Software, copyright and the learning environment: an analysis of the IT contracts Swedish schools impose on their students and the implications for FOSS

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Abstract

Free and open source software (FOSS) is commonly made available to students in schools, but the schools do not necessarily take a holistic approach to their provision of IT (including software) which takes into account the nature of FOSS. In particular, we have identified a number of contracts with which Swedish students who are provided with laptops by their schools are required to comply which set out conditions for the use of the laptops, and associated software and content. Many clauses in these contracts are legally incompatible with certain FOSS licences, or contain misconceptions about FOSS, licensing and culture. This paper explores the relationship between the contracts and FOSS licensing and culture, and suggests a number of resolutions to the contradictions and misconceptions, as well as considering related issues.

Keywords

Law; information technology; Free and Open Source Software; schools and education; further restrictions; GPL; Sweden

1. Introduction

In recent years public sector schools have been exposed to and adapted to a number of societal and technological changes which impact on educational practices. One such change concerns adoption of IT, including a variety of different types of software and services, in educational activities in schools.

The use of IT (including software) in schools has received significant attention in many countries in a desire to gain positive pedagogical effects and prepare students for society and working life.¹

International Free and Open Source Software Law Review

1

¹ Balanskat, A., Blamire, R., Kefala, S. (2006) The ICT Impact Report: A review of studies of ICT impact on schools in Europe, European Schoolnet, 11 Dec.; Fleischer, H. (2012) What is our current understanding of one-to-one computer

Research shows that several public sector schools in different countries seek to achieve such pedagogical effects by provision of laptops and software to individual students, including compulsory schools (broadly ages 7-16) and upper secondary schools (broadly ages 16-19) in Sweden.²

There is previous research addressing use of Free and Open Source Software (FOSS³) at university⁴ and high school levels,⁵ and some research on provision of software under different licences in school contexts. For example, González-Martínez et al.⁶ presents a review of the use of cloud computing ('Software as a service' or 'SaaS') in schools. However, there is a lack of research on legal conditions for provision of FOSS to students in schools. With provision of FOSS in such a scenario, students, schools and municipalities are exposed to a number of regulations and rules related to the use of software and services and it is common that students and guardians are required to comply with conditions in contracts presented by the school. Many of these conditions are difficult to interpret.⁷

Exposure to and involvement in FOSS culture may make a significant contribution to skills development both in educational contexts but also more broadly. For example, previous research⁸ which involved data collection from "Swedish practitioners within companies known to be active users" of FOSS stressed active involvement in FOSS projects as a promoter of change with significant opportunities for learning. In fact, the study⁹ identified "skills development as an important outcome of participating", and several practitioners "also elaborated their experiences of being able to influence and expressed a sense of fun."

In a broader study aimed to establish the state of practice concerning IT usage in Swedish public sector schools with students of school age in Sweden (which starts in the year they turn 7 and ends

2

projects: A systematic narrative research review, Educational Research Review, Vol. 7, pp. 107-122. http://dx.doi.org/10.1016/j.edurev.2011.11.004; de Macedo Guimarães, L. B., Duarte Ribeiro, J. L., Echeveste, M. E. and de Jacques, J. J. (2013) A study of the use of the laptop XO in Brazilian pilot schools, Computers & Education, Vol. 69, pp. 263-273.; IES (2010) Teachers' Use of Educational technology in U.S. Public Schools: 2009, National Center for Education Statistics, NCES 2010-040, U.S. Department of Education, Washington, May.; Livingstone, S. (2012) Critical reflections on the benefits of ICT in education, Oxford Review of Education, Vol. 38(1), pp. 9-24. http://dx.doi.org/10.1080/03054985.2011.577938; Öman, A. and Svensson, L. (2015) Similar products different processes: Exploring the orchestration of digital resources in a primary school project, Computers & Education, Vol. 81, pp. 247-258. http://dx.doi.org/10.1016/j.compedu.2014.10.011

