc. A benefit of using it in education is that it combines a new creative medium with social dynamics.[28]

2.2 Learning Approaches

Many classrooms today still look overwhelming similar to classrooms used prior to the information age. If I were to call to mind the layout of a typical secondary school classroom seen during my time as a teacher trainee, I might visualize a room containing several rows of student desks neatly arranged into single file rows. The teacher's desk, much larger than the students' desks and prominently located near the front or back of the room, is arranged in such a way as to afford the teacher an unhindered view of the students. A chalkboard or whiteboard is prominently mounted at the front of the classroom. Additionally, a few

[28] Buffington, Melanie L. (2008), 'What is web 2.0 and how can it further art education?', *Art Education,* Vol. 61, No. 3, pp. 39.

bookcases and cabinets as well as a computer terminal or two are located near the periphery of the classroom. This type of classroom organization is not uncommon and is a typical example of teacher-directed classrooms.[29] With this type of learning approach, the teacher introduces the subjects worthy of study, lectures on those subjects, and consequently disseminates knowledge to the students.[30] In teacher-directed or teacher-centered classrooms, teachers use low-level technology (i.e., word processing) which does not actively engage students in collaborative projects.[31] In some of the first schools, distinctive roles emerged that were significant for millennia to come: "teachers lectured and students followed whatever was said."[32]

With the student-centered approach to learning, students are more actively engaged in the learning process.[33] Learning merely for the sake of acquiring knowledge is replaced with a more constructivist perspective to learning that emphasizes learning by doing and taking responsibility for one's learning.[34] Constructivism is a theory of knowledge that concerns itself, not with the mere accumulation of knowledge, but with making connections and reflecting over that which has been learned. Learning occurs when we reflect on our experiences, whereby we construct our understanding of the world; and can be understood when we apply our knowledge in new situations.[35] Some of the theorists associated with the constructivist perspective include John Dewey, Lev Vygotsky, George Kelly and Jerome Bruner. The phrase "learning by doing", originally coined by Dewey, is perhaps the most simplistic way to summarize constructivism as it is through our interaction with artifacts and each other that learning occurs. It would be misleading to suggest that the pedagogue's role is irrelevant with the student-centered approach to learning. The difference is that in a student-centered classroom, the teacher is no longer the intellectual authority at the center of the

[29] Ford, Maureen (2003), 'Unveiling technologies of power in classroom organization practice', *Educational Foundations*, Vol. 17, No. 2, pp. 12.
[30] Knowlton, Dave S. (2000), 'A theoretical framework for the online classroom: a defense and delineation of a student-centered pedagogy', *New Directions for Teaching and Learning*, No. 84, pp. 5-8.
[31] Park, Sung Hee; Ertmer, Peggy A. (2007), 'Impact of problem-based learning (PBL) on teachers' beliefs regarding technology use', *Journal of Research on Technology in Education*, Vol. 40, No. 2, pp. 249.
[32] Säljö, Roger (2010), 'Digital tools and challenges to institutional traditions of learning: technologies, social memory and the performative nature of learning', *Journal of Computer Assisted Learning*, No. 26, pp. 57.
[33] Knowlton, Dave S. (2000), 'A theoretical framework for the online classroom: a defense and delineation of a student-centered pedagogy', *New Directions for Teaching and Learning*, No. 84, pp. 5-13.
[34] Gülbahar, Yasemin; Tinmaz, Hasan (2006), 'Implementing project-based learning and e-portfolio assessment in an undergraduate course', *Journal of Research on Technology in Education*, Vol. 38 No. 3, pp. 309; Knowlton, Dave S. (2000), 'A theoretical framework for the online classroom: a defense and delineation of a student-centered pedagogy', *New Directions for Teaching and Learning*, No. 84, pp. 5-14.
[35] Ellmin, Roger; Ellmin, Birgitta (2003), *'Att arbeta med portfolio: teori, förhållningssätt och praktik'*, Stockholm: Gothia, pp. 139.

class, but consigned to the role of mentor and collaborator, who ensures that the classes he or she designs yield meaningful learning experiences.[36] T1 recounts a situation in which she was home sick for two weeks. Instead of cancelling her classes, she asked for the students to present their literature reports via podcasts, which they uploaded to the class website:

> Kevin- How did you notify them?
>
> T1- Via the class website…if one misses class for some reason then all the students know that they can always go in and get information about the course.[37]

Despite being sick, T1 could communicate with her students via the internet, thereby creating a virtual classroom whereby students could take part in course information. Furthermore, the use of the podcast as a means to present a literature report challenged the students to rethink how literature can be presented. T3 uses, Fronter[38], her school's online platform, in a similar way. "/…/ our students use this [Fronter] very frequently" and know that they can always access schedules and messages.[39] Via Fronter, and the internet, students can utilize new means of gathering information for group projects. In one instance, students created visual campaign projects and used the internet in order to contact politicians.

