Partnering for Impact: Increasing Cyberlearning's Influence in Education Markets

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Overview

Many Cyberlearning researchers know that their work could make a significant positive impact on today's educational products and practices, if only there were a way to get it out there. CIRCL's Partnering for Impact activity offers guidance, resources, and workshops to help researchers think through their options and be effective in their outreach efforts.

Partnering for Impact is not new; indeed it has already succeeded. For example, a number of companies sell products based on concepts and technologies developed under the Cyberlearning umbrella. Some, like Carnegie Learning and Alelo, were startup companies launched by the researchers themselves. Other researchers ushered their technology into the marketplace by licensing technology or by consulting for established publishers and technology firms about new product or product feature ideas. And, of course, there are likely many ed tech products that have incorporated the ideas that learning scientists shared openly in their publications and conference presentations.

Terms like commercialization, productization, and tech transfer are often used to describe the process of moving ideas and technology out of the lab and into the marketplace. The education marketplace, however, is special for a number of reasons: state and federal regulations; balkanization (procurement at the state, district, and school level); lagging technology infrastructure in the schools; teachers without the needed time or training; and perennially tight budgets. And the marketplace is now changing rapidly. For example, one major textbook publisher has increased its software development staff from 5 to 500 people in the last year and converted all of its 1500 titles into digital offerings of some type. Thus, approaches to bring consumer, healthcare, or military innovations to market do not always smoothly apply in education.

Because of the special expertise and capabilities involved in bringing educational products to market, arranging to work with people who already have the needed expertise — entrepreneurs, investors, educational publishers, marketing consultants, educators — will expedite the transition from research to broad adoption: partnering for impact.

> Cyberlearning researchers can envision the possibilities afforded by learning science. Ed tech companies work with educators every day, and have insights into the critical needs and major opportunities in education. Partnering can lead to scalable learning solutions that address these critical needs, and which are infused with insights into how people learn.
> – W. Lewis Johnson, Ph.D., Co-Founder and CEO, Alelo

Learning scientists' and Cyberlearning researchers' technical inventions and findings about how technology is best used in the classroom are extremely relevant to the current ed tech boom — the multi-year surge of investment in new products from startups and established companies that target education at all levels. There are now hundreds of startups, incubators, accelerators, and hackathons focused on the education market.

> In 2014 alone, US ed tech companies raised $1.36B in 201 rounds from more than 386 unique investors. (EdSurge, Dec. 23, 2014).

Despite the fact that tech entrepreneurs are the celebrities of our day, there are often more effective and efficient ways to move scientific research into products and practice. Researchers who want to invest their time in outreach activities should consider the alternatives to entrepreneurship, think about their own personal motivations, and take a fresh look at the potential impact of their work from the perspective of market demand.

- Often there is little incentive for, or accommodation of, entrepreneurial efforts in academic career planning or in the funding of scientific research.
- While Cyberlearning researchers (and NSF) often envision their work applied in K-12 classrooms in the US, that's probably the hardest market to penetrate. Could the innovation be a game changer for community colleges, private schools, foreign universities, or enterprise training departments?
- What problem gets solved? Who will buy the product or service featuring your innovation, and why? Do these future customers need relief badly enough to change "the way things have always been done"?

- Typically, not every element of one's work has commercial potential. What's the gem? What insight or innovation will capture the interest of product developers and their customers? Is there some way (patent, copyright) to protect inventions so as to assure that a commercial venture can profit from the work before it is copied by competitors?
- What work is left to do, besides "hardening the software," before the innovation is packaged in a product that can be sold and used effectively?
- Does it make more sense, based on personal goals, to forego entrepreneurship and license the technology or consult for a while with an established firm, and let them bring a product into the world?

There are many areas of opportunity within the corpus of Cyberlearning research. Some researchers may indeed be appropriate candidates for the venture funded startup route. But for those not ready to devote their energy to a startup company, there are alternatives.

The subsequent tabs in this article highlight some of the issues and options to be considered by researchers who are interested in seeing their work move into products and into the schools. We also list some recommended first steps and useful resources, including non-academic conferences that offer excellent opportunities for exposure and for finding partners as one's plans mature.

Issues in Reaching the Ed Tech Marketplace

In 2014, CIRCL hosted a Partnering for Impact Workshop in California to identify and address the barriers that must be overcome in the community's efforts to bring learning science research results to bear on ed tech products and on their use in schools. We've summarized here some of the issues that researchers should be aware of as they consider how their work might find its way into the hands of teachers and learners.