Hatakka, M., Andersson, A. and Gronlund, Å. (2013) Students' use of one to one laptops: a capability approach analysis, Information Technology & People, Vol. 26(1), pp. 94-112. http://dx.doi.org/10.1108/09593841311307169
 See continue of for more information about what constitutes (ECS2)

³ See section 4 for more information about what constitutes 'FOSS'

⁴ German, D. (2005) Experiences teaching a graduate course in Open Source Software Engineering, In Scotto, M. and Succi, G. (Eds.) Proceedings of the First International Conference on Open Source Systems, Genova, Italy, 11-15 Jul., pp. 326-328.; Kilamo, T. (2010) The Community Game: Learning Open Source Development Through Participatory Exercise, In Proceedings of the 14th International Academic MindTrek Conference: Envisioning Future Media Environments (MindTrek'10), Tampere, Finland, October 2010, ACM Press, pp. 55-60. http://dx.doi.org/10.1145/1930488.1930500; Lundell, B., Persson, A. and Lings, B. (2007) Learning Through Practical Involvement in the OSS Ecosystem: Experiences from a Masters Assignment. In Feller, J. et al. (Eds.), Open Source Development, Adoption and Innovation, Springer, Berlin, ISBN 978-0-387-72485-0, pp. 289-294. http://dx.doi.org/10.1007/978-0-387-72486-7_30

⁵ Lin, Y.-W. and Zini, E. (2008) Free/libre open source software implementations in schools: Evidence from the field and implications for the future, Computers & Education, Vol. 50(3), 1092-1102. http://dx.doi.org/10.1016/j.compedu.2006.11.001

⁶ González-Martínez, J. A., Bote-Lorenzo, M. L., Gómez-Sánchez, E. and Cano-Parra, R. (2015) Cloud computing and education: A state-of-the-art survey, Computers & Education, Vol. 80, pp. 132-151. http://dx.doi.org/10.1016/j.compedu.2014.08.017

⁷ Under Swedish law, the students, if they are under the age of 18, cannot be legally bound to the agreements. Breach of them is likely to be regarded as a breach of school rules rather than a legal matter. This does have some impact on 'further restrictions' which are outlawed by GPLv2 and GPLv3 licences – see below. In some cases, parents or guardians are required to sign, in which case, the contracts would be legally binding on those parents or guardians (assuming they themselves are adults).

⁸ Lundell, B., Lings, B. and Lindqvist, E. (2010) Open source in Swedish companies: where are we?, Information Systems Journal, Vol. 20(6), pp. 519-535. http://dx.doi.org/10.1111/j.1365-2575.2010.00348.x

⁹ Lundell et al. (2010) ibid., at page 529.

in the year in which they turn 19), an extensive data collection exercise was undertaken. The exercise included questions and requests for public documents from all public sector schools through data collection via each of the 290 municipalities in Sweden. As a number of schools and municipalities did not provide requested information, data collection continued with a long-term systematic effort to identify information about IT usage in schools. Information obtained included details on provision of software (including FOSS) and contracts related to IT usage in schools.

As part of the broader study, this paper presents new results on inconsistencies between FOSS licences and contracts applicable to students in Swedish schools governing their use of school IT ('school contracts'). Further, and in so doing, we highlight misconceptions concerning copyright. Specifically, results presented concern: a characterisation of FOSS licenses used in Swedish schools; a critical review of inconsistencies between FOSS licenses and school contracts; and an elaboration on implications and resolution of inconsistencies between FOSS licenses and school contracts, with an elaboration on misconceptions concerning copyright.

There are two main goals in the paper. First, we identify and characterise inconsistencies between the licenses applicable to FOSS provided in Swedish schools and the contracts to which students of those schools are required to adhere in order to use school-provided laptops. Second, we explain the legal implications of, and suggest a resolution of, identified inconsistencies. In so doing, we report on certain misconceptions some of which may contribute to and explain identified inconsistencies.