T1 relates why she feels it is important to challenge the traditional classroom environment:

> There are a lot of reasons for doing so. To a certain extent one can then be a little less dependent on time and space. We have some students who have difficulty getting up in the morning, but they can still do well in my class because we can have individual solutions—sometimes one must be in school, that's not how I meant it—but when we do get together we can have a meeting about something instead of me standing there and being the judge who says 'you weren't here this morning.'[40]

The amount of data generated in online environments is too vast for teachers to neatly package and deliver to students.[41] Students need to therefore take initiative and define learning to meet their personal goals.[42] This student-centered approach to learning fosters the

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[36] Knowlton, Dave S. (2000), 'A theoretical framework for the online classroom: a defense and delineation of a student-centered pedagogy', *New Directions for Teaching and Learning*, No. 84, pp. 213.
[37] Interview with T1.
[38] Fronter is an educational company started in Norway that provides a platform for online learning. In contrast to most Web 2.0 applications, Fronter is not a free service. The city of Stockholm contracts services.
[39] Interview with T3.
[40] Interview with T1.
[41] Draves, W. A. (1999),'Why learning online is totally different', *Lifelong Learning Today*, Vol. 3, pp. 4-8.
[42] Ibid.

use of tools—not for the purpose of memorizing facts to be regurgitated on a test—but to actively take control of learning and transcend what teachers constitute as valid knowledge.[43] Moreover, the multitude of information available to us in the digital era requires that we filter out much of what we see and hear, and select information on the basis of interest and relevance.[44] One might think of art-making as an individual process. Gokhale calls attention to Vygotsky's conviction that students perform at higher intellectual levels when working collaboratively as opposed to working individually.[45] Furthermore, those who work in collaborative learning environments gain a better understanding of material; this type of environment also fosters critical thinking through discussion and the clarification of ideas.[46]

2.3 Web 2.0 Applications

Online learning environments are a part of everyday practice at SK1 and SK3 where the laptop computer is standard issue for all students. Immediately upon stepping through the door at SK1, I could not help but notice how the classrooms had a different arrangement than the traditional classroom. Students sat in groups with their laptops instead of at desks and seemed to be actively engaged in group projects. SK1 emphasizes the importance of students working in groups. The portable computer serves as an external memory, and information source that allows us to organize our experiences and link to the world wherever we are.[47] Via their computers, students were able to access the class website where teachers post homework assignments and current information. T3 describes an instance in which students worked with graphite drawings. Via Fronter they were able to access the assignment:

> T3- /…/ and then one can click here, "how to draw with graphite" [points at computer], and then one can open the PowerPoint file, that shows you how to do it. /…/ and then the student can open it and can return to look at it.
>
> K- In case they have forgotten something?
>
> T3- Or if they were absent. Now it's downloading [demonstrates how]. And now they can click on the actual assignment—[in order to read] what the purpose is, the goals—and things like that.[48]

In addition to the class website, students also build and maintain personal websites or "rooms", as they are called in Fronter, for each school subject. This allows them to post their school assignments and maintain contact with fellow students and teachers. Not all

[43] Knowlton, Dave S. (2000), 'A theoretical framework for the online classroom: a defense and delineation of a student-centered pedagogy', *New Directions for Teaching and Learning*, No. 84, pp. 5-9.
[44] Säljö, Roger (2010), 'Digital tools and challenges to institutional traditions of learning: technologies, social memory and the performative nature of learning', *Journal of Computer Assisted Learning*, No. 26, pp. 59-60.
[45] Gokhale, Anuradha A. (1995), 'Collaborative learning enhances critical thinking', *Journal of Technology Education*, Vol. 7, No. 1, pp. 28.
[46] Ibid., p. 29-30.
[47] Säljö, Roger (2010), 'Digital tools and challenges to institutional traditions of learning: technologies, social memory and the performative nature of learning', *Journal of Computer Assisted Learning*, No. 26, pp. 53.
[48] Interview with T3.

