

Free Technology Academy: a Joint Venture of Free Software and OER

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Abstract

The decision to publish educational materials openly and under free licenses brings up the challenge of doing it in a sustainable way. Some lessons can be learned from the business models for production, maintenance and distribution of Free and Open Source Software. The Free Technology Academy (FTA) has taken on these challenges and has implemented some of these models. We briefly review the FTA educational programme, methodologies and organisation, and see to which extent these models are proving successful in the case of the FTA.

Keywords

Free Software, Open Source, OER, business models, education

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Introduction

In recent years, many educational institutions have developed strategies to facilitate the transfer of knowledge to the rest of society (Matkin, 2010). One of these strategies is the production of Open Educational Resources (OER), i.e., learning materials -textbooks, class notes, learning activities, etc.- which can be used, modified and redistributed by anyone with few restrictions (UNESCO, 2002).

The decision to publish educational materials as OER is usually supported by one or more of these arguments: because it is an efficient way to disseminate these works; due to ethical reasons against proprietary constraints in learning materials; or because of a governmental policy that requires them to do so. In the case of the Free Technology Academy, this decision was taken very early in the creation of the project, for two main reasons: the ethical imperative of facilitating universal access to knowledge and for consistency with an educational programme about Free Software.

That decision taken, the question arises of how it can be done in a sustainable way. One may think that no revenue can be generated with free (as in freedom) materials. On the other hand, considerable resources must be invested to produce, maintain and distribute them. In this paper, we discuss some of the models for the production of OER and the running of courses based on these materials. We show some business models from the domain of Free Software, which may be valuable for open education as well.

Finally, we discuss the particular choices of the Free Technology Academy and how some of these models are being applied. In particular, we identify three important challenges to open education: providing tools to enable feedback and updates, choosing document formats to facilitate authoring and distribution and designing economically efficient practices for open development of course materials.

Production models for free educational materials

The FLOSSmetrics project (Free/Libre and Open Source Software Metrics, n.d.) mapped the economic models behind 451 Free Software projects along three axis: control (software model), collaboration (development model) and revenue (business model). The software axis runs from proprietary to Free Software. The development axis runs from closed to open participation. The third axis contains the the ways in which software projects generate income, which can be summarised into the following main categories:

• *fully Free Software*, revenue is generated with training, custom development, consultancy, certification and other *services*

- business models based on proprietary add-ons, known as *open core* (like SugarCRM) or on publishing software both under a proprietary license and a free license, known as *dual licensing* (like MySQL)

- platform providers* which generate revenue by aggregating applications into one coherent platform and certifying its quality (like RedHat)

The FLOSSmetrics research shows that service provision is the dominant way to generate revenues from free software. In education, the analogue to fully free software would be “fully free knowledge”. In the educational domain, some typical services would be: tuition of learners in a course, assessment of learners' participation and certification of the acquired knowledge. The main ways of generating revenue with course books are the commissioned production of materials and by selling printed copies. Revenue can also be generated by providing custom training for specific target groups.

In addition to the above, forms of “open core” exist in education. In MIT's OpenCourseWare, some resources are published under free licenses, while enrolment is required to access the full course contents. The “platform providers” model can also be observed in the educational community. A university or network of universities offering a coherent educational programme could be seen as a platform provider, bringing a coherent programme with assured quality and formal recognition of results.

Production of materials

An interesting business model analysed in FLOSSmetrics is the *R&D Cost sharing* model, defined as cooperation between interested parties to achieve economic efficiency in the R&D of new software. It is observed that this model works best when all participants have equal rights. Free licenses, open standards and open development practices can assure such a level playing field.

Regarding the development of educational materials we find a wide range of models. Benkler (2006) analyses the differences between intra-firm, market-based and peer production, and uses economic theory to show that, in certain cases, peer production can be more economically efficient than the others. Important reasons for that to occur are 1) the lack of transaction costs (no contracts to be managed, almost no hierarchy), 2) motives other than monetary may induce people to participate in the production process, and 3) the results of the collaborative effort are available for all participants under equal conditions.