Cross-cultural communication. Since academic researchers, commercial product developers, and educational adopters operate in substantially different worlds, extra effort is required to achieve effective communication. Each community has its own goals, priorities, schedules, and deadlines, not to mention terminology and communication styles. With a little effort and a bit of empathy, researchers can effectively communicate our ideas, results, and vision to investors, publishers, and educators, but it might feel like an unnatural act at first.

For example, we tend to leave out some steps, assumptions, or facts that are taken for granted among researchers, but that must be explicitly laid out for practitioners. We like our jargon and acronyms, vs. theirs. Our communication style tends toward lecturing — it's an occupational hazard. We think research and scientific truth are what's really important, whereas a classroom teacher, even one who loves science, might have other day-to-day requirements for selecting and adopting products. Bottom line, we need to know whom we're talking to, and be able to describe benefits and costs from their perspective in their language.

The press and media can help create awareness of the potential impact of Cyberlearning on people's lives. Getting the story out right can be tricky, and may require a few learning trials. It is, however, important that teachers, parents and learners see the point, from their perspective. Ultimately, there must be public demand for better products that incorporate what Cyberlearning has learned about learning. See for example this piece from the Huffington Post (April 2015)

Alternative paths. Besides starting one's own company to bring a product to market, there are alternative paths with very different requirements and outcome. These options are not necessarily exclusive. It's advisable to consider all the options in the context of your personal values, lifestyle, expectations, and ambitions.
- Startups. These days, starting a company, getting venture financing, and selling out for billions shortly thereafter is a meme that's hard to avoid. There are all sorts of incubators, hackathons, and VC pitch sessions organized to help get your startup started. While entrepreneurship can be challenging and rewarding, it can also be disappointing and hugely time consuming. That said, once you've got a solid business plan, pitching your company/product idea to seasoned investors who know the ed tech space can be enlightening, even if you don't get funded. And if you are offered financing from an established venture firm, it's a good sign that your team is qualified and that you're starting out in a good direction.
- Licensing intellectual property. A much less time-consuming and life-altering path to commercial success is possible if your research has resulted in an invention that might be patented or in learning materials that might be copyrighted, for instance. Often universities will help researchers protect their intellectual property, which can then be licensed, productized, and taken to market by an existing firm with an established reputation and marketing organization. Once the IP protection is in place, you would then pitch your ideas to educational

publishers, platform and device providers, and even well-financed startup companies, and negotiate a fee structure for the (exclusive or non-exclusive) license.

- If you and your employer are not concerned with seeing additional revenue from your inventions and ideas, you might expedite the impact of your work by just talking to educators, publishers, investors, entrepreneurs, policy makers, or the public about the potential impact of your work. Choosing the right audience, the right venue, and the right wording is important, as discussed below. This path is a relatively low-revenue one, but not necessarily zero revenue.

  For instance, you might:
  - Get hired as a consultant to help product developers understand, implement, and extend your research results
  - Secure a summer internship for you or one of your students at an ed tech firm or at a school that's making an effort to adopt and integrate technology
  - Hold a workshop (or a MOOC) of interest to industry players
  - Form a university-industry consortium or a Github community
  - Supply a piece of the needed infrastructure, like a database or ontology
  - Partner with other research teams to create a more complete offering
  - Write a bestseller about the future of education targeted at a non-academic audience

What's a product? No matter what path you follow, it's important to understand the difference between research results and products. Sometimes, just a small part of your research work is a gem that could be directly turned into a viable product. On the other hand, creating a product from where you're at now could require ten times more work and money than you've already invested.

People buy products because they solve a problem they're having — hit a pain point. Your idea is not actually a product idea until you have a notion of who will buy it, why they'll buy it, and how they'll use it to solve their problem. And once you have an initial notion of what you'd be selling to whom, it's a really good idea to go talk to some of those "customers." And listen.

Understanding the market generally — who's buying what from whom — is key to refining the product concept; describing it in the best way; and positioning it relative to competitors and alternatives. Working with people who have been active in the market (investors, entrepreneurs, school superintendents, consultants) is the best way to learn, because the ed tech market is complicated and changing rapidly.

Its important to understand the idea of the "whole product." If you're introducing a new software app, for instance, there may be a lot of work to do, besides "scaling up the code," before you have a viable product. You might need to: build additional software components; populate your skeletal

content framework; create a user interface acceptable to today's learners; integrate your system with databases and other systems; collect money from buyers or users; write an implementation guide; or offer online support or teacher training. No matter how much efficacy data you have accumulated, if the teachers don't like it or the students don't use it, it doesn't work.