schools have access to Fronter, as it is a paid service. At SK1, which lies outside of the city of Stockholm and therefore does not have access to Fronter, students build personal websites by taking advantage of Web 2.0 tools. Google Apps and Apple's iWeb are the preferred applications. They are user-friendly and have intuitive interfaces that students may have come across on Facebook or other Web 2.0 applications. They allow students to easily create their own personal platforms and upload class projects and reflections. Students are encouraged to build their sites according to personal aesthetics, as the school stresses the importance of visual texts. T1 compares her school's use of Google Apps to Fronter. "Fronter is a school portal that is closed [private]. The whole idea with SK1 is sort of, we have some things that are private that we—like digital portfolio and things like that—but then it's also important to show them to others [make them public]."[49] Although the majority of students choose to have private websites that only teachers have access to, they have the possibility to invite others to partake in their student websites. Fronter, on the other hand, lacks this feature.

2.4 Foundation for Learning

There is no sound evidence showing that computers improve school performance.[50] Säljö presents a study by Sternberg et al. that illustrates how computer impact on school performance depends on variables such as "student engagement, group participation, frequent interaction and feedback from mentors, and connections to real-world contexts."[51] This suggests that language and social interaction are important components to learning. The relationship between language and thinking is central to the sociocultural theory.[52] According to Vygotsky, speaking with others, writing, reading, etc., have different qualities, but are all branches on the same tree: activity.[53] T4, an art teacher with more than 25 years of teaching experience, returned to school approximately one year ago in order to take advantage of a state program that allows teachers to continue their teacher education while still working 50%. The program focuses on teaching teachers how to integrate ICT into their curricula. He explains the importance of conversing with his students and how it can be difficult in a busy classroom:

[49] Interview with T1.
[50] Säljö, Roger (2010), 'Digital tools and challenges to institutional traditions of learning: technologies, social memory and the performative nature of learning', *Journal of Computer Assisted Learning*, No. 26, pp. 55.
[51] Ibid.
[52] Säljö, Roger (ed) (2002), *'Utmaningar och e-frestelser: it och skolans lärkultur'*, Stockholm: Prisma, pp. 80.
[53] Strandberg, Leif (2006),*'Vygotskij i praktiken: bland plugghästar och fusklappar'*, Falun: Norstedts Akademiska Förlag, pp. 113.

> It is quite difficult to find the time to talk individually. One must, in order for it to be a good conversation, one must sit as you and I are now doing, without disruption, but when I am talking to students, there are 29 others that must work independently /…/. But nevertheless, I really try to make it work because it is so, it's so essential. The conversation is essential. At times it is practically difficult.[54]

T4 explains how he is continually engaged in conversation with his students, but that the conversations sometimes seem fragmented and unconstructive. "/…/ and one could structurize it [the conversation] with some form of website or blog or, /…/ and then one can also go back and look: 'what was the student thinking here?'—because one doesn't remember that in November, for example."[55] Schools can alternate learning situations in which student activity and interaction can proceed inwards so that an intrapersonal dialog can take place.[56] Working in groups can lead to students attaining a greater understanding than working independently. T1 describes a group project in which students depict a societal problem through the creation of a television program:

> [They did a project about] the person behind the drugs or the person behind something, and we had a group of boys, who were difficult to motivate. They had difficulty in getting started—and were very interested in many things—but not that which takes places here [at school]. But then they became very absorbed and did a good, a very good television program.[57]

She plays a segment of the film from one of the student's websites. The seriousness with which the students appear to have approached the project is visible in their faces:

> They were all active within their different roles. They were very clever. It turned out that one of them was good at editing [film] and…what happened with all of them was that they grew immensely because they were finally able to be good at something and create a depth in the film that I believe would never had been possible had we asked them to write an essay or give an oral presentation.[58]

Non competitive, collaborative learning is one of the goals of technology education; it emphasizes creative thinking, problem solving and making decisions as a team.[59]

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[54] Interview with T4.
[55] Interview with T4.
[56] Strandberg, Leif (2006),*'Vygotskij i praktiken: bland plugghästar och fusklappar'*, Falun: Norstedts Akademiska Förlag, pp. 123.
[57] Interview with T1.
[58] Ibid.
[59] Gokhale, Anuradha A. (1995), 'Collaborative learning enhances critical thinking', *Journal of Technology Education*, Vol. 7, No. 1, pp. 22.