Course design

As described by (Glott, Meiszner, & Sowe, 2007), one of the main characteristics of Free Software communities is usually known as “openness” or “inclusivity”. Meiszner (2010) suggests to apply Free Software concepts to education. They come with a “hybrid approach”, a mix between an inside and outside approach. The former refers to a scenario where learners would build upon the

work of earlier cohorts contributing to a growing and improving body of course material. This is in line with Fischer's (2007) metadesign and dePaula's (2001) courses-as-seeds model. In addition, the latter refers to a scenario where learners are sent out to participate in Free Software projects and communities to apply and deepen their theoretical knowledge.

FTA master level programme in Free Software

The following sections give a general view of the FTA programme and methodology.

Free Software Curriculum

Only a small number of master programmes in Free Software is currently operating and none of them are international initiatives, although it is clear that international cooperation can be very useful in attracting a critical mass of learners. The FTA is the first effort towards an international master programme on Free Technologies.

The FTA programme started to run in 2010, with the support of the EC's Lifelong Learning Programme, with a pilot consisting of 8 courses which had 163 registered learners. Course materials were either translated from textbooks of the UOC programme (Universitat Oberta de Catalunya, n.d.) or developed afresh for the purpose. In 2011, the programme will be extended to 26 instances of 14 different courses. Many of these new courses will be based on the UOC programme, along with some courses from URJC (Universidad Rey Juan Carlos, n.d.) and OUNL (Open Universiteit Nederland, n.d.).

After completing a course, learners obtain a certificate issued by the FTA and recognised by the partner universities according to their own rules for external electives and substitutes. One of the objectives of the FTA project is to establish an international master programme certified by participating universities directly, rather than through recognition as electives or substitutes in some other programme. The road to such a programme will not be short or easy, mainly because of the diverging demands that national accreditation bodies would place on such an international programme. Therefore, the establishment of an international degree programme was not listed as a deliverable of the 2009/2010 project plan. However, in April 2010 an International Task Force was set up to plan a curriculum for such a programme (Free Technology Academy, n.d. a). In the model that is being developed, a core part of the curriculum will be shared between all partners, while tracks of different flavours will be elective, and may be offered only by some of the partners. Different options for recognition are being considered, such as local accreditation at the national level, double degrees between universities and joint degrees between various partners.

Educational methodology and course design

The FTA learning methodology allows learners to define their own study schedule: the main communication tools are asynchronous and there are few deadlines during the course and activities can be joined at different dates and times. This flexible model allows for anyone to join FTA courses, regardless of their location and job, as long as they have regular access to the Internet.

During the course, tutors use the class forums to engage learners in debates on issues related to the course. In this sense, the tutor is more a guide than a conventional teacher. Also, relevant experts are invited to participate in the course as guest lecturers, giving a video talk and discussing it with the group afterwards.

The evaluation of FTA learners is done continuously during the whole course. There are a number of Continuous Assessment Activities (CAA) for which learners receive marks. Depending on the course, these activities may consist of answering a set of questions, writing a short essay or completing and documenting a practical task. Also, participation in class activities is evaluated by tutors, usually accounting for 20% of the final grade. Following the courses- as-seeds model (see Section *Course Design*), learners are encouraged to contribute and provide feedback to existing course materials and a growing body of useful content.

FTA Campus

All courses provided by the Free Technology Academy are conducted entirely online at the FTA Virtual Campus, which is fully based on Free Software in order to guarantee its sustainability and the transfer of the technology and expertise to all present and future partners. The base for the FTA Campus is the University Campus (UC) project (Projecte Campus, n.d.), a framework developed by a consortium of Catalan universities in cooperation with the MIT that is published under the GPL license. In the FTA Campus, the UC framework runs on top of Moodle, a widely used Virtual Learning Environment also released under the GPL license. The FTA Campus integrates other Free Software applications such as Wordpress, MediaWiki, OpenFire and Mahara.

Quality and recognition

The overall quality policy of the FTA is laid down in a common QA plan. At the operational level, this provides for questionnaires sent to all participants (both learners and tutors) at the end of each course, the results of which are presented to the Board for decision making. At the strategic level, the Board has established a joint Scientific Council with recognised international specialists to oversee QA procedures in relation to the curricula and learning materials, learner performance, tutors, learning facilities and assessment outcomes.