There are four research questions:

RQ1: Given that certain FOSS applications are provided to students in Swedish schools, which FOSS licenses apply to that provision and what characterises those FOSS licenses?

RQ2: Given that Swedish students' use of school laptops is governed by contracts issued by their school, to the extent that the terms of those contracts are inconsistent with the FOSS licenses applicable to FOSS applications identified as being provided in schools, what characterises these inconsistencies?

RQ3: Given that Swedish students' use of school laptops is governed by contracts issued by their school, to the extent that the terms of those contracts are inconsistent with the FOSS licenses applicable to FOSS applications provided in schools, what are the legal implications of identified inconsistencies and how can those inconsistencies be resolved?

RQ4: Given that Swedish students' use of school laptops is governed by contracts issued by their school, what misconceptions do those contracts contain about the effect of copyright and licensing both in relation to software and digital assets?

The rest of this paper is organised as follows. First, we provide a background on Swedish schools and provision of FOSS (2) followed by our research approach (3). Thereafter we characterise FOSS licenses used in Swedish schools (4), and characterise inconsistencies between FOSS licenses and school contracts (5). We report on implications and resolution of legal inconsistencies between FOSS licenses and school contracts (6) and elaborate on misconceptions concerning copyright, identifying, in addition, some related misconceptions concerning FOSS (7). Finally, we present our analysis (8), followed by discussion and conclusion (9).

2. Background

Research conducted in the Swedish public sector context notes¹⁰ that "Swedish schools have a relatively long history of computer use in schools and in recent years the IT focus has grown even

¹⁰ Hatakka, M., Andersson, A. and Gronlund, Å. (2013) Students' use of one to one laptops: a capability approach analysis, Information Technology & People, Vol. 26(1), pp. 94-112. http://dx.doi.org/10.1108/09593841311307169

stronger." It shows that besides pedagogical motivations there are also other reasons for why 1:1 laptops are provided to students in Swedish schools, one being the democratic perspective.¹¹

It has been found that provision of laptops and associated software may lead to undesired dependency on specific (proprietary) technology. Previous research from Swedish schools found¹² that the use of 1:1 laptops in primary schools identified negative outcomes for some students and with the introduction of 1:1 laptops in school previous research identified that in "many cases the students also lost the choice not to use the laptop". Hence, students may implicitly become "locked-in" to the use of laptops and the software provided to them.

Openness and transparency have been recurring themes in communication and public speeches from representatives for the Swedish government for a number of years. For example, in its 2004 IT bill (2004/05:175), the Swedish government declared that the use of Open Standards and OSS should be promoted.¹³ Further, in a public speech during the Swedish EU presidency, the responsible minister presented the Swedish position on the importance of openness in the public sector and in so doing stressed the importance of open source and open standards.¹⁴

In the Swedish context, it should be noted that students in an educational context cannot be expected or required to buy (or pay to rent) specific technology when studying in Swedish public schools. In fact, the Swedish Schools' Inspectorate¹⁵ examines an important principle for education in Sweden, namely that "education shall be free of charge", and clarifies that the cost of calculators used in public sector schools and costs related to use and insurance of laptops provided to students for use at school and at home cannot be charged for. However, a small fee (approx. $\in 10$) can be accepted on an occasional basis, such as for costs related to a school trip involving outdoor activities.

Previous research in the Swedish school context identified¹⁶ that "Education is also a goldmine for hardware and software manufacturers who compete with each other to generate sales of their products." Further, it was noted¹⁷ that "Because schools' investment in computers is so massive, it is easy to understand why Apple, Dell, HP and others compete in order to win contracts with schools."

It has been shown¹⁸ that students' use of laptops and software is regulated by "softer measures such as rules and contracts between the school, the students, and the parents/guardians."

