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THE ROLE OF EDUCATIONAL TECHNOLOGIES (EDTECH) IN SUSTAINABLE MOUNTAIN DEVELOPMENT (SMD)

Rethinking approaches in the technological age

Sustainable Development Myth-Busting

Myth #1: Education = Schools

Schools are not the only form of education delivery, nor are they always the best. Due to their mostly urban locations, most schools may be highly inaccessible to isolated rural communities. Although those who seek an education may choose to emigrate, issues of labour shortages, brain drain, and loss of culture may arise for the community. By falsely equating education to schools, development efforts may be misdirected as they fund institutions that are inappropriate for their target communities.

The metrics used for measuring the success of educational projects and programmes are also often disproportionally focused on formal aspects of education, such as school enrolment rates, years of schooling, or graduation rates. This obstructs from view improvements in education made through other, less formal methods, such as online or home schooling, and may in turn force development projects to de-prioritize investments in informal means of education, as the results will not be noticed by donors. A more nuanced approach to education should instead be adopted, one which recognizes that schools are not a universal solution, and which encourages the exploration of alternative approaches.

EdTech and Sustainable Development in the Mountain Regions of Central Asia

In Central Asia, mountain pastoralist communities have mostly relied on traditional knowledge systems developed within their own communities and across generations to inform their practices. However, in today's rapidly changing world, traditional knowledge is likely insufficient for these communities to keep pace, resulting in increased vulnerabilities to emerging challenges, such as climate change or globalization. To ensure a sustainable future, these communities must be able to adapt to global changes, which could be encouraged through appropriate educational methods that enable the introduction of new knowledge into these communities, while taking into account unique mountain challenges, such as remoteness and hazards, along with locally adapted livelihoods. The emerging field of educational technology (EdTech) may be best suited for the job, and this section discusses two EdTech innovations and their value for sustainable development in context of Central Asia's mountain environment.

Online Distance Learning (ODL)

Since its resources are generally open to anyone with an internet connection, ODL is far more accessible than formal education. For remote populations such as mountain pastoralists, ODL's popularization would mean that education could be accessed right where they are, reducing the pressure on many to leave their communities in search of education in the cities. Compared to formal education, ODL is also far more adaptable. Here, it is important to note that ODL does not exclusively mean Massive Open Online Courses (MOOC), such as those offered by Coursera and similar platforms, and it includes more personalized and scaffolded structures that enable learners to collaborate in cohorts throughout their learning process. Such features could make ODL more suitable for mountain pastoralists rather than formal education, as they may find their learning goals to be inadequately addressed by the usually rigid teaching methods and curricula offered through schools. Further, as ODL permits study at any time and place, learners can customize their education to fit their own lifestyles, no longer needing to sacrifice one for the other. For nomadic/semi-nomadic pastoralists, whose lives inherently involve opportunistic movement and flexibility due to the seasonal nature of rangelands and associated needs of their animals, this feature of ODL is particularly beneficial.

The interactive features of the internet have also allowed many ODL programmes to adopt a gamified design, where learners work together to complete reward-yielding challenges. Beyond allowing for assessment of learners through the demonstration of their skills, gamified learning encourages collaborative problem-solving, which is recognized as one of the most effective ways of knowledge uptake. Online games in general have also been observed to generate feelings of optimism and productivity, as well as strengthen social fabric, all of which are important social dimensions of sustainable development. Gamified ODL may thus be an effective tool in promoting not just individual betterment, but promoting the well-being of entire communities.

Myth #2: Education can "trickle down"

Sustainable development education has, in large part, been focused on the developed world, manifesting in ways such as the addition of sustainable development topics into school and university curricula. This has been done with the thinking that leaders and institutions originating from the developed world may then be better equipped to advance sustainable development efforts worldwide, creating a trickle-down effect. However, in an already asymmetrical international order with developed countries possessing the greater share of power and resources overall, educational investments made with the aim of further enhancing their citizens' roles in global decision-making will only deepen global inequality. Instead, sustainable development education should aim equally to empower citizens of the developing world, affording those at the global periphery with the tools to shape their own future in a way that recognizes their independence and agency. In other words, sustainable development should not be seen as something that simply "happens" to developing world citizens, but as a process that involves them as stakeholders.

Kham Tibetan nomad
Photo: Marc Foggin

Digital Badging and the Blockchain

Certification is another important part of the educational process, serving as proof of learners' abilities to employers or others. In formal education, students are certified with diplomas, which remain the most widely accepted form of certification due to the reputational backing of the issuing institution. In an online context, certification can be provided by digital badges, which are essentially image files embedded with metadata equivalent to the information on a transcript or diploma, such as the learner's and issuer's identities, the skills acquired and their assessment criterion, and the dates of issue and expiry. Digital badges are also embedded with a link to a method of verification, which ensures their security. If a learner earns multiple digital badges, blockchain technology could be used to validate the series of badges and produce a cumulative evidence of work for that learner. Acting as a public digital ledger, the blockchain, by storing its data across multiple servers, records unalterable sequences of transactions, despite there being no central authority in the system. Essentially, blockchain technology allows people to bypass record-keeping institutions, such as banks in the case of finance, or, in the case of education, schools. Linking a learner's badge to clear evidence verifying the achievement, as well as to all other badges obtained by the learner and storing these as a blockchain, creates a complete and secure record of academic achievements that can be freely shared and accessed, potentially replacing the need for a traditional diploma.

Implications

So, what are the implications of ODL and digital badging in the context of Sustainable Mountain Development (SMD)? In the arena of environmental conservation, for example, EdTech can help introduce novel wildlife and environmental monitoring technologies to mountain communities, such as GIS or camera traps, which could help promote sustainable, biodiversity-friendly living practices. ODL could significantly enhance access to training in these technologies, as the physical presence of specialists would no longer be essential (even if still beneficial). Consequently, the expected usage of such technologies would increase, allowing local people to more effectively assess their surrounding environment in order to more sustainably manage resources. Wildlife tracking technology could also help conservation efforts of endangered species, and the information gathered could be used to appeal for donor funding to further support such efforts. Digital badges may assist in proving to donors the credentials of local community members in mountain regions and therefore the credibility of their appeals.

Digital badging could also expand opportunities for community-based tourism and ecotourism. For example, guides could demonstrate their familiarity with mountain terrains and proficiency in safety/first-aid procedures with badges containing links to photo/video evidence, reassuring visitors of their competency. Foreign language proficiency, also verifiable via digital badges, is another skill that will become increasingly desirable and perhaps even necessary in order to interact with foreign tourists, who may become more common as globalization continues to reduce the "distance" between places.

From a project implementation perspective, ODL can be more cost and time efficient to introduce than formal schooling, as it would not require the building of physical facilities or training of local staff. In remote and educationally-deprived mountain communities without existing schools and a shortage of qualified teachers, ODL may be the more logistically rational solution.

Overall, the massive potential of emerging EdTech is undeniable. However, current development work continues to prioritize traditional schooling. It also continues to measure success in metrics relevant primarily to formal education. While schools are undoubtedly important, EdTech should be recognized as a worthy alternative (or as complement) to this, an asset that contributes directly toward achieving Sustainable Development Goal #4, namely "to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all."

EdTech and Cultural Change

In assessing the effectiveness of EdTech as a development approach and priority for increasing equity, its social and cultural impacts are clearly another important dimension to consider. In particular, how are Central Asian communities likely to perceive EdTech? Would further interaction with EdTech change their perceptions of it? Furthermore, might EdTech affect these communities at an even deeper level, such as influencing certain cultural values?