Production methods in practice

The methods for the production of OER within the FTA are in constant evolution, as FTA partners strive to find and improve an efficient way to produce course materials. In the time since it started operating, the FTA has used three different non-exclusive models to produce the learning materials for its courses, showing an evolution towards a production process more open to external participation.

Quasi-static materials

The first FTA materials have been adapted from existing course books of the UOC's Master Degree in Free Software, translated from Spanish or Catalan into English and adapted to an international audience, and in some cases new content has been developed to complete them. Other materials are being planned using a similar process, where a single partner is in charge of the adaptation of an existing material. Completely new materials have also been produced this way for the FTA, either inhouse by one of the partners or by subcontracting external experts (see Figure 1).

This model allows the FTA to reuse existing high quality materials from partner universities and has the advantage of being simple to manage because it uses existing processes in the partner responsible of the material. However, it does not help to reduce the burden of maintaining these materials in the future.

Feedback cycle and open publication

The area of ICT is constantly changing and poses a moving target for the production and maintenance of educational resources. While some of the course materials used at the FTA age slowly and can be updated by the mere addition of new content, most of them need frequent revisions in order to prune and update obsolete information, cover new features in relevant applications and techniques, etc.

As a first step towards a more open process, the FTA is experimenting with a web-based document annotation tool (Van der Pol, n.d.) which allows users to comment on specific sections of a document. This will allow to centralise feedback from learners, tutors and external users in a single application, making it much easier for the FTA to review these comments for the next update of the resource (see Figure 2). This will help reduce the cost of maintenance of FTA materials, but still most of the effort will be carried out by the FTA.

Peer production

As a third step towards a collaborative process for the production of OER, the FTA is bringing together several interested actors in the joint production of course materials. While it does not constitute a fully open process, this model will allow the FTA to engage other parties in the whole process of developing a new course.

In this model, the FTA invites relevant experts and institutions on a particular field to participate in the development of a new course, including the authoring of course materials. The structure of the course is then discussed with the participants and the workload of developing the materials is distributed. The resulting OER are enriched by this discussion, and each participant invests only a fraction of the total resources (see Figure 3).

Shared exploitation, Network and Cooperation

The concrete implementation of the cooperation model in the FTA is presented in the following sections.

Shared Development and Exploitation

We apply the “shared R&D costs” model in order to set up an economically efficient educational programme. This takes place in two levels: a) open the FTA Campus to external users and enable participation as much as possible, and b) build a community of partners, universities, NGOs and companies who can add value to the network (Free Technology Academy, n.d. b).

Regarding the first part, the community of individuals, this can be seen as more than a conventional alumni network. A social network has been started as part of the FTA Campus, the FTA Community Portal, where alumni and external users can share experiences and discuss topics related to Free Technologies. However, in fact, part of the learning process itself is open: the FTA Campus Wiki, which is used in almost every FTA course to list interesting resources, summarise course outcomes and conduct group activities, is open to all users. External users also have access to Guest Lectures, and other activities will be made available for the general public in the coming months.

Regarding the second part, the partner network, the philosophy behind it is based on shared costs and shared revenues. It is expected that, due to the collaboration in the context of the FTA, partners can contribute to a set of common goals and benefit from the results of the collaboration, while each of them invests only a fraction of the overall effort. Partners join resources to execute the course programme and share the costs of development of additional courses, quality assurance and international recognition.

As mentioned above, the FTA performs a joint exploitation of the educational programme between its partners. In this sense, the FTA offers its partners various economical opportunities, such as sharing costs in the production and maintenance of a common curriculum, course materials

and a state-of-art study programme; a shared platform for joint communication to reach out to learners and potential staff; a virtual campus infrastructure that is jointly developed and maintained; and a common set of quality assurance and recognition procedures. At the same time, income generated by tuition fees and the sale of printed copies of course materials is also shared among FTA partners.

Revenue model

Drawing upon the lessons from Free Software, the FTA offers a "fully Free Knowledge" programme, compared to "fully Free Software" in the FLOSSmetrics research. Revenues are generated from educational services, which mainly refers to guidance during a course by a specialised tutor, continuous assessment and an FTA certificate which is recognised by partner universities. Currently, these three services are offered in one tuition fee per course module. Early registrations for courses are awarded with discounts. In addition to the revenue from tuition fees, the FTA partners have recently started to provide a Print-on- Demand (PoD) service to ship printed copies of digital course books to registered learners.

Conclusions and recommendations

The FTA aims to produce OER in a sustainable way, from both the social and the economic points of view. Some lessons can be drawn from the Free Software communities on how to reach sustainability without restricting users in their ability to participate and reuse the produced knowledge. The "fully free knowledge" model can be seen as a generalisation of "fully free software", providing the freedoms to use, study, copy and distribute all expressions of knowledge, be it software, scientific research, cultural works or educational resources. Revenues can be generated through services around the production of, which is true for free software as well as for open educational resources. The production of such free knowledge can be intra-firm, market-based and peer to peer.

The FTA project addresses the challenge of sustainability by incorporating this model into the cycle of OER development and offers a set of services around these educational materials to generate the necessary revenues. These services are mainly educational, with courses that are delivered on-line using the FTA campus: expert tutor guidance, assessment of learner activities and issuance of certificates for learners who have reached the learning objectives of a particular course. These certificates are recognised by the official educational programmes offered by the Higher Education institutions integrated in the FTA network. In addition, the FTA also offers a Print on Demand service which allows to obtain physical copies of the books.

For the production of OER we identify three important challenges: providing tools to enable feedback and updates, choosing document formats to facilitate authoring and distribution, and designing economically efficient practices for the open development of course materials.

For its master-level programme in Free Software and Open Standards, the FTA has published all its course books under copyleft licenses. The reuse of existing courses under free licenses has

provided an economic headstart. For the adaptation, maintenance and production of new materials a clear evolution in production processes is taking place. The production has moved from the traditional “intra-firm” model to a market-based model and is evolving into a peer production model. In that sense the FTA follows the Courses-as-seeds model where course materials are seeded into the study programme and learners, teachers and external experts contribute their feedback which in turn is taken into account in next versions. Such development cycle poses new challenges, like the need to facilitate it with adequate tools. The FTA has started to use a web- based annotation tool that allows users to add comments and suggestions right on to the (digital) course books, as well as a community portal where anyone can participate in the decisionmaking and development process. Stable versions of the resulting materials are considered “official” when they have been supervised and approved by a group of experts belonging to the Higher Education institutions which constitute the FTA consortium or its associate partners, in order to guarantee their scientific and academic correctness.

The FTA seeks effective cooperation through a growing network of partners, based on sharing costs and revenues. Advantages for the learners include a wider programme, specialists from different countries and realities as well as certificates that are recognised by partner universities.

The combination of practical and effective tools, open standard file formats and free licenses together with an open business model following the fully-free- knowledge model with educational services is believed to provide the foundations for sustainability. Ultimately, this depends on having a sufficient number of people enrolling its programme. With this model, which may be useful for other fields different from Free Software and Open Standards, the FTA tries to reach sustainable production of OER.

Figures

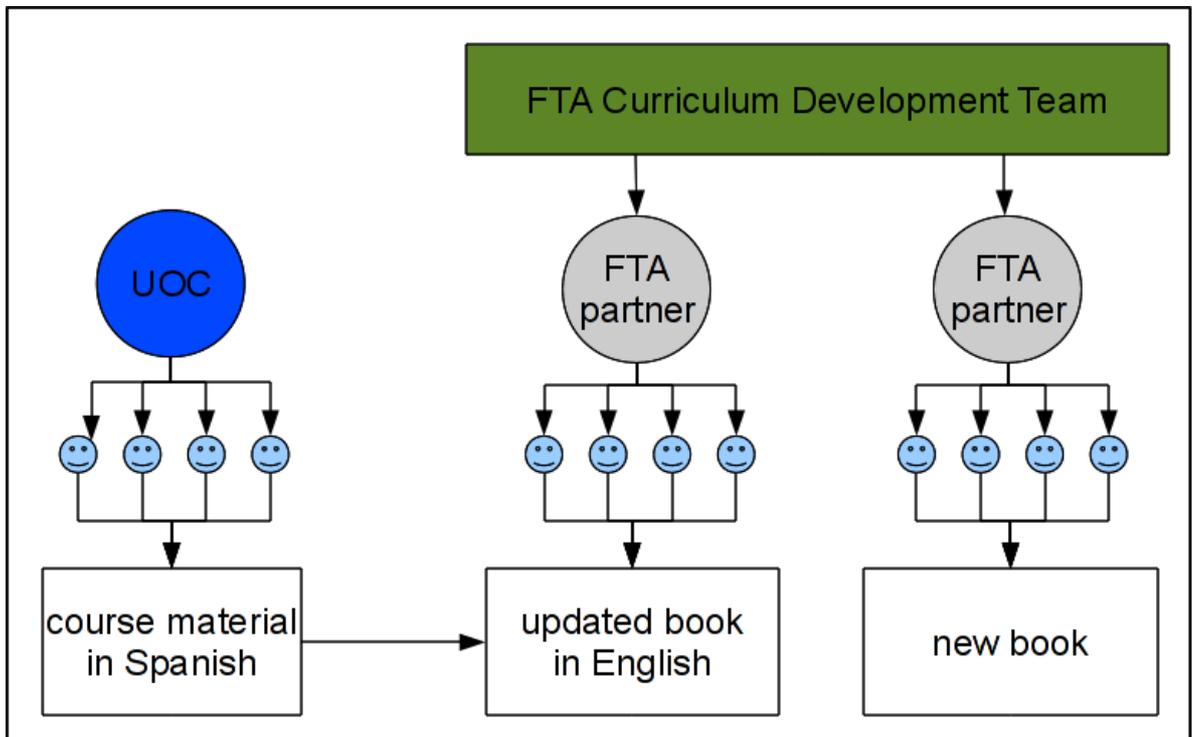


Figure 1. The first model of development of FTA materials is inherited from participating universities

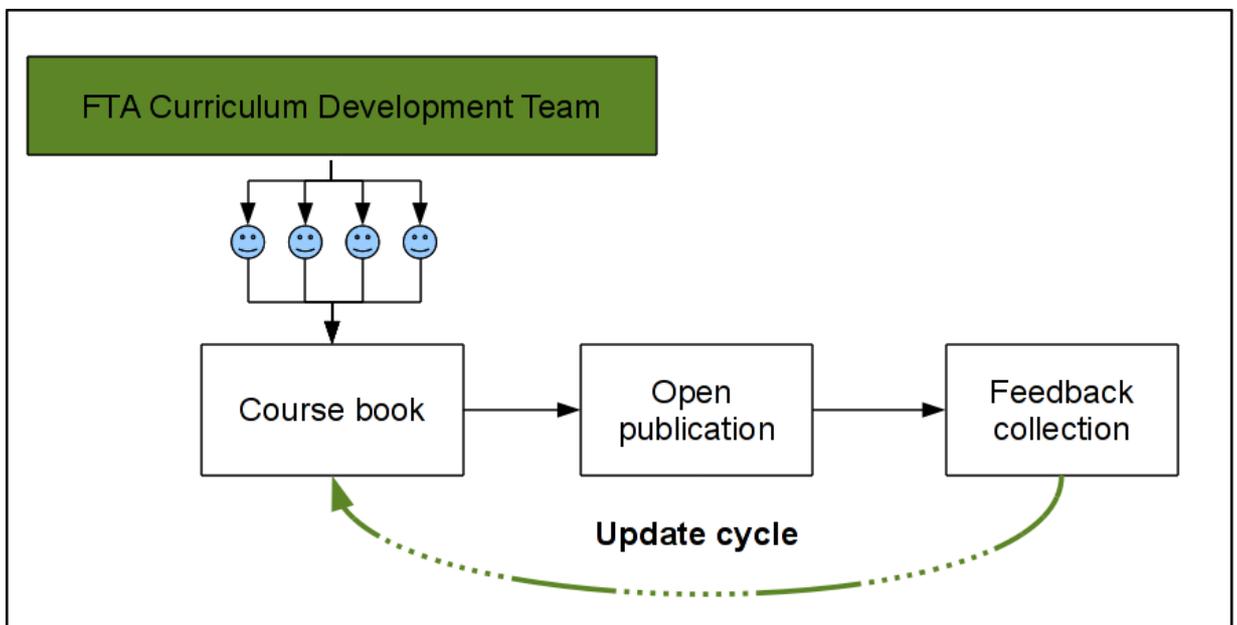


Figure 2: The second mode of development of FTA materials includes feedback mechanisms