Before software and services provided by external suppliers are adopted for use in public sector organisations, such as schools, it is recommended that a risk assessment is undertaken. Such an assessment needs to take into account potential impacts on both the acquiring organisation and also on individuals affected by software and services used in the organisation. To support such an assessment, specific guidelines have been established for use by Swedish public sector organisations.¹⁹ These guidelines stress the importance of reviewing contracts and conditions for

 $http://www.edelegationen.se/Documents/Vagledningar\%20mm/Riktlinjer_sociala_medier_v1_0.pdf$

¹¹ Hatakka et al. (2013) ibid.

¹² Hatakka et al. (2013) ibid., at page 108.

¹³ Regeringskansliet (2005) From an IT policy for society to a policy for the information society: Summary of the Swedish Government Bill 2004/05:175, Ministry of Industry, Employment and Communications, Sweden, Regeringskansliet, September.

¹⁴ Odell, M. (2009) Innovations for Europe: Increasing Public Value, Public Speech at: 'European Public Sector Award', Maastricht, 5 Nov.

¹⁵ Skolinspektionen (2011) Avgifter i skolan, Informationsblad, Skolinspektionen, 7 Dec., http://www.skolinspektionen.se/Documents/vagledning/infoblad-avgifter.pdf

¹⁶ Fleischer, H. (2012) ibid., at page 120.

¹⁷ Fleischer, H. (2012) ibid., at page 120.

¹⁸ See page 45 in: Andersson, A., Hatakka, M., Grönlund, Å and Wiklund, M. (2014) Reclaiming the students - coping with social media in 1:1 schools, Learning, Media and Technology, Vol. 39(1), pp. 37-52. http://dx.doi.org/10.1080/17439884.2012.756518

¹⁹ See page 20 in: E-delegationen (2010) Myndigheters användning av sociala medier, Riktlinjer från E-delegationen, Version 1.0, 30 December (in Swedish),

use of services provided by external suppliers before their use in a public sector organisation. In a public sector school context, this review must consider the perspective of its users, and thereby include assessment of conditions for teachers and students. Such risk assessment of contracts is particularly important for Swedish governmental agencies and public sector schools in situations when these organisations use social media and services provided by external suppliers which are based outside the EU.²⁰

3. Research approach

To address the goals in this paper, a set of contracts used in Swedish public sector schools was obtained together with associated information concerning provision of software (including, in some cases, SaaS). The contracts and information were collected as part of the broader study: collected data from the broader study of relevance for this paper includes details on provision of software (including FOSS) and contracts related to IT usage in schools.

Contracts were identified and collected from the broader study in order to identify potential issues that may arise in deployment of FOSS in municipalities which provide laptops to students. Initial analysis of collected contracts identified which signatories are required. Almost all schools require that both students and their guardian(s) sign the contract (which may be unsurprising given that students younger than 18 cannot be legally bound by contracts under Swedish law.²¹ The study also considers contracts which either only the student or the guardian(s) needed to sign. Some schools use contracts which two guardians are required to sign.²²

School contracts used in municipalities (including both those municipalities that provide and do not provide FOSS) were initially interpreted holistically in order to obtain an initial impression of potential issues. This was done with a view to identifying a relevant approach for analysis of statements and contract terms.

Several approaches for coding and analysis were considered, leading to the emergence of the four freedoms as an appropriate framework for categorisation of statements in the contracts. The 'four freedoms' define what constitutes a free software licence according to the Free Software Foundation.²³ Contract statements were filtered and coded accordingly. As the coding progressed, supplementary categories were introduced to cover issues concerning perceptions of copyright in contract statements, with a view to disclosing potential misconceptions and attitudes relating to copyright (whether more or less supportive of FOSS culture). Specific statements in contracts were reviewed and validated from a legal perspective, at which point it became clear that there is a mapping amongst the four freedoms, and the exclusive economic rights reserved to copyright owners by the Computer Programs Directive²⁴ (and, in the case of other digital assets, by the Copyright Directive²⁵).