Two additional issues related to productization are especially relevant to researchers: myopia and inflexibility. After spending years developing a system or approach and demonstrating its effectiveness, it's natural to remain focussed on what you've been working on and even expect that additional funding would be best spent perfecting your algorithm, for instance. Entrepreneurs and investors often focus on what's called the Minimal Viable Product, because speed to market can sometimes determine success more that functionality, and additional features can always be added in Version 2. Similarly, as the process of productization proceeds, it is often happens that the eventual product offering differs substantially from the system or approach you perfected and demonstrated. (Sticky Notes was a failed adhesive product). Flexibility is a key trait of successful entrepreneurs.

Technical Issues. "Scaling up" is probably the wrong way to think about moving an academic software system that has been used to collect data into a commercial product. First of all, professional software development and product management are different from the work of even the most talented amateurs. Commercial software teams address issues like architecture, platforms (tablets, publishers, analytics, schools), performance, usability, time to market, flexibility, understandability, and maintainability.

Whether in a school or in a publishing house, there are an increasing number of systems and apps that your system or app might need to interface with, to retrieve data about the student, monitor and alert a teacher, or record activity and performance. You can't ask a teacher or student for information that your system should already know, and you can't expect your system to collect and store all of the learners' data. Systematic instrumentation and independent data analytics are increasingly expected in the marketplace.

Academia. You might not at first think of academia as a barrier to your efforts to broaden the impact of your research. There are, in fact, several issues.

First, your academic career is typically not advanced by your success in "spreading the word" or by the number of students who are using products based on your work. The time involved in pursuing these outreach goals does not count towards your obligations to the university. Similarly, while there are certainly exceptions, most funders of scientific research expect you to make progress on the science, not necessarily on any related engineering or application.

Most universities nowadays would like to get a piece of the action on any profits derived from inventions or advances made by their faculty and students. You should be familiar with your employer's policies about intellectual property, consulting, and sabbatical leave. Schools often have tech transfer offices staffed with lawyers. Your research funders may also have commercialization policies you should be aware of.

Research plans are laid out and funded in advance — often you're proposing work that you will not get funded to do for a year or more. The research horizon makes it difficult sometimes for academics to be responsive to businesses on their time scale, which is driven by the changing competitive landscape. Getting a product out the door can require planning through several stages, each depending on the previous one. Missing deadlines at any stage can be catastrophic. University and government accounting and reporting requirements can also interfere with the flexibility businesses need.

The game in business is solving customers' problems — exactly the inverse of academia. In other words, your research funders, the folks who give you money, succeed if you succeed — if you do good science, get published, get recognized, etc. In business, you succeed only if the folks who give you money, your customers, succeed. Scientific simplification is an important technique for identifying studiable phenomena and solvable problems. In the real world, friction is not 0 — the nuances and variability of the learning context, for example, can be critical to product design.

Finally, entrepreneurship often involves "sweat equity." Months or even years of unfunded, unrewarded, unrecognized work before investor or publishers will buy into what you're doing. Furthermore, success often depends on building a team of people who have expertise in areas you're not expert in (software development, product management, marketing, finance, …). For a salaried university researcher, the transition to entrepreneurial status can be difficult.

The education marketplace. There are a lot of new educational products targeted at schools, universities, parents, and students. There are many more in the pipeline, and future saturation of the market is potentially problematic in itself. But there are many other issues in the educational marketplace that have been around for a quite a while.

The U.S. K-12 market, where many learning scientists hope to see the impact of their work, is notoriously hard to penetrate for several reasons, besides perennially tight budgets:

- Balkanization (procurement at the state, district, and school level) makes efforts to market new products very expensive. The textbook publishers and some platform vendors have developed large sales and marketing organizations to address this reality. Similarly, there are numerous regulations and requirements from multiple jurisdictions that impact educational products in the various market segments.
- The technology infrastructure in the schools is not typically what you'd find in the university research environment. The computing and communication situation in students' homes may also be suboptimal.
- While the situation is changing, classroom teachers have not had a lot of technology training and often struggle to find time to learn to use new products. If Cyberlearning doesn't fit into the way classrooms operate, it won't make a difference. There are schools and teachers that are changing the way their classrooms are used, but that is not the case in most of the K-12 market and won't be for many years.

A similarly fractured market structure exists in higher education, where publishers often sell new products directly to individual professors. Economic and social pressures are causing many colleges to rethink their business models, and many are trying to use technology to cut costs, differentiate themselves, or find new markets.

Finally, you might be thinking about selling an app or other products directly to teachers, parents, and learners online. While it does avoid some of the market structure problems, it's hard to get the attention of busy teachers and learners. That's a problem you will share with many ed tech entrepreneurs.