2.5 Collective Tools

Our collective knowledge can be externalized in the form of artifacts, which have been called External Symbolic Storage Systems (ESS), and allow us to preserve information and distribute it to others.[60] We would have difficulty determining a feverish child's core temperature were it not for the thermometer, a common household artifact. The inscription of knowledge and experience into a thermometer results in an ESS that can be utilized by others. Whereas humans are not the only animals capable of creating artifacts, we have the unique advantage of being able to improve them so that they can be passed on to future generations.[61] The ability of ESS, such as computers, to process information has nothing to do with the computer as a passive object. Only through the interaction between a thinking human being and the computer can ability and skill be attained.[62] The information explosion that has taken place in recent years warrants a strategy with which to simplify enormous amounts of information, so that it can be accessed and navigated effectively.[63] Before we had the ability to store information on paper or in computers, we were forced to store it in our heads.[64] ICT serves as an externalization of our collective knowledge and allow us to interact with others in ways not previously possible. T1 underscores how the posting of schoolwork to student websites confers a sense of pride and ownership for students. It also serves as a forum for them to share their collective knowledge with others:

> I feel this is where a lot of schools fall short /…/ one [a student] does a lot of great stuff, but it isn't real—it's done for the sake of the teacher and it doesn't have to be so complicated. It can be as easy as posting it to a website so that others can leave feedback /…/. To have a group of students tell about something that they've done, one notices that they reflect on what they are doing and how they thought [about the project]. And then one can see that they've changed things that they've already finished.[65]

Jerome Bruner emphasizes an idea, first put forth by the French cultural psychologist Ignore Meyerson, called the externalization tenet.[66] Meyerson believed that communities of mutual learners collectively create "works"—or oeuvres as he called them—which give unity, pride and a sense of identity to all who participate in their creation. These

[60] Säljö, Roger (2005),*'Lärande & kulturella redskap: om lärprocesser och det kollektiva minnet'*, Falun: Norstedts Akademiska Förlag, pp. 50-2.
[61] Ibid., pp. 80-1.
[62] Ibid., pp. 190.
[63] Ibid., pp. 191.
[64] Säljö, Roger (ed) (2002), *'Utmaningar och e-frestelser: it och skolans lärkultur'*, Stockholm: Prisma, pp. 17.
[65] Interview with T1.
[66] Bruner, Jerome S. (1996), *'The culture of education'*, Massachusetts: Harvard University Press, pp. 22.

oeuvres, which include among other things, the arts, laws—even a sports team's championship—sustain group solidarity, help make a community, and foster mutual learning.[67] An idea may be vague and difficult to communicate so long that it remains a thought or intention, but the externalization of that idea into a sketch or rough draft results in a form that is more accessible to reflection.[68] The fact that T1's students returned to make changes to projects that were already graded may have something to do with the externalization tenet. School projects can be seen as oeuvres that students take pride in maintaining, long after they have been completed and turned in to the teacher. Could it be that the act of posting school work to a public forum strengthens student unity, pride, and sense of identity? Bruner maintains that the most important externalization in history was literacy, "putting thought and memory 'out there' on clay tablets or paper."[69] Having expressed the importance of the conservation and dissemination of collective works, and its implications for learning, let us explore the student portfolio as a tool for learning.

2.6 Student Portfolio

Portfolios have been used in education as a means to gauge student performance for many years. The Oxford Dictionary of Current English defines the portfolio as being "a thin, flat case for carrying" /…/ "pieces of creative work intended to demonstrate a person's ability." [70] The portfolio can be likened to an artist's visual curriculum vitae, as it gives an account of the artist's past work, education and professional accomplishments. In that sense, an artist portfolio can be used as a tool for applying for exhibitions, grants and galleries. The student portfolio is similar in some respects. It is a collection of various works accomplished during a course or curriculum (e.g., written reports, video/audio tapes, pictures, drawings, discussion records) that demonstrate student growth and stimulate introspective thinking.[71] Additionally, the student portfolio is a purposeful collection of work that the student has actively chosen and includes evidence of student reflection.[72] An important feature of the student portfolio is that there is less focus on the finished result and more focus on how it can be utilized as a tool