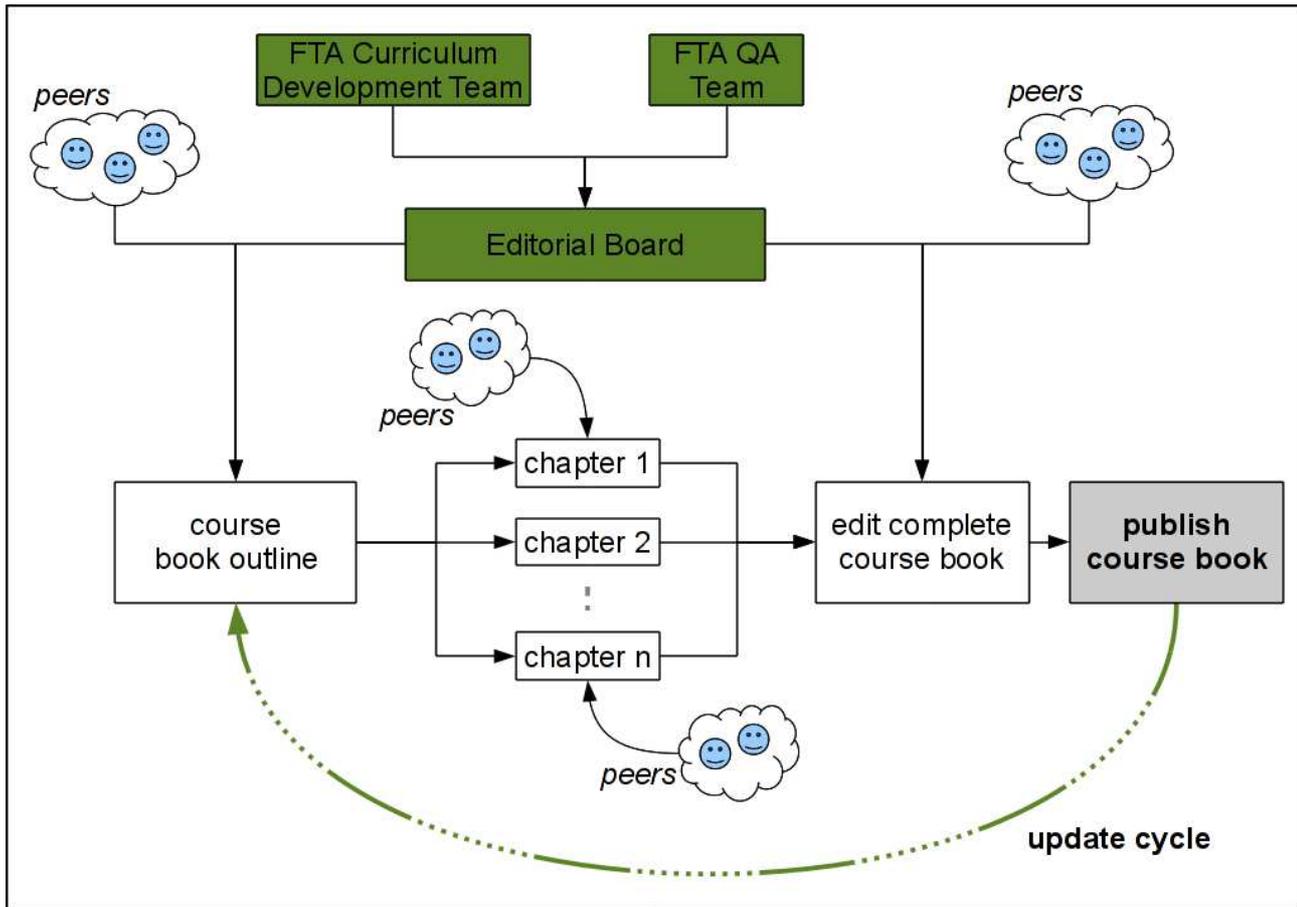


Figure 3: The P2P model includes the participation of interested actors

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