The scope of FOSS licences reviewed was determined by reference to the FOSS applications that were identified as being provided in schools as established in the broader study.

4. Characterisation of FOSS licenses used in Swedish schools

So-called 'free' software licences are licences which provide the recipient of code²⁶ licensed under

²⁰ SOU (2010) Så enkelt som möjligt för så många som möjligt: Under konstruktion – framtidens e-förvaltning,

Betänkande från E-delegationen, Statens Offentliga Utredningar, SOU 2010:62, Stockholm, ISBN 978-91-38-23440-2. 21 See footnote 7 above.

²² It is not clear what is supposed to happen if a student only has one guardian.

²³ See below for a brief introduction to the genesis of the four freedoms.

²⁴ Computer Programs directive 2009/24/EC

²⁵ Copyright Directive 2001/29/EC

^{26 &#}x27;Code', meaning software code, is traditionally divided into source code and object code. The source code is the

them with unrestricted rights under the four freedoms mentioned above. They are freedoms to (0^{27}) use the software, (1) study and modify the software, (2) distribute the software and (3) distribute modifications to third parties. 'Open source' software licences provide similar rights to recipients of open source software, as defined by ten criteria (the 'Open Source definition') published by the Open Source Initiative²⁸ (OSI). With few exceptions (not relevant to this paper), software released under a Free Software Licence will also meet the OSI criteria, and vice versa, hence the term FOSS ('Free and Open Source Software').

FOSS differs significantly from proprietary software (sometimes mistakenly called 'commercial software') in that its licence terms emphasise freedoms rather than restrictions. The preamble to a common FOSS licence (the GNU General Public License (v3)) states:

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program – to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. You can apply it to your programs, too.

Someone who receives software licensed to them under a FOSS licence is, by that licence, granted the right to exercise the four freedoms. If they distribute²⁹ the software to a third party, they may or must (depending on the original licence) also grant that third party the right to exercise the four freedoms in respect of that software.

Hence, FOSS licences may be placed into two broad categories: copyleft,³⁰ sometimes called 'reciprocal' or 'sharealike',³¹ which requires an onward recipient to receive the software under a licence preserving the four freedoms, and permissive, sometimes called 'academic', which allows the software to be passed on under a different, possibly non-FOSS, licence.³²

Where FOSS is made available under a copyleft licence, if it is distributed, it is a condition of the copyleft licence that the distributed code must be distributed under the same (or, in some cases, a specified compatible) licence. If FOSS is made available under a permissive licence, there is no such obligation, and the FOSS may be redistributed under any licence (albeit that there may be some requirements involving the retention of attribution notices and disclaimers).

International Free and Open Source Software Law Review

6

human-readable text in which software is written, modified and debugged. In a compiled computer language (like C+ +), the source code is converted (on the programmer's computer) into the software the computer can run – the object code – using a suite of software called a toolchain, a significant component of which is the compiler. Some computer languages (such as Python and JavaScript) are 'interpreted' meaning that the source code can be run directly on the enduser's computer without being compiled, provided that there is an appropriate interpreter installed on that computer (almost all web browsers will have a javascript interpreter installed, for example). 'Executable' means the code which can run on the computer – which may be object code or source code depending on the language. The distinction between source and object is significant in terms of FOSS licensing because many licences make the distinction (and were drafted before interpreted languages became common, which in itself creates a raft of issues outside the scope of this paper).

²⁷ As an organisation founded by a computer software engineer, the Free Software Foundation favours starting the list with zero.

²⁸ Open Source Initiative: http://opensource.org/osd-annotated

²⁹ The word 'distribute' has a specific meaning in copyright law. This is discussed below.

³⁰ Copyleft is a play on the word 'copyright' and is a mechanism, dependent on copyright law to work, which makes it a condition of a copyright licence for the licensee, on distributing copyleft software or any modifications to it, to make the source code to the software and modifications available under the same licence.