[67] Ibid., pp. 22-23.
[68] Ibid., pp. 22-24.
[69] Ibid., pp. 25.
[70] Soanes, Catherine (ed) (1993/2001), '*Oxford dictionary of current english. third edition'*, New York: Oxford University Press, inc.
[71] Chang, Chi-Cheng (2001), 'A study on the evaluation and effectiveness analysis of web-based learning portfolio (WBLP)', *British Journal of Educational Technology*, Vol. 32 No. 4, pp. 435-6.
[72] Paulson, Leon F.; Paulson, Pearl R.; Meyer, Carol A. (1991) 'What makes a portfolio a portfolio?: eight thoughtful guidelines will help educators encourage self-directed learning', *Educational Leadership*, Vol. 48, No. 5, pp. 60.

for students to reflect and make connections in their learning. The inclusion of journals, which are record of what students have thought about in relation to assignments, is therefore a key component. Student portfolios are windows into the student's head that allow for staff and students "to understand the educational process at the level of the individual learner."[73] Vygotsky was interested in how psychological function is dependent on the interplay between how we think with artifacts and how this external activity is eventually internalized as thought.[74] For example, a student might use a ruler to understand how lines converge in a three point perspective drawing. Over time; however, the student learns to mentally calculate the convergence of lines towards their vanishing points, thus learning how to execute drawings without the need for a ruler (i.e., artifact). In this way, drawing with the help of a ruler facilitates the understanding of perspective. Similarly, the maintenance of a student portfolio makes reflection possible. It offers students an opportunity to grow as they can step back and reflect holistically on a collection of their work.[75]

In addition to traditional paper portfolios, students can also choose to create portfolios digitally. The digital portfolio is not an assembly of actual works, but rather a collection of works recorded in digital media.[76] This can include portfolios stored on compact discs, PowerPoint presentations, internet servers, PDF's, etc. The process of transferring (i.e., scanning) content to a computer in the creation of a digital portfolio is a learning occasion for students as it gives them an extra opportunity for reflection.[77] T4 describes how traditional portfolios can have certain drawbacks. He explains that many of his students are not interested in the "how" of a project, but only in the final results and that they often choose to throw away sketches that they are unhappy with:

> The interesting thing is how—'why did it [the project] turn out like this?' What did you think about day one, day two and why did you make this change day four and so on? But that is often uninteresting to the students, that relationship. It is a difficult and hard pedagogic task for me to get them to reflect about: 'and why did it turn out like this?!' And what one is happy or disappointed with—but above all what one is disappointed with. Where did it go wrong? And how should you have done it?—and so on and so forth.

[73] Ibid., pp. 62.
[74] Strandberg, Leif (2006),*'Vygotskij i praktiken: bland plugghästar och fusklappar'*, Falun: Norstedts Akademiska Förlag, pp. 122-3.
[75] Fitzsimmons, Debra (2008), 'Digital portfolios in visual arts classrooms', *Art Education*, Vol. 61, No. 5, pp. 51-53.

[76] Ibid., pp. 48.
[77] Strandberg, Leif (2006),*'Vygotskij i praktiken: bland plugghästar och fusklappar'*, Falun: Norstedts Akademiska Förlag, pp. 127.

> And it [the solution] is clear. A portfolio is needed, either in digital form or not /…/. Otherwise we have nothing to talk about other than this finished picture. But they sit there anyway and [gestures as though he were crumpling up a piece of paper and throwing it over his shoulder] 'shit!'.[78]

When students actively choose to destroy preliminary sketches, it can be difficult for both the teacher and student to observe the learning process. Maintaining traditional student portfolios; however, may be problematic for teachers as there may be a lack of storage space. S1, an art teacher trainee, started project blogs with her secondary students as a means to store student journals for the purpose of reflection. She explains that one benefit of having student work on the blog meant that it did not "disappear somewhere or get broken and then /…/ lost."[79] In this case, she saw the function of the blog as a safe place to store student work. Let us now examine this Web 2.0 tool that facilitates a visual overview of student work and allows students to amass pictures, essays, sketches and reflections all in one place.

2.7 Blogs

The blog has simplified the work that students traditionally needed to invest in creating portfolios. Blogs are websites that integrate the Web 2.0 concept of simplicity and interactivity. The format of the blog allows for an easy overview of content. It is automatically formatted with headlines, followed by entries that are time and date stamped.[80] This allows teachers to easily gain an overview of student "posts" or entries. The fact that they are automatically dated simplifies the task of reviewing student coursework and reflections. With a blog, everything is assembled one place, which facilitates viewing it from any location where there is a computer and internet connection. S1 recounts her experience with using blogs as a teacher trainee:

> It was a lot of work for me at first, because I was to follow 60 blogs /…/ but, in the end, I succeeded in following all of the blogs that existed and I felt that—when everything was up and running—I could just pick up my computer wherever I was, instead of running to the art classroom to read journals.[81]

Strandberg emphasizes Vygotsky's view of writing's ability to facilitate higher psychological functions: writing is a method through which students refer to themselves as another, and in

[78] Interview with T4.
[79] Interview with S1.
[80] Buffington, Melanie L. (2008), 'What is web 2.0 and how can it further art education?', *Art Education*, Vol. 61, No. 3, pp. 38.
[81] Interview with S1.

so doing, are able to see the words that complement thinking.[82] Blogs are also collaborative learning environments that allow for multiple people to talk with each other.[83] Overby describes the blog as being a neutral environment where students can post their thoughts and questions.[84] It is an environment where reluctant students can "speak" their opinion without fear of sounding unintelligent.[85] Some students may find themselves inhibited in certain social situations. Hypertext (online) environments can give students new means of contributing to class discussions as it shifts the balance from speaking to writing.[86] T2 writes of an instance in which the blog functioned as a forum for collective learning:

> /…/ [the students] had maybe sat in on a lecture and not understood what the teacher said—or had understood in a certain way. And so they posted it on the blog and then gained a different understanding from another blogger—and then came the second, third and fourth [post]—and together they came up with a conjecture. /…/ I felt that that was very, was unbelievably interesting to see. This often occurred when there was a high level of abstraction in a lecture and together, via the blog, they were able to gain an understanding about certain questions and what this also led to was that they became empowered the next time—to perhaps dare to ask questions in another way instead of just passively listening and feeling like, 'well, I'm a little bit stupid, I don't understand.'[87]

One aspect of the internet is that it is navigated via hyperlinks.[88] Hyperlinks, an inherent feature of digital portfolios, impact student information organization and reflection.[89] Hyperlinks engage students as active participants as it allows them to contribute to the system.[90] Hyperlinks can also be nonlinear, allowing users to interact with digital portfolios in ways not possible with traditional paper portfolios. A blog can be viewed in many ways, depending on which hyperlinks the user chooses to click on. According to Overby, the typical high school (secondary school) student's way of reflecting about art is also nonlinear as they

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[82] Strandberg, Leif (2006),*'Vygotskij i praktiken: bland plugghästar och fusklappar'*, Falun: Norstedts Akademiska Förlag, pp. 124.
[83] Overby, Alexandra (2009), 'The new conversation: using weblogs for reflective practice in the studio art classroom', *Art Education*, Vol. 62, No. 4, pp. 22.
[84] Ibid.
[85] Ibid.
[86] Landow, G. (1997), '*Hypertext* 2.0: *the convergence of contemporary critical theory and technology'*, Baltimore: The Johns Hopkins University Press, pp. 227.
[87] Interview with T2.
[88] A link in a hypertext document which, when selected or clicked onscreen, causes another related object (esp. a file or program) to be displayed or activated; a word, phrase, or graphic, which may be underlined, highlighted, or otherwise emphasized, to indicate that it is linked in this way. (Soanes, 2001).
[89] Fitzsimmons, Debra (2008), 'Digital portfolios in visual arts classrooms', *Art Education*, Vol. 61, No. 5, pp. 51.
[90] Landow, G. (1997), '*Hypertext* 2.0: *the convergence of contemporary critical theory and technology'*, Baltimore: The Johns Hopkins University Press, pp. 220-7.

"do not focus solely on analyzing artworks; they are interested in their peers' thoughts and reactions. Thus, a discussion left open to meandering produces interesting and meaningful connections to the students' interests and experiences."[91]

Furthermore, publishing a digital portfolio to a blog not only allows for students to write about their work as it progresses, but also receive feedback from classmates, teachers and parents.[92] T4 explains how he is looking forward to actively using computers and Web 2.0 tools, such as blogs, as it might be a way for teachers and parents to discuss student achievement: "There are some things that I would like to improve in my teaching and that could be achieved with digital media in some way—that is in order to contact parents; that it becomes clear for them what we are doing and how things are going for individual children."[93] Shortly after uttering these words, he seemed to come to his senses: "At the same time I think to myself—damn, that would take a lot of time if I also had to communicate with parents!"[94]

2.8 Barriers

That a classroom of 25-to-30 students only has access to one or two computers may be due to two factors. On the one hand, the teacher may not have access to computer labs, software or administrative support and this external barrier is beyond the teacher's control and costly to fix.[95] T4 expresses his frustration over the external barriers regarding technology at his school by saying that the Information-technology (IT) department at his school is "a continual source of frustration."[96] He also says that computer use is a "neglected area" at his school despite willingness from some teachers to integrate technology into the classroom. [97] The lack of resources at T4's school illustrates a classic example of external barriers and how they constrain a teacher's ability to implement tools for learning.

[91] Overby, Alexandra (2009), 'The new conversation: using weblogs for reflective practice in the studio art classroom', *Art Education*, Vol. 62, No. 4, pp. 19.
[92] Buffington Buffington, Melanie L. (2008), 'What is web 2.0 and how can it further art education?', *Art Education*, Vol. 61, No. 3, pp. 36-41.
[93] Interview with T4.
[94] Ibid.
[95] Park, Sung Hee; Ertmer, Peggy A. (2007), 'Impact of problem-based learning (PBL) on teachers' beliefs regarding technology use', *Journal of Research on Technology in Education*, Vol. 40, No. 2, pp. 247-8.
[96] Interview with T4.
[97] Ibid.

The second factor that results in technology taking a back seat in education is referred to as the internal barrier. Internal barriers have to do with the belief systems of a teacher's perceived value of computers for student learning and are the most difficult to change as it is difficult to change a person's beliefs about technology.[98] A study conducted by the U.S. Department of Education in 2000 shows that only one-third of teachers felt prepared to use computers and the internet in their classrooms, despite the fact that over 99% of all schools have internet connections.[99] The use of ICT in the classroom does not; however, guarantee a student-centered perspective. T2 maintains that the proliferation of Digital White Boards throughout Sweden may, in fact, perpetuate teacher-centered education:

> I was unbelievably fascinated when the digital whiteboard came. /…/ it builds on the blackboard, the traditional room and instruction by a teacher—it's quite static, actually with an interactive whiteboard. /…/ this is travelling like a plague throughout Sweden. Every classroom shall have an interactive whiteboard. It may be that students, or [younger] pupil s, they shouldn't sit in the classroom as much as they do. Maybe it's so that one seeks knowledge. I mean that an expensive interactive whiteboard also preserves the structure of education.[100]

T2 raises an important point. New technologies should not merely result in teachers learning how to use a new tool, but should challenge conventional ways of teaching and acting.[101] Anderhag et al. highlight a study, conducted by Hiltz et al. that shows how the use of ICT in the classroom encourages new forms of communication and allows for a multifaceted environment for teaching and communication.[102] One of the reasons why teachers may be hesitant to use computers could be due to them seeing the classroom computer as a thing, rather than seeing it as a resource. A car is more than the sum of its oil changes, but allows for us to transport ourselves and see the world in new ways.[103] Similarly, the use of digital media has more to do with learning how to read, interpret, understand, and produce written and visual texts in a participatory media society, than simply learning how to use a computer.[104] Learning cannot be liberated from the tools that

[98] Park, Sung Hee; Ertmer, Peggy A. (2007), 'Impact of problem-based learning (PBL) on teachers' beliefs regarding technology use', *Journal of Research on Technology in Education*, Vol. 40, No. 2, pp. 247-9.
[99] Ibid., pp. 248.
[100] Interview with T2.
[101] Hernwall, Patrik (2009), 'Att ta vardagen i anspråk', *Pedagogiska Magazinet*, No. 1, pp. 51.
[102] Säljö, Roger (ed) (2002), *'Utmaningar och e-frestelser: it och skolans lärkultur'*, Stockholm: Prisma. pp. 166-7.
[103] Hernwall, Patrik (2009), 'Att ta vardagen i anspråk', *Pedagogiska Magazinet*, No. 1, pp. 51.
[104] Ibid.

we use and ICT tools do not determine a students learning process, but are one of many available resources.[105]

3. Results and Analysis

This study looks at few of the individual teacher approaches to integrating ICT and Web 2.0 into the classroom curriculum. It illustrates how teachers embrace student-centered learning environments and how these environments challenge teacher-centered approaches to learning. In addition, it focuses on the individual and how Web 2.0 can facilitate reflective learning practices and dialog.

