Creating knowledge-building communities is a pedagogical approach which aims to create knowledge rather than simply impart knowledge. In this article a rationale for making such a community will be made by contrasting such an approach with traditional teaching methods, and by explaining why the traditional approach is failing to prepare our youth with the necessary skills to enter the 21st century workplace. Additionally, this article will explore how using this approach will fulfill this aim. Finally it discusses how to implement knowledge-building communities into schools by looking at:

- the key principles involved
- the school culture necessary
- promoting the change to parents, students and other interested stakeholders.

Rationale

Traditionally our educational institutions have followed a ‘transmission model’ where the teacher largely dictates the content and process of learning in the classroom environment. Information is transferred from the teacher to students and successful learning is tied to a teacher’s ability to deliver the predetermined curriculum. Students are largely passive as the teacher is seen as the dominant agent for learning. This results in high dependency on teachers and low cognitive effort from the students. There is no motivation for students to assess their own comprehension or to pose meaningful questions to further their knowledge.
Traditional practices are described by Hewitt (2002) as typically revolving around the ‘artificial discourse’ the teacher initiates. This leads students down a predetermined path as they are steered towards a learning intention. Feedback is given judging whether they have suitably memorised and regurgitated the material. Highly valued in this system are curriculum guidelines, tests, exercise books, project work and ‘copy, paste and delete’ researching methods. The result of this pedagogy is that for the students there is limited:

- Substantive thinking required.
- Meaningful interaction with peers (e.g.: collaborating, conjecturing)
- Information gathering
- Numbers of their own questions answered.

Traditionally cognitive objectives are the main reasons schools exist, however cognitive responsibility is largely lacking. Scardamalia (2002) suggest that the existing prominent culture in schools leads to ‘Teacher A and B’ behaviour. In this ‘Teacher A’ believes learning is a by-product of doing exercises which are the main focus. There is no idea of cognitive responsibility. ‘Teacher B’ believes that the teacher has total cognitive responsibility which may be communicated to the students. The students’ only responsibility is completing the tasks dictated by the teacher. Both styles produce students who have a task-centred concept of learning, with little awareness of how learning occurs, how to structure their own learning process and little understanding about strategies to overcome problems in their search for knowledge.

In the late 20th century some educationalists suggested moving away from this traditional pedagogy. We now live in a knowledge society, where information is plentiful and easily accessible. Therefore there is little need for the skill of regurgitating facts. This has brought about unique social problems. Our young people desire connection with their society, particularly with what is most ‘dynamic and meaningful’ (Bereiter & Scardamalia 2006). What is proposed is movement away from transmitting knowledge towards building
knowledge, by creating a knowledge-building culture, the premise being that all ideas are improvable. These new methods ideally contribute to society’s knowledge and lead to innovation. Students will see themselves more included in the society they live in and will be involved in advancing the frontiers of knowledge, thus embracing and being embraced by their society.

Skills learned in a knowledge-building community are transferrable into the ever-changing 21st century workplace, where knowledge is readily available and ever expanding. Scardamalia (2002) observes that in today’s effective work places, collective responsibility is taken for the success of the enterprise rather than being the sole responsibility of the leader. Cognitive collective responsibility adds the dimension that all staff are responsible for “knowing what needs to be known and will also take responsibility for insuring that others know what needs to be known.” (p. 2)

This knowledge-building pedagogy requires a movement away from individual knowledge towards communal knowledge; away from ideas being fixed, to the concept that ideas are improvable; away from knowledge of, towards knowledge about. It requires a movement towards having discourse (rather than arguments) where the commitment is progression, seeking common understanding and expanding accepted facts. Education thus shifts from regurgitating facts to developing a mind-set which aims at improving ideas. It “requires a belief that students can deliberately create knowledge that is useful to their community in further knowledge building and that is a legitimate part of the civilisation wide effort to expand knowledge on all frontiers” (Bereiter & Scardamalia 2006, p. 34).

Rather than ‘Teacher A and B’, ‘Teacher C’ is proposed, who will turn cognitive activity over to the students, who will become responsible for their learning (Scardamalia, 2002). This is difficult for most teachers because of career-long habits, and past educational experience of enduring ‘Teacher A and B’ behaviour. Learning to do this would be a “significant learning accomplishment in its own right” (p. 4). Using student-centred and/or collaborative learning techniques, most teachers are still doing ‘Teacher A and B’
behaviours in a less obvious way.

**Implementation**

To enable knowledge-building, Golding (2011) argues that discourse could be achieved by creating a ‘community of inquiry’. He posits a continuum of discussion types from one extreme of ‘teacher-directed’ to the other extreme of ‘student-directed’, with a community of inquiry somewhere in the middle. The community of inquiry balances the two poles, by “allowing multiple answers with the restriction that there be reasonable or reflective judgments made as a result of the inquiry.” (p. 12) Rather than a teacher pretending ignorance and questioning the students to get to their known destination, this type of discussion is ‘genuine’, as it starts with questions from both parties, and both have to follow the inquiry where it leads to resolve these queries. The three types of discussion can be summarised as follows:

- **Teacher-directed** – best for checking for understanding for a test; imposed, dependent, authoritative, absolute.
- **Community of inquiry** – best to create thinking like a scientist, historian or philosopher. Students need extensive training and coaching in thinking skills. Involves disciplined dialogue. Follows an inquiry where it leads with reflective judgments.
- **Student-directed** – best for getting to know each another. It is independent, under-scaffolded, divergent, relativist, conversation.

In a community of inquiry students are in control of their discussion, and learn to be focussed, make judgments and direct their inquiry themselves. The teacher intervenes purely to guide quality inquiring. Students learn to think for themselves, thus fostering independent, disciplined inquiry. Teachers become ‘thinking coaches’ for some of the time, focussing on what **thinking** students need to perform or what **methods** are not working so
well, rather than worrying about answers being correct. The scaffolding used is more about the processes and methods rather than content. This prompts thinking, justification, and evaluation, and supports students finding their own way.

In order to support knowledge-building communities, a computer program ‘Knowledge Forum’ was developed (Bereiter & Scardamalia 2006). This is an environment for communities to carry out practices that are constitutive of knowledge- and innovation-creating organisations. This platform allows for groups to be involved in discourse along with outside experts, and idea improvement can truly take place. Students can reflect, network and produce powerful outcomes. They can participate wherever, whenever. The internet, instead of being merely a super-library, becomes a super-conferencing space where ideas can be built upon, transformed and improved; a safe, self-affirming atmosphere where responsibility and outcomes are shared. Learners must interact with knowledge, in many contexts, question it and connect it with existing knowledge. This allows experiential knowledge absorption and assimilates it into the mind in a permanent way. Knowledge Forum facilitates discourse and allows the shift from ‘inert knowledge’ into productive knowledge.

Knowledge Forum has a function called the Analytic Toolkit which contains archived data on the social interactions taking place. Teachers may view which students are participating when and how, and are able to make judgments about students’ progress accordingly. Teachers can decide when and how they need to intervene to encourage participation or possibly redirect students. Philip (2010) describes how this information is used to support some students to increase their participation. Sometimes by simply showing them the graphics the students themselves can see how they need to respond to become active knowledge community members.

Such pedagogical transformation requires a progressive school environment to nurture it. Hargreaves (1999) suggests that “The knowledge creating school, in ideal typical form:
  - audits its professional working knowledge"
• manages the process of creating new professional knowledge
• validates the professional knowledge created
• disseminates the created professional knowledge.” (pp. 123–4)

In such a school ideally teachers create their own knowledge-building community. This would involve colleagues experimenting, questioning and regularly having discourse reflecting on the methods being used in the classroom, with improvement in mind. Bielaczyc & Collins (2006) identify that “The teachers describe their main aim as fostering a ‘learning club’ where students view themselves as members of the classroom community whose goal is Learning to Learn.” (p. 47)

Scardamalia (2002) proposes 12 principles for launching a knowledge-building classroom (Table 4.1 p. 9 summarised):

1. Real ideas, authentic problems that they really care about.
2. Improvable ideas – always a higher level, refinement, safe to take risks.
3. Idea diversity – a rich environment where ideas can evolve into more refined forms.
5. Epistemic agency – students share ideas, negotiate a fit between their ideas and those of others, set their own goals, self-motivate.
6. Community knowledge, collective responsibility.
7. Democratising knowledge – all participants valued for contributions, all take pride in advancements.
8. Symmetric knowledge advancement – exchanges within and without.
10. Constructivist uses of authoritative sources – in touch with leading-edge experts with a critical stance.
11. Knowledge-building discourse – sharing knowledge AND refining and
12. Embedded and transformative assessment – used daily to diagnose problems, ensuring the work exceeds expectations.

Bielaczyc & Ow (2010) describe implementation methods of a knowledge-building community in a project called ‘Ideas First’ – a two-year science programme in primary schools in Singapore. Classroom videos were used for teacher reflection and Knowledge Forum for students’ work. Epistemic games were developed to support students to develop ‘epistemic fluency’ – strategies for working with various forms of knowledge. These games were used when starting Knowledge Forum to develop epistemological perspectives on communal practices.

An example is ‘Think Cards’ – labelled: ‘My idea is’ ‘New info is’ ‘A better idea is’. These cards show progress in thinking and were made from snapshots from Knowledge Forum. They engage the community into asking: “Given this view – what types of moves would be best next?” Initial ideas are posed, new information is gathered, then a decision is made – do we either gather new information from

a) investigative work, or
b) exchanging ideas with others?

Both lead to improved ideas (see model p. 867). Students found new information from libraries, experts or the internet. Classroom discussions revolved around why these were useful and whether they were trustworthy. Note-taking skills were taught, including the importance of citing resources in order to return to sources if need be.

Students generated many New Info cards and shared them with the whole class or in small group discussions. This allowed information exchange and facilitated new, improved ideas. Cards promote physical interaction, visualisation of and working with their ideas. Writing cards in their own words prevented the ‘copy, paste and delete’ action which prevents productive knowledge. Think cards mimicked the structure of Knowledge Forum and were deemed as critical to proceed into the virtual space of Knowledge Forum. Teachers in the
‘Ideas First’ project believed the cards aided the development of knowledge-building practices and reflection on how knowledge itself was built. Rather than the usual classroom style of studying science and regurgitating the facts transmitted to them, students were discovering how scientists discover new ideas.

**Promotion**

Knowledge-building pedagogy can be promoted to interested stakeholders as enabling:

- collaborative learning
- multiple simultaneous learning activities
- changes in curriculum delivery and development
- increased staff collegiality and professionalism
- shy students beginning to participate in discourse.

Using this technology Christal, Ferneding, Kennedy, Puthoff & Resta, (1997), found students: “*gained higher verbal achievement, did more writing, give deeper explanations of what they have learned, engage in more constructive activity, improved graphical literacy, are more reflective about their own and others’ evidence of learning, become better problem solvers, have more of a ‘mastery orientation’ towards learning, more student-centred approaches to instruction and more collaborative approaches in learning activities.*” (p. 49). This is all information that could be used to market this approach.

In conclusion, knowledge-building pedagogy creates a learning environment where the whole is truly more than the sum of its parts. Students learn the vital new skills necessary to prepare themselves for a 21st century workplace. Students become epistemic agents, experientially learning skills of developing productive knowledge, collaborating meaningfully with peers and experts and become aware of the process. Implementation of this pedagogy requires a paradigm shift within school culture. This can be facilitated with computer technology such as Knowledge Forum. The benefits are plentiful, and allow our
youth to assimilate into our society by interacting with and contributing to that society. By effectively presenting the benefits to interested stakeholders this transformation in pedagogy can be successfully promoted and adopted.

References


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