³¹ Or 'viral' or 'cancerous'

³² The openness of software is dependent on the licence, not on the code. Thus a person can receive the Apache Web Server under the Apache 2.0 License (which is a permissive licence), as FOSS, and (because the Apache licence allows this) pass exactly the same code on to a third party under a different, non-FOSS licence. In the hands of the final recipient, the software is not FOSS, even though it's exactly the same code which was received under a FOSS licence. Copyleft licences are designed to prevent this from happening.

Where a school distributes³³ FOSS to students and that software is governed by a copyleft licence, the school will only be compliant with that copyleft licence where it redistributes the FOSS to students under the same (or a compatible) licence. The consequence of this is that the licence received by the students for copyleft FOSS will be a licence which guarantees the four freedoms. At the same time, students are required to enter into an agreement³⁴ with the school which requires them to comply with certain obligations relating to computing in general, but also concerning the laptops with which the school provides them, and the software which is, and may be, installed on the laptops. (Further, some municipalities provide access to applications on a SaaS basis. This would require the student to enter into a further agreement with the SaaS provider. Analysis of such contracts is generally beyond the scope of this paper, although we make some observations in section 8).

Those contracts may (possibly as an unintended consequence) have the effect of limiting the scope of the FOSS licences under which the students have received the software. This is an issue which potentially affects all software which is made available under copyleft FOSS licences. However, some licences, notably the various versions of the GNU General Public License (GPL), for example (GPLv3) and GNU Lesser General Public License (LGPL) contain wording specifically preventing the imposition of further restrictions:

You may not impose any further restrictions on the exercise of the rights granted or affirmed under this License³⁵.

The effect of this is two-fold. A recipient of GPL code will be licensed to use, modify and distribute that code under the GPL without being bound by any further restrictions³⁶, and the school, where it distributes GPL code in a way which attempts to impose additional restrictions, will itself be in breach of the GPL in respect of that code. Consequently, it would lose its own licence to use that code (subject to specific cure provisions in GPLv3³⁷).

The issues arising from the attempted imposition of further restrictions on the FOSS licence do not arise with FOSS licensed under permissive licences. The extent to which they apply to other licences provided under copyleft licences other than the GPL depends on a careful reading of the individual licences, and even then is a matter of debate which is outside the scope of this paper.

We have established that FOSS is provided to students by the schools under a number of licences including the following³⁸:

- GPLv2 (or any later version)
- GPLv3
- GPLv3 (or any later version)
- Mozilla Public License v2 (MPLv2)
- Apache v2
- Eclipse Public License v1 (EPLv1)
- LGPLv2.1

^{33 &#}x27;distribute' is a term of art in copyright law, and its significance is covered below

³⁴ There are three different mechanisms varying from school to school: sometimes the student signs, sometimes the guardian signs, and sometimes both. If the student is under 18 years, there is a question (not investigated in this paper) under Swedish law of the enforceability of the contract.

³⁵ GPLv3, section 10 (part)

³⁶ See GPLv3 section 7, para 4. This is not explicitly stated in GPLv2, but is implied.

³⁷ GPLv3, section 8

³⁸ The licences listed are those applicable to the software reported to be used at the time the data was collected. Some projects may have relicensed in the interim and we have no data about whether the schools are using the relicensed versions.

- LGPLv2.1 (or any later version)
- LGPLv3
- LGPLv2.1 with UNRAR exception

Those with a copyleft effect which would grant the students the unrestricted right to use, study, modify and redistribute the code received under it, including a right to receive the source code are:

- GPL (all versions)
- LGPL (all versions)

Those without a copyleft effect so far as distribution of unamended object code is concerned (and which therefore do not give rise to any direct issues of compatibility between the licence and the school contract³⁹) are:

- Apache v2
- Mozilla Public License v2 (MPLv2)⁴⁰
- Eclipