One-Size-Fits-One Inclusive Learning

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Abstract. The importance of education escalates in the shift to a knowledge economy. This shift also requires retooling of our education systems to support diversity. There can be no sustainable prosperity or social wellbeing unless our education systems include all members of a society. Coincidentally the digitization and networking of our social substrate also provides the mechanisms to provide more inclusive, diversity-supportive education. The paper outlines an approach to inclusive learning through personalization developed over the last decade, supported by the AccessForAll standard and most currently applied in the Open Education Resource community.

Keywords: accessibility, inclusive design, universal instructional design, personalization, open education, open education resources, eLearning

1 Introduction

In a knowledge economy, education and the full development of human capital becomes ever more critical. The prosperity of a society rests in large part on the educational development of its members. The emergence of the digital economy brings with it a major shift in the goals or required outcomes of education. Digitization is freeing us from the need to mass produce the equivalent of human calculators, human hard drives or standardized human robots to staff our factories or offices. As has been outlined in many discussions of learning transformation (including deep learning or 21st century learning), the new skills and knowledge of value are creativity, resourcefulness, flexibility, collaboration, communication, critical thinking and independent thought [1]. Unfortunately most education systems globally have not been retooled to nurture these skills or knowledge.

We are also repeatedly reaffirming that sustainable prosperity can only be achieved when that prosperity includes all members of society [2]. This implies that learning must be inclusive. A successful economy must insure that no members are marginalized or excluded from education and employment. This implies that education is of even greater relative importance within society and that the way in which education is delivered must be radically adjusted or updated.

If our goal is to optimize learning for all learners we must recognize that learners learn differently. Learning outcomes research shows that learners learn best when the learning experience is personalized to their learning needs. Learning breakdown, drop out and lack of engagement in education occurs when students face barriers to

learning, feel disadvantaged by the learning experience offered or feel that their personal learning needs are ignored [3][4]. Coincidentally, while the move to a digital economy has triggered the imperative to radically update education, digital content and digital delivery mechanisms can also be harnessed to assist in addressing the diversity of learning needs – due to the potential mutability or plasticity of digital systems and content but more importantly due to the opportunity for collaboration, cumulative production and support for networked communities[5]. These produce a greater diversity of learning resources to address a broader range of learning needs, thereby enabling personalized learning.

2 Achieving Personalized Learning through Open Education

Given the vast diversity of learning needs, how do we create a corresponding variety of learning resources or experiences to match these needs and how do we ensure that they are delivered in the best way to each learner? Educators struggle daily with lack of time to prepare curriculum for the average student, how can they be expected to personalize learning for all learners. One key to this dilemma is shared, collaboratively and cumulatively prepared curriculum or learning resources accessed via the Internet. By sharing the production of learning experiences, the task of addressing the diversity of learning needs in a given class does not fall on a single educator. A mechanism for this that is growing in popularity is the use of shared or pooled learning resources such as open education resources (OER). OER is a global effort to produce and share free, high-quality educational resources. OER are available in almost every discipline and at every level of education.

It would seem that OER provide a powerful means of addressing the diversity of learning needs thereby enabling personalized learning and fostering learners with a diversity of perspectives needed by the new knowledge economy. While the use of OER is gaining in popularity worldwide, the adoption and implementation in formal education systems is far less pervasive than anticipated or warranted given the restriction on resources experienced by public education. Objections or concerns raised by educators regarding the adoption of OER includes: lack of local control over standards and quality of the content, lack of support for cohesion and consistency of an educational program, lack of ownership and recognition for resource producers, and loss of control over the presentation of the curriculum. All of these concerns stem from traditional, pre-digital notions of education. An even larger impediment to adoption is the well-entrenched commercial and administrative system used to deliver curriculum in many jurisdictions. Textbook adoption in the US for example is a multi-billion dollar business that is impervious to significant change.

3 Accessibility and Open Education Resources

At the same time the status of meaningful access to education worldwide is far from healthy. Non-completion is at an alarming rate, literacy levels are not responding to intervention efforts and large groups of learners feel marginalized or

excluded from existing systems of education. This is despite the fact that most countries, states and educational institutions have committed to provide equal access to education for students classified as requiring special education[6]. All educational institutions in the US, Canada and the European Union for example are governed by policies that require that curriculum be accessible to learners recognized as having a disability. Many of these policies are currently based upon a somewhat restrictive definition of disability and accessibility. Accessibility in formal education in the US has become a large and complex framework focused on policy compliance and specialized service delivery. Students must qualify and resources must comply to a fixed binary notion of disability and accessibility – to constrain special service expenditures and to enable compliance monitoring and enforcement.

While OERs seem like a perfect mechanism for addressing the needs of learners requiring alternative access means, most Open Education Resources (OERs) are not designed to be accessible for learners with disabilities, most OER producers or developers are not aware of how to create accessible OERs, and most OER delivery mechanisms (e.g., OER portals) present significant barriers to learners using alternative access systems[7]. Consequently OERs do not meet legislative requirements in many countries and the OER initiative falls short of the commitment to inclusive education.

One of the reasons for this situation may be that the formal accessibility framework adopted by many jurisdictions in high-income countries has received a less than welcoming reaction from the OER community. The reasons for this include:

- Accessibility is seen to constrain creativity and innovation in both technological and pedagogical approaches, it is seen to be counter to interactivity or more engaging learning experiences,
- OER creators are not aware of learners with the constrained set of qualifying disabilities among their user group,
- the OER movement is dependent on voluntary participation which tends to be less responsive to enforced standards, and
- the guidelines for complying are seen to be too complex and confusing and in some cases impossible to achieve.

The pervasive and well-entrenched accessibility framework and the reaction it has engendered in the OER community have acted as an impediment to adoption of OER as a curriculum alternative in many formal education systems. These education systems fear litigation or other consequences of non-compliance with accessibility policy. This situation is unfortunate as the fundamental principles and motivations of OER and Accessibility are well aligned (inclusion, respect for diversity, equal access, open access, freedom to share and refine, etc.). More importantly the reforms required to achieve the OER community's vision of learning and education are the same reforms required to achieve the ultimate goals of accessibility (reforms to Digital Rights Management and Intellectual Property, move to digital content and delivery, recognition of the diversity of learners, learner choice, recognition of alternative learning delivery models, focus on deep learning, inclusive education). The two communities should be strong allies but find themselves relegated to opposite sides of a number of policy and advocacy debates.

The traditional approach to addressing the challenge of OER accessibility would be to modify all OERs and OER sites to meet a fixed set of accessibility criteria such as

the Web Content Accessibility Guidelines, WCAG 2.0. However there are several problems with this approach. There are a vast number of OERs, many of which are not amenable to modifying to meet WCAG 2.0. The time and resources required to modify all of the resources would be prohibitive. This approach provides a one-size-fits-all solution and does not recognize the full diversity of learners. The retrofit may compromise the learning experience for many learners. The approach would restrict the types of technologies, technical advances and range of interactive experiences that can be used in creating OERs for fear of contravening the accessibility criteria.

More significantly this traditional digital resource accessibility approach and the underlying policies and services that are based on fixed, binary notions of disability and accessibility do not serve the needs of learners with disabilities. This approach and framing:

- excludes learners that do not fit the categories (notably, learners with disabilities have less degrees of freedom or flexibility to fit assigned classifications and are therefore more likely to "fall between the cracks"; in addition there are many learners who do not qualify as having a disability but would benefit from or need alternative learning experiences),
- treats learners with disabilities as a homogeneous group when they are in fact the most heterogeneous group of learners,
- classifies learners based on a single parameter, ignoring the multiplicity of needs and skills that affect learning,
- constrains the design of learning resources thereby giving less leeway to address minority needs and non-normative learning styles or approaches faced by people with disabilities, and
- compromise the learning experience for many of the learners the services are intended to serve (e.g., learners with disabilities relying on visual learning).

The fixed binary definitions also encourage specialized, segregated services for people with disabilities (i.e., they serve to "ghettoize" education for students with disabilities). This makes these services less sustainable (more vulnerable to funding cuts, open to the whims of shifting funding priorities, peripheral to mainstream efforts and investments, etc.) and more costly (duplicating services found in the mainstream)[8].

There is another frequently missed casualty of the traditional special education framework. The implementation and interpretation of accessibility legislation intended to support inclusion has become exclusive and narrowly defined. This is in part due to the pressure to contain costs and create a testable legislative compliance mechanism. Unfortunately this creates a large group of doubly marginalized learners. These learners are not served by mainstream education nor by service enhancements and programs intended to serve learners with disabilities. This includes children whose families or support mechanisms do not have the financial resources, administrative savvy or advocacy skills to enable the child to qualify for special services. It includes learners who do not fit the narrow classifications of disability, especially as it relates to learning or cognitive disabilities. It includes students who only receive attention once it is too late, once they have become a "disciplinary" or "behavior problem."

In response to this dilemma a number of research and standards efforts have proposed a relative framing of disability and accessibility recognizing the range of

human diversity[9]. All learners potentially face barriers to learning. Like barriers faced by people with disabilities these can be seen as a product of a mismatch between the needs of the learner and the learning experience and environment. Learning needs that affect learning can include:

- sensory, motor, cognitive, emotional and social constraints,
- individual learning styles and approaches,
- linguistic or cultural preferences,
- technical, financial or environmental constraints.

Using this framing an accessible learning experience is a learning experience that matches the needs of the individual learner or the learners within a group. Thus a resource cannot be labeled as accessible or inaccessible until we know the context and the learner/s. This aligns well with OER best practices, learning outcomes research and evidence regarding good pedagogy in OER-based education. This framing merely adds an additional critical impetus to the broader goals and values of the OER community. The added push recognizes that some learners are more constrained than others and are therefore less able to adapt to the learning experience or environment offered, with the result that the learning environment or experience must be more flexible.

To achieve an accessible or inclusively designed OER system requires the capacity to match the learning needs of individual learners. This requires OER resources that are amenable to reuse, and a large, diverse pool of OERs. If the default OER is inaccessible to a specific learner the delivery system would either:

1. transform the resource (e.g., through styling mechanisms),
2. augment the resource (e.g., by adding captioning to video), or
3. replace the resource with another resource that addresses the same learning goals but matches the learner's specific access needs.

To achieve this requires:

1. information about each learner's access needs,
2. information about the learner needs addressed by each resource,
3. resources that are amenable to transformation, and a pool of alternative equivalent resources, and
4. a method of matching learner needs with the appropriate learning experience

A new initiative supported by the William and Flora Hewlett Foundation, the FLOE (Flexible Learning for Open Education) project creating the conditions needed to enable this approach to inclusive learning. FLOE leverages many years of work in Canada and internationally. The Connecting Canadians Initiative, which prioritized inclusive design, supported a large body of research into learning object repositories (which can be said to be the precursors of Open Education Resources)[10]. This led to the creation of a number of foundational technologies and practices to support inclusive online learning such as Web4All and AccessForAll. AccessForAll is both an open international interoperability standard and a number of open source implementations for matching learning resources and learning delivery systems to meet the individual needs of learners. AccessForAll has been implemented in projects and services such as TILE (The Inclusive Learning Exchange), TransformAble, ATutor, the Angel Learning Management System, EU4All, Teacher's Domain and the K12 Library. These implementations have been used to refine both the standard and subsequent implementations[11].

The approach to accessibility is based on the notion of designing for diversity and as such brings with it a host of associated benefits related to diversity, flexibility and adaptability in several realms. In many cases these are powerful motivators for adopting inclusive design principles that may be invoked if and when accessibility is not seen as a critical priority. Even when accessibility is seen as a requirement, these associated benefits can be added motivators for applying inclusive design principles. These associated benefits include: ease of internationalization and translation, OER portability across operating systems and browsers, ease of reuse, repurposing, and updating, improved discovery and selection of appropriate OER, and ease of delivery through a variety of mobile devices whether phones, smart phones, tablets or laptops. The project embeds inclusive design in the day to day OER workflow making inclusive design largely automatic and unconscious wherever possible and providing the supports and decision making tools to enable efficient and effective inclusive design where human judgment and effort are required.

4 Conclusion

All learners benefit from personalized learning. An educational delivery system designed to match the diverse needs of learners addresses commitments to equal access to education without the need for fixed binary notions of disability and accessibility and the problems this engenders. This personalization is made possible by the pooling and sharing of resources through initiatives such as the open education resources community. Inclusively designed OER delivery systems both improve the viability of OER and create more sustainable, integrated approaches to inclusive education. This ultimately leads to sustainable prosperity.

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