Chapter 4
Open Educational Curricula Interpreted Through the Māori Concept of Ako

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Abstract The idea of open educational resources has been growing in popularity over the last decade, particularly in response to the initiatives of large institutions such as Massachusetts Institute of Technology and the UK Open University and the work of organizations such as UNESCO. In essence, this concept promotes ideas originally developed in the context of software which state that genuine freedom requires the ability to change and share any tool. Traditional models of curriculum development can be seen as embodying many of the undesirable aspects of closed systems, with control remaining in the hands of teachers. Truly Open Curricula would allow the same freedom of modification that currently exists for content. The Māori concept of Ako describes the relationship that exists between learners and teachers and recognizes that an educational experience influences both through their shared experience. This useful idea is used to explore the reality of an Open Curriculum and to suggest a model for open education that is defined less by technology and more by the structured social experience of education.

Keywords Open education • OER • Open curriculum • Ako

4.1 Introduction

Every month it seems a new university is announcing its entry into the Massive Open Online Courses (MOOC) market. Much is being made in the media of the experience of former Stanford artificial intelligence researcher and academic Sebastian Thrun's experience (Hsu, 2012; Murray, 2012) culminating in his departure from Stanford and the formation of a company to build on that success (Udacity;

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http://www.udacity.com). The Open University, Massachusetts Institute of Technology (MIT), Harvard, Stanford and a range of other institutions are all experimenting in the Open Educational Resources (OER) space and releasing large amounts of content for use by students anywhere in the world. This international largesse has not escaped the notice of the United Nations with UNESCO working in partnership with a consortium of international institutions to explore the concept of an OER university (Mackintosh, 2011). These initiatives appear to be being driven by a range of factors. Individual teachers are being motivated to address a widely perceived failure of higher education to provide cost-effective education to everyone and to improve the quality of learning and teaching. Open approaches are also seen as providing a response to the monopoly on knowledge being developed by commercial publishers and also supporting lifelong learning (McGill, Currier, Duncan, & Douglas, 2008; OECD, 2007; Yuan, MacNeill, & Kraan, 2008).

At the heart of the current activity, there appear to be two key ideas. The first is the concept of openness. Originally an almost nostalgic view on the development of software, the open ideal is now an active political philosophy that combines ideas of democracy with a Marxist perspective on the common ownership of society (Lane & Van Dorp, 2011; Unsworth, 2004; Vest, 2006). The second is what (Batson, Paharia, & Kumar, 2008) describes as the consequence of the pedagogy of abundance. Digital technologies and the Internet have created a world where the cost of creating and accessing information has dropped substantially and the role of educational institutions as repositories of scarce knowledge is no longer assured. Thomas Carlyle stated that "The true University of these days is a Collection of Books" (Carlyle, 1885, p386) in response to the explosion of books following the invention of the printing press. Technology now means that most people, at least in theory, can carry the university with them wherever they are.

These ideas, and the projects they have stimulated, suggest that the world is about to experience a shift in how higher education is accessed and valued by our societies. However, significant challenges confront those engaging in open education. The most obvious one is that of sustaining the creation and delivery of the "open" resources. Researchers in the field of open education are starting to see a change in focus from the creation of content to an examination of how that content is used to support learning (Ehlers, 2011; Lane & Van Dorp, 2011; Stacey, 2010). This focus on use suggests two main issues. The first is the mundane question of who pays? The experience of the content industries (music, television, movies, books, and news) suggests that sustainable business models embracing digital media are challenging. Many of the current open education initiatives are dependent on charitable funding from educational foundations and struggle to demonstrate sustainable financial independence (Baraniuk, 2008; Stacey, 2010).

The second main issue is that of the curriculum. Current activity in open education is predominantly framed within a model of teacher-driven courses. Many of the open resources being developed for educational use are being created for use by other teachers and within the existing model of formal education and qualifications. This raises the question, is it possible to meaningfully describe an "Open Curriculum," an educational experience able to be reshaped usefully by a learner

outside of the necessary control of a teacher? And if so, is there still a role for a teacher and how do the two roles engage effectively with each other? This chapter explores these questions and whether a conception of education expressed by the New Zealand Maori term "Ako" might be useful in defining one possible direction for higher education.