Case study evidence (Gwin, 2021)

Evidence from a recent case study conducted by Randall Gwin on Central Asian teachers' attitudes toward EdTech provides some insight into the above questions. Gwin found that, after receiving online training, most participants effectively adopted ODL technologies in their teaching methods, and participants' use of collaborative ODL tools had increased from the beginning to the end of the training. Despite the participants' differing cultural backgrounds, there was no evidence that cultural values affected ODL adoption. The training course, itself an ODL program, also appears to have altered certain cultural characteristics of the participants. Specifically, decreases in two Cultural Dimensions (a set of values people exhibit in the workplace, as theorized by Dutch social psychologist Geert Hofstede) were identified among the participants: Power Distance (sensitivity to hierarchies), and Masculinity (competitiveness). Lower Power Distance could be attributed to the online training environment, which made social status markers such as gender and age less salient, thereby reducing the perception of hierarchies. Lower Masculinity could be attributed to the training's use of ODL for collaborative learning, which promoted participation over competition.

Implications

If EdTech is to be widely introduced in the developing world, its potential to influence culture must be recognized and made transparent to local stakeholders. While it is true that most of the values promoted by EdTech are "positive," such as increased egalitarianism (by lowering Power Distance), and that such value-shifts may in turn help further other Sustainable Development Goals (e.g., SDG #10, Reduced Inequalities), consultations with local stakeholders are still necessary to avoid possible cultural incompatibilities and to help preserve their agency. On a related note, while the reduced visibility of identity characteristics in online environments may reduce some hierarchies in learning, this same feature of ODL may also obscure learners' uniqueness and lead to losses in individual character and identities.

As discussed in previous sections, social and geographic conditions in Central Asia, particularly in its mountain areas, make the region an especially suitable candidate for EdTech. Once introduced, EdTech use could be expected to spread rapidly in the region due to the region's relatively young population and quickly expanding internet access. However, due to the diversity of ethnic, religious, and linguistic groups as well as the region's relative political instability, increased caution may be necessary when it comes to adoption of EdTech at larger scale, to ensure that the cultural changes it could instigate do not result in unintended, potentially destabilizing, consequences.

Furthermore, because increasing internet access is a precondition for the spread of EdTech, greater use of EdTech necessarily implies greater connectivity. Exposure to new ideas and perspectives from other cultures would increase for Central Asian learners, which on one hand may promote cross-cultural understanding, but on the other hand could equally create some risk of cultural dilution and possibly loss. The current preponderance of Western voices in the academic world also raises some questions of whether EdTech could serve as tool for ongoing/modern colonialism, as many of the ideas taught and then applied by ODL learners mostly originate from Western sources. In the end, EdTech is not a magic bullet, without flaw, and any EdTech-based intervention must be conducted with great care and in close collaboration with local stakeholders.

Kazak nomad moving to summer pastures
Photo: Marc Foggin

Conclusion

Recognizing the value of education as a crucial component and tool for sustainable development, and particularly the utility of EdTech in bringing targeted, high-quality educational opportunities to isolated communities such as those living in Central Asia's mountains, the following recommendations are proposed:

- Encourage the use of EdTech as an alternative to formal schooling in remote areas where formal schooling is not widely accessible, and build up the necessary infrastructure to support EdTech, such as by further expanding internet coverage.
- Incorporate indicators of online learning into development metrics measuring education in order to make visible the progress achieved in this emerging area of sustainable mountain development.
- Acknowledge the independence and agency of local mountain stakeholders, and treat them as partners rather than subjects in development interventions, including programmatic advances such as EdTech.
- Make transparent the possible cultural effects of EdTech, and take a balanced, cautious approach to EdTech-based interventions so as to avoid unintended negative consequences such as sociocultural homogenization.
- Reconsider the notion of sustainability: first, by better integrating local agency and sociocultural dimensions into relevant frameworks; and secondly, by appropriately differentiating between "sustaining projects" versus supporting "the continued (and evolving) use of development objects" such as new technologies or knowledge.

Tajik herders on the road
Photo: Marc Foggin

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Plateau Perspectives supports grassroots initiatives in community-based conservation and sustainable development in the Tibetan plateau region and the mountains of Central Asia

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