Next Steps and Useful Resources

We've listed here some suggested first steps and selected resources that might be useful in your initial explorations of ways to broaden the impact of your work.

- Look for local experts and resources. University and regional incubators, consultants familiar with the ed tech market, veteran ed tech entrepreneurs, and even meetup.com groups could shorten your learning curve and help in deciding on a path forward.

- Read EdSurge, a weekly newsletter that covers the ed tech landscape, including announcements about startups and VC funding, ed tech conferences, workshops, hackathons, prize competitions, and just about every new product that hits the market. Understanding a bit about what else is going on in the marketplace will help you refine your ideas and communicate more effectively with potential partners. Some other interesting resources:
  - The Office of Educational Technology's Ed Tech Developer's Guide
  - Ed Table Talk, Michael Jay's monthly webcast about issues in ed tech
  - Stanford's Patent Law and Strategy for Innovators and Entrepreneurs (iTunes)
  - 51 Questions Any Edtech Entrepreneur Must Answer (Edsurge)
  - NewSchools Entrepreneur Resources (New Schools Venture Fund)
  - Ed-Tech Guide (Audrey Waters, Hack Education)
  - 10 Startup Lessons From Kaplan's EdTech Accelerator Demo Day (Entrepreneur Magazine)
  - Ed Tech Magazine
  - Building Strong Public/Private Partnerships in Information Technology: A Cross Cultural Primer

- NSF's Innovation Corps is a public-private partnership program that teaches grantees to identify valuable product opportunities that can emerge from academic research, and offers entrepreneurship training to student participants. I-Corps Teams — composed of academic researchers, student entrepreneurs and business mentors — participate in the I-Corps curriculum. The curriculum is administered via online instruction and on-site activities through one of several I-Corps Nodes. Also, there are Small Business Innovation Research (SBIR) programs from NSF, Department of Education, and other federal and state agencies that are sources of information, funding, and potential partners.

- Attending conferences and showcases might be a good idea early on, to get an up-to-date picture of today's ed tech marketplace; make some connections with people and companies; and learn what will be expected when you are ready to seek funding and partners. Eventually, you should plan to be speaking at these non-academic conferences to educators, publishers, and investors. Edsurge maintains a list of ed tech conferences and events. Some

recommendations (note that deadlines for speaking proposals are often 6-12 months before the program):

- TransformingEDU, Consumer Electronics Show, Las Vegas, January
- SXSWedu, Austin, Texas, March
- ASU+GSV Education Innovation Summit, Scottsdale, Arizona, April
- SIIA Ed Tech Industry Summit, San Francisco, May
- Assoc. of American Publishers: Content in Context, Washington, June
- ISTE Conference and Expo (educators), Philadelphia, June
- Edsurge: Digital Innovation in Learning Awards, Silicon Valley, November
- Masie Learning Conference (enterprise training), November, Orlando
- I/ITSEC (the military training conference), Orlando, December
- SIIA Education Business Forum, New York, December
- Online Educa (Europe's biggest event), Berlin, December

- Practice explaining your work and its potential impact to non-scientists. Family members will do, especially if they're inclined to ask hard questions. Potential team members with business backgrounds are even better. Eventually, whatever path you take, you will be talking to intelligent non-scientists: investors, publishers, educators, policy makers, software vendors, and the press. Practice will help you answer their questions within their framework of understanding and action.

- If you're targeting classroom adoption, talk to teachers about what technology they use; what they have not been able to integrate into their workday; and what products they'd like to see in the future.

- Write articles that will be read and understand by educators and business people, and get them published in non-academic trade or consumer publications. Or write a book that is published by someone other than Elsevier or Springer. Creating demand among educators, parents, and students for the innovations you envision will drive the market and eventually resolve the business and classroom issues. When you speak or write about your work, don't focus only on efficacy as demonstrated in your pilot studies. Think about how the product will be sold and how it will be used by teachers. Who will buy it? How will they deploy it? How will teachers or learners use it?

- If you decide to start a company, put together a team with expertise in marketing (preferably in education), finance (preferably in raising capital), and product management. Top-tier venture capitalists say that the team is more critical in their evaluations than the technology or the business plan.

- There are a wide variety of incubators, hackathons, and advisors that focus on ed tech startups. They are a good place to find team members and advisors in the very early stages of your explorations. Later on, when you have a business plan, a pitch, and maybe a demo, there

are showcases that specialize in ed tech startups. EdSurge keeps a list of all of the ed tech incubators.

If you come across useful resources for learning scientists who would like to see their research results in the hands of teachers and learners, please send CIRCL a note.