4.2 Ako

The Māori people of New Zealand have the concept of "Ako." Commonly the word is used to mean "education," but it has a more complex etymology. Ako embodies the idea that teachers and learners are inescapably entwined in a synergistic experience of learning. The act of learning teaches others who in teaching you become learners themselves (Hemara, 2000). This concept of education as a relationship has a number of attractive features consistent with the ideas of active education, social constructivism, and the use of discussion and communication technologies to support learning (Bishop, Berryman, & Richardson, 2002; McDonald, 2011).

To understand Ako, it is important also to be aware of the respect for experience and knowledge within Māori culture. The two roles of teacher and student are not equivalent and Ako does not mean that learning arises from the interaction of peers. A successful Ako relationship will reflect mutual respect and awareness of each other's strengths and needs, framed within a shared desire and interest in the object of the learning. Epistemologically, Ako is also framed traditionally by tikanga, the worldview, customs, and rules of the Māori culture. Tikanga sets limits on many aspects of daily life including that of learning and forms a normally invisible framework constraining, sustaining, and defining the actions of both the learner and the teacher. At this point, it is also worth emphasizing this view of Ako is a modern description of education quite distinct from the practices of learning sacred knowledge within Māori communities prior to European settlement in New Zealand (Mead, 2003).

Educationally, the key concepts of Ako that can be used to frame the work of teachers and learners more generally can be summarized as follows:

1. The design of education in the form of relationships between people who are not equals but treat each other with respect.
2. The work of the participants is structured by a set of implicit and explicit cultural norms and expectations independent of the subject being studied.
3. Learning is active, and the act of learning stimulates and provokes a pedagogical response from the teacher that facilitates deeper learning by both the learner and the teacher.
4. The learner and the teacher are participants in a larger community that supports and sustains them and which values both of their contributions to the life of that community.

These ideas form a coherent set of values, or tikanga, that can be used to frame education in many contexts and which will be used below to suggest a model for open education that is defined less by technology and more by the structured social experience of education.

4.3 Open

The idea of "Open," a far newer cultural concept than Ako, draws on two main strands of modern thought. The first is embodied by the Open University in the United Kingdom and similar "Open" education institutions internationally. These institutions are guided by a philosophy of education that accepts anyone as a student irrespective of their prior performance. Teaching materials produced by open institutions are often made available publicly as well, in order to promote wider access to learning materials.

The second sense of openness is derived from the field of software. Open source software describes the practice of sharing the source code of software as well as the compiled or runnable application. The emergence of the modern consumer computer business has seen this replaced with commercial software which is merely used and which cannot easily be modified by users.

Many within the research computer community have strong reservations about the implications of the lack of access to the source code of software. These concerns led people such as Richard Stallman to explore the concept of openness through the idea of free software (Stallman, 2002). These ideas, expressed as a set of four freedoms (Table 4.1), were not just a statement of practical concerns about the ability to modify software but are a strongly expressed political position on the role software could play in society: "When users don't control the program, the program controls the users. The developer controls the program, and through it controls the users. This nonfree or 'proprietary' program is therefore an instrument of unjust power" (http://www.gnu.org/philosophy/free-sw.html).

A successful open source software project is often seen through the continuous refinement and improvement undertaken by a large number of contributors. Importantly, there are two major types of participants in these projects, the architects or leads who define the major goals and structure of the software and who validate the contributions made by others and those who work within that structure to

Table 4.1 Richard Stallman's four freedoms (http://www.gnu.org/philosophy/free-sw.html)

The freedom to run the program, for any purpose (freedom 0)
The freedom to study how the program works and change it to make it do what you wish (freedom 1). Access to the source code is a precondition for this
The freedom to redistribute copies so you can help your neighbor (freedom 2)
The freedom to distribute copies of your modified versions to others (freedom 3). Access to the source code is a precondition for this

improve the software's capabilities. In many projects the boundary between these two groups is fluid and users actively participate in discussions about the architecture and feature set of the software they are collectively creating and using. A key feature of this community is that all of the members are active users of the software they create.

David Wiley recognized (Wiley & Nelson, 1998) the potential impact the ideas of the open or free software movement could have in education and coined in 1998 the concept of "open content." He suggested that this would see the creation of a mechanism for free and simple access to learning materials and support a culture of educational innovation and collaboration (Wiley, 2002). Building on the ideas of open content, UNESCO hosted a forum in 2002 (UNESCO, 2002), which defined the concept of OERs. Extending beyond content, OERs were defined as "educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes" (UNESCO, 2002, p24).

The two strands of openness started to merge in 1999 when the Open University collaborated with the British Broadcasting Corporation to create a website of open content (http://open2.net/). This website provided a range of freely accessible online educational content complemented by online and public collaboration and contribution facilities (Lane, 2012). The materials produced however remained under copyright and thus fail the test of the four freedoms outlined above.

Subsequently, the Open University partnered in 2006 with the William and Flora Hewlett Foundation in the module-based Open Content Initiative (OCI now known as OpenLearn, http://openlearn.open.ac.uk/). The OpenLearn materials are also copyright, but licensed through a Creative Commons License (Bissell, 2009) that allows personal noncommercial use, provided that such use acknowledges the source of the material and that any changes are covered by the same license terms. Again this fails the test of the four freedoms outlined above. Similarly, in 2001 the MIT started making course materials publicly available on the Internet (Goldberg, 2001). As with the Open University, these remained owned by MIT and were structured in courses reflecting the degree model at MIT.

The work of these initial innovating institutions is now being complemented by a number of collaborations as more institutions explore the concept of open education. The Higher Education Academy (HEA) and the Joint Information Systems Committee (JISC) are promoting and supporting the use of OERs through a national programme (JISC, 2012). This describes (JISC, n.d.) OERs as "Open educational resources are learning and teaching materials made freely available online for anyone to use. Examples include full courses, course modules, lectures, games, teaching materials and assignments. They can take the form of text, images, audio and video, and may even be interactive." The edX consortium of MIT and Harvard and the Coursera initiative partnering with Stanford, Princeton, University of Michigan, and the University of Pennsylvania are rapidly moving a large quantity of courses online for students to access for free. Moving well beyond content, these initiatives are providing full courses with assessments and collaborative environments. The one thing they do not offer is a qualification; instead students receive a "letter of

achievement" that the terms of use make clear is not any form of qualification from the partner institutions.

MIT, Harvard, and the other institutions experimenting with free courses online clearly have to maintain a tight balance between the reputational benefits of being seen to be socially responsible and innovative, while also protecting the reputation of their existing qualifications. It has been suggested that beyond the possible reputational benefits, these initiatives might potentially attract students into the full-fee programmes (Hanna & Wood, 2011). Coursera, despite being a for-profit enterprise, has not indicated how it intends to make money from its free courses, but it seems inevitable that some form of premium service will be offered at some point and this might provide a pathway to an accredited qualification (or a Pearson validation acting as a proxy for accreditation).

There is also, however, a strategic dimension to these initiatives when viewed from the perspective of the successful high-profile and high-quality institutions engaging in them. By giving away free online courses, they are essentially lifting the expectations of society for all online providers. Existing online providers will have to demonstrate how they are offering sufficient value over and above the free courses to justify their fees. These free initiatives are a textbook case of Christensen's low-end disruption (Christensen, Anthony, & Roth, 2004) with the twist that the disruption is being done by the established institutions. Potentially this will make it very much harder for any other organizations engaging in low-end disruption that might challenge the current incumbents in the future.

MOOCs are the high-profile modern face of open education, but it is important not to be distracted by their hype and scale and to consequently miss the fact that they are not truly open as defined by the four freedoms. Free software advocates make the distinction between free as "free beer" and as "free speech." The course initiatives described above are all "free beer," they provide access to course experiences and content, but they control the conditions and outcomes. The structure of the courses are defined by instructors, the content remains covered by copyright and only available for personal noncommercial use, and there is certainly no hint that the students might remix the courses for their own ends. In reality, much of the material released as "open" content is commonly provided for use by individuals but remains under the control of the creator and cannot be modified, amended, and reused by others without their permission. The perception by many academics is that the audience for open resources is not students, but rather other academics teaching similar courses who will simply use it as provided (Brent, Gibbs, & Gruszczynska, 2012).

This latter point perhaps explains one of the key ways in which open education differs from open software (Mackie, 2008). Open source software projects typically operate as a community of practice with all of the members actively collaborating on the software being developed. Initiatives such as edX and Coursera in contrast are not creating communities of active participants "hacking" their courses, they are rather establishing new communities of learners in very much the same form as that of a traditional university (and just changing how that is paid for).

Taking these reservations regarding many supposedly "open" educational initiatives into account, what are the key concepts of openness that can be used to guide the creation of a completely open education?

1. Open technologies prevent the exertion of "unjust" power on the users, providing the users with options that are not controlled by the developer of the software.
2. The freedom to modify for personal reasons exists within a community of sharing experiences of that modification and use, which encourage further development and use of the software.
3. People engaging in open projects will naturally adopt different roles depending on their knowledge, skills, and available resources (including their own time) with many people happy to work to a plan defined by others providing that it is clear and it addresses their needs.

4.4 Using Ako to Create a Philosophy for Open Curricula

In part at least, the difference between open source software projects and open education may be a consequence of how they are experienced and used. Software is commonly seen as being a tool, while education can be seen as a series of experiences within a larger process, which may be described as a curriculum, often resulting in the achievement of a qualification.

Curriculum is a complex concept. It can apply to the student's experience in a specific class, a programme of study usually resulting in a qualification, or a national qualification framework. Curriculum can be scoped over short periods of time, e.g., a single module, or it can be applied to several years of study. It can refer to the content, the teacher's intentions or plans, the structure of learning activities and assessment, the relationships between those activities and formally defined graduate and learning outcomes, or the change in skill, knowledge, and capability experienced by the student (Doll, 2008; Lynch, 2008; Niculescu, 2009). Importantly, although we can distinguish between the formally designed curriculum and the perceived curricula experienced by staff and students (Niculescu, 2009), students remain motivated significantly by the assessment component of their curricula and the associated feedback ultimately resulting in their being qualified (Nicol, 2009). Generalizing assessment activities to make them relevant in multiple curricula contexts is recognized as a challenge for existing OERs (Lynch, 2008). Those operating educational repositories are addressing the need to complement educational resources with information on the pedagogical uses of the material; however, these uses are still being framed with the expectation that the structure of the curriculum is being created by a teacher in an institutional context (Carey & Hanley, 2008).

In terms of the current analysis, curricula can perhaps be best understood as the structured relationships between learning activities experienced by the student. Traditionally curricula are seen as the responsibility of the teacher and institution, with any flexibility to tailor the experience and personalize it for students in the

hands of the teacher, not the student (Lynch, 2008). Clearly, students do not know what they do not know and so are wise to be guided by more experienced people. Complete freedom to choose to learn anything in any order seems to be a recipe for chaos or at least inefficiency with a risk that much student time will be spent drifting aimlessly through the ever-growing body of human knowledge such that nothing tangible can be achieved. In this regard, simply having OERs available for students is clearly insufficient in itself for many people to be able to learn (Lane & Van Dorp, 2011).

Analogously, open source software, even that which meets all of the freedoms discussed earlier, benefits from some constraints and structure. Software must be able to be executed by a computer as a series of logical and purposeful instructions. Computers are very effective at providing summative feedback to people writing code; software either compiles or it doesn't. Beyond that basic constraint, software normally is created to achieve a specific purpose, and the people using it and creating it are able to quickly determine whether it meets their needs. Often this will include the ability of software to operate effectively in conjunction with other software systems. Beyond these basics, however, many software products contain subtle bugs or misbehaviors that only occur when the software is used in specific contexts. Much of the work of software developers is spent analyzing these subtle faults and identifying the causes.

Curricula can be seen as helpfully providing structures and constraints supporting the user experience of learning. The need to place educational materials within a specific context can be seen complicating the learner's attempts to evaluate materials for themselves (Mackie, 2008). Consequently, the approach of traditional "closed" learning is to place the evaluative and structural responsibility in the hands of the teacher and institution. Even when describing the consequence of open, student created and driven education writers still impose traditional models of degrees with "someone" responsible for selecting and structuring the resources used to support student learning (Batson et al., 2008). As discussed earlier, many ostensibly open educational initiatives have thus remained closed rather than open or "free" for learners to control for themselves even when they are operating outside of formal qualification frameworks.

Using the key concepts of openness drawn from the software world and those of Ako identified earlier as a guide, what might an Open Curriculum look like? A key feature in common with both philosophies is the need for community and the roles of participants within that community. Beyond the existence of the community, there is also an awareness of the values of that community, the means by which participants demonstrate respect for others. There is the mechanism used to identify the different goals of the participants and the incorporation of those goals within the shared activity of the group. Finally, there is the achievement of outcomes valued by the individual participants, with the same activity leading to a variety of outcomes depending on the goals and roles of the individuals.

An Open Curriculum needs to allow learners the ability to define their own objectives within the framework established by the community they are participating within. It would then provide a mechanism for explicit summative feedback on

whether the learner is successful in achieving the key steps to that goal (equivalent to the process of compilation and execution of software) as well as formative guidance on the quality of achievement and progress towards the larger objectives (equivalent to the discussion by the community of people developing software as well as the outcome of using the software).

Some of the participants in the curriculum processes would be in teaching roles, setting the scope, shape, and structure of the overall experience but always collaborating with others who might contribute components of that structure. All of the participants would also be active members of a larger community of learners using the curriculum to support the achievement of their own goals, just as the open source software developers are themselves users of their tools. This community conception of learning is very consistent with modern ideas of the evolution of the web into the idea of "web 2.0" where value is created through the collective actions of community members who learn to "be" through a social and creative process (Seely Brown, 2008).

It is also important to emphasize that this community model depends on collective ownership and an acceptance of a loss of complete control by those who create the affordances of the community (Norman, 2004). Any attempt by a few to own any aspect of the whole is incompatible with the community dynamic. Accordingly, it needs to be legally open as well, unencumbered by copyright.

Combining these ideas of pedagogical freedom and the experience of open source communities of practice, an Open Curriculum imbued with the concept of Ako can be seen as embodying the following elements:

1. An openness of the curriculum itself, where the representation of the pedagogical model, the resources supporting its application, and the support needed to engage with it are all provided in ways that enable learners to access all parts of the curriculum, reuse these, remix them, modify them, and freely share them with others.
2. The existence of a community around the curriculum, with participants adopting different roles and responsibilities within a commonly held cultural framework. All members can participate actively in the defining the structure of the curriculum (including the designed goals or outcomes intended), contributing to the creation and development of supporting resources, and, most importantly using the curriculum and the materials to enhance their own learning.

4.5 The Challenges of an Open Curriculum

Richard Stallman's four freedoms were a response to a proliferation of ideas about openness and form a robust critique of different models of open software. Similarly others have also engaged with the ideas of open education and started the process of stating key ideas intrinsic to openness that can be used to evaluate different initiatives.

Mackintosh (2011) describes the basic components of an OER through the three dimensions of educational values, pedagogical utility, and technology enabling. These capture the need for resources to be both legally and practically used, copied, remixed, and redistributed. Ehlers (2011) defined a hierarchy of pedagogical levels of freedom or openness. Low degrees of openness reflect transmission models of education where the teacher "knows" what the learner has to learn and focuses on transferring their knowledge. Medium degrees of freedom exist where the outcomes are predetermined, but the pedagogy is open and determined collaboratively by learners. High degrees of freedom exist when the objectives and the methods are determined by the learners, who are then facilitated by teachers who scaffold experiences.