The ability of students to share their personal websites through hyper linking adds another dimension to the learning process as this interactive environment confers a greater sense of engagement.[106] It may also be a way to reevaluate the function of the classroom. As one informant noted, the use of an online environment allows one to be a "little less dependent on time and space." This study looked at the use of ICT as a purposeful artifact. The students in this study use their websites, not because the teacher tells them to do so, but because it allows them to share group projects and provides a forum where they can learn in meaningful ways. According to one informant, the ability of the students to upload and share their work with others, besides the teacher, makes learning more "real".

Another reason why student portfolios are meaningful tools for students may have something to do with Meyerson's externalization tenet. T1's television project illustrates how students externalized their collective works, or oeuvres in the form of a television program. Throughout the process of filming and making decisions about editing the program, the students were able to internalize their "external" activities and engage in intrapersonal dialogs about what was happening in the project. Because the students posted their project to a digital portfolio, where it could be viewed by anyone, it became a vehicle for the students to actively make connections about their learning. It also provided an opportunity for the teacher and other students to comment, thus stimulating an environment conducive to reflection and student-centered learning.

[105] Säljö, Roger (ed) (2002), *'Utmaningar och e-frestelser: it och skolans lärkultur'*, Stockholm: Prisma. pp. 213-4.
[106] Kubey, Robert; Csikszentmihalyi, Mihaly (2002), 'Television addiction is no mere metaphor', *Scientific American*, Vol. 286 No. 2, pp. 80.

Similarly, the use of blogs may provide an environment that is more conducive to conversations. T4 deems the conversation to be essential to learning. Although he had yet to use the blog as a means to communicate with students at the time of the interview, he felt he could anticipate the benefits of using such a forum. When students actively choose to destroy or simply lose their sketches or other portfolio pieces, it can be difficult for both teachers and students to observe the learning process. Digital portfolios in the form of websites and blogs may present a solution. Instead of students storing their work in a traditional portfolio—that can easily be misplaced or destroyed—the regular posting of work to a blog allows for all work to be stored in one place. It also gives students the opportunity to make connections about their learning through the regular posting of reflections. Web 2.0 serves as an artifact through which students and teachers can discus student development and achievement, thus defining knowledge together.

4. Conclusions and Recommendations

The different approaches to using Web 2.0 has given me greater insight into how the use of ICT is just as creative and stimulating for pedagogues as it is for students. Throughout my discussions with those involved in this study, I gleaned a genuine understanding for how teachers use computers as a means to enhance their students' learning environment. Even T4, who has yet to use blogs in the classroom, sees the potential that these tool offer and how they promote an environment where students are encouraged to reflect over the process of completing a school project. During our interview, he expressed how overwhelmed he felt in regard to implementing some of these tools into his daily practices. Fortunately for him, he has a colleague, who is also participating in Lärarlyftet. Together, they may be able to develop a strategy for implementing Web 2.0 in the classroom.

For those teachers, who already integrate Web 2.0 into their curricula, the use of these tools does not assure eventual mastery of them. Their function is secondary to the possibilities that they offer education. A comment that was not fully explored in this study, but expressed by some of my informants, was that we live in a continually changing society. Teachers, nor anyone else, can possibly predict what the future holds for the students of today—nor can they imagine the set of skills that their students will need to master in order to become viable, employable citizens of tomorrow. One thing is certain though. The future promises a

multifaceted, changing world. What teachers can do to prepare students for this world is to encourage collective learning.

The continual advancement within the field of Web 2.0 may provide teachers with some of the tools for achieving this goal. Web 2.0 tools, such as Google translator, have the potential to completely change the ways with which we communicate with one another. The ability for a person to immediately translate blogs or other websites into his or her native language, opens up a huge realm of possibilities for communicating with people on continents half a world away. The modes with which we interact with one another are increasing every day. It is up to educators to seize the possibilities that abound and challenge the traditional ways of approaching education. We might not live in a democratic world, but the free Web 2.0 tools that are available to us today, promote constructivist learning environments that are available to any school with computers and internet connections. As stated earlier in this study, it is not computers that improve education, but engagement, group participation, reflection and feedback. No technology can ever replace the need for humans to continually engage in discussions with each other. It can; however, provide new tools to facilitate learning.

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