Kahle (2008, p30) identified five principles for open educational design: "(1) Design for access. (2) Design for agency. (3) Design for ownership. (4) Design for participation. (5) Design for experience." Access describes not only the ability to acquire educational resources but also the ability for a wide variety of people to effectively learn with them. Agency reflects the control the learner has over the resources and their ability to modify them to suit their local circumstances. Ownership describes the key aspect of the open philosophy that resources are intended to be owned by future users who incorporate them in new forms and manners into new resources; as implied in Stallman's four freedoms, if you can't modify something you don't own it. Participation refers to the need for learning to occur within a social context as well as the community of practice that generates and sustains the creation of learning resources. Finally, design for experience captures the need for the affordances (Norman, 2004) of a learning resource to be clearly apparent to users and able to support their effective use of the entirety of the knowledge available to them.

The Open Curriculum infused with the ideas of Ako described above would demonstrate high degrees of freedom under Ehlers (2011) model and is very compatible with Kahle's five principles (Kahle, 2008) and those of Mackintosh (2011). Beyond these it emphasizes the importance that the social dimension plays in complex human endeavors. This is potentially a strength of the Open Curriculum but also a significant challenge.

The Open Curriculum hinges entirely on the need for current roles of teacher and learner to blur. This is challenging for people who define themselves strongly in either role. Teachers, particularly at universities, are used to roles of responsibility, authority, and accountability as well the status of being an academic. Academic roles are very much states of being, intimately entangled with individual senses of identity and purpose.

Harley (2008) reported that the biggest single factor preventing the use of OERs was the need for the resource to fit into the model defined by the academic. In particular they found that humanities and social science academics particularly were disinclined to use resources that structured learning. Others (Coughlan & Perryman, 2011; Walsh, 2011) have also described the inconsistency in uptake of OERs apparent between disciplines. Much of the current body of OER work supports learning of generic study skills, professionally applicable topics, and basic knowledge in the disciplines of science and mathematics. A number of factors may be responsible for

this, including the ease with which basic science and study concepts can be embodied in OERs, but it also likely that many academics in the humanities and social sciences are unable (or unwilling) to see their teaching embodied as an OER (Coughlan & Perryman, 2011), in essence to shed some of their control over the learner.

Learners are often unused to taking personal responsibility for their own learning, not only in managing the tasks that need completion, but in defining what tasks are needed, their scope and extent. Experiences with systems that provide students with the ability to take control of their learning suggest that very few actually will do so (Aczel et al., 2011). Beyond this, consider the impact of being one student amongst 150,000. Maintaining a sense of purpose and focus while caught up in communities of this scale suggests that learners need significant resilience and motivation. Learners (by definition) don't know what they don't know and lack the skills and knowledge often to initiate productive learning and need to be given some form of context or map to start the process of knowing (Matkin, 2011).

The systems within which education occurs are perhaps the most significant challenge to Open Curriculum embodying Ako. Academics often refer to their freedom, but in reality a complex web of regulations, laws, precedent, and societal expectations controls the tertiary education systems of all countries. Much as open source projects have benefited from systems that support and structure their existence, Open Curricula need systems that enable their creation, development, and use (Aczel et al., 2011; Marshall, 2012). Traditionally these systems are seen as qualifications, accreditation frameworks, and institutions of higher education. The absence of any model of social acceptance of open qualifications is notable in the current MOOC initiatives with institutions like Stanford clearly challenged by the risks of associations with Udacity. The need for clarity in the social and cultural place of different models has lead in New Zealand to the development of separate Māori adult educational providers, known as Wānanga. These institutions operate within the legal framework of New Zealand education but otherwise pursue a model of education defined by āhuatanga Māori according to tikanga Māori (Mead, 2003).

A key feature of the systems of formal education is their certification or documentation of the achievements of learners. A major challenge facing the Open Curriculum is how participants can communicate their learning effectively and efficiently to others. Experience with MOOCs is already highlighting the problem of various types of cheating or fraud, and the experience of e-commerce has shown that once something has extrinsic value there will be extensive attempts to subvert the integrity of the associated systems. The community model of Open Curricula may represent at least a partial solution here if the audience assessing and validating student achievement are active participants in the community. This suggests an attractive idea for those concerned about the divide between education and economic life.

Inevitably, the ultimate success of Open Curricula as a model of education will depend on a receptive social context, including the commercial world. Where the Open Curricula are successful, the scale and success of the supporting community will be a powerful argument supporting the significance of learning arising from their use. As an analogy, consider the status of the Linux operating system. Linux in its many forms is now a significant part of the information technology infrastructure underpinning the web and many people depend on their knowledge of Linux for their jobs.

This success, however, also illustrates the likely consequence of success for Open Curricula, which is the increasing involvement and dominance of commercial interests. While these interests can't directly control open projects, they can dominate them through the scale of investment they make in the project. Companies such as Pearson are clearly seeing opportunities to develop new business models building on open education initiatives. Linux has been able to maintain its integrity and independence through a combination of having gifted leadership and a committed community determined to resist corporate control. Open Curricula need a similar strength that will be harder to sustain as each community is likely to be much smaller than that for Linux.

Scale presents major challenges for the Open Curriculum as well. Early experience with MOOCS suggests that popular subjects are likely to attract interest from hundreds of thousands of people, far too many to credibly engage in any effective community without significant effort in structuring their participation. Inevitably, this suggests that communities will have to be formed continuously, building from the original "parent" community in a process analogous to the "forking" of open source projects. This then introduces inevitable inefficiencies as changes can't easily be shared between different communities.

A related challenge, shared with open source software projects, is the scarcity of expertise. To function well, each community needs its own participating "experts" capable of leading the experience of the group. The scarcity of expertise needs to be respected, and experts, even redefined as advanced learners, need to be supported and their skills and knowledge used wisely. All too easily the communities can fall back into a pattern of subordination to a small group of leaders, and the Ako principles of engagement and community participation are lost. One way in which this problem could be minimized would be through the development of a formal statement of values, a tikanga, for the Open Curriculum that would encourage participants to behave in ways that sustain the Ako model, rather than a teacher domination model. A key factor facilitating this would be the lack of any ownership of any aspect of the Open Curriculum, enabling people to take resources freely from failing communities in order to sustain successful ones.

The Open Curriculum model presented here is the result of experience with technological systems and reflects a modern understanding of education and the role that technology can play in it. The specific technologies that can be used have not been defined and this represents an area where there are many opportunities for entrepreneurial involvement. The absence of qualifications and support from existing formal systems of education means that Open Curricula communities will depend on a web of services, many of which could be offered commercially without compromising the experience of the participants. It is not difficult to imagine Open Curricula projects succeeding in existing collaboration platforms like Facebook and the various Google tools, but it is also not hard to see how new providers could establish the infrastructure needed to host Open Curricula much as wikis and blogs have been enabled previously.

4.6 Conclusion

An Open Curriculum ultimately is defined by the state of learning, the desire to actively seek new knowledge. The disposition to engage with other people learning from their experience in related endeavors, and to both learn from them and support the learning they experience, to be part of a process of Ako within a community. This primacy of a tikanga of learning distinguishes the Open Curriculum from models of "open" education that retain the authority of the teacher, that are limited to resources or content, or which are functioning more as communities of practice (Wenger, 1998). Requiring an active community using a shared tikanga has the advantage of automatically creating a model of support and engagement that will help many students learn effectively.

The challenges outlined above are real, and interestingly many also apply to the wave of MOOCs and other OER initiatives already underway. Clearly if these different models do lead to new forms of education, we will have to experience a difficult transition. People supporting open philosophies can easily be confused with anarchists and it is clear that widespread open education will be anarchic for a period, possibly even destructive to old orders and systems of education. The Open Curriculum model described here is not free of all constraints and the focus on community may well provide stability sufficient to weather the anarchy.

The Open Curriculum is not a model for scaling education without any concern for the costs. It will not support a YouTube model of education where content is simply dumped online in the hope that someone will find it useful. It requires commitment and ownership on the part of those participating in it. Ako requires all participants respect each other, respect the systems that sustain their learning, and explicitly participate in a community of shared endeavor. Inevitably, this will be hard to achieve in the chaos of the modern Internet. Much as with any open source project, it is likely that any single attempt to implement the model will fail, hopefully these failures will also help us learn. The few successes will be all the more valued for their genuine openness and potential for demonstrating a model of education for the future free of the hierarchies and limitations of our current formal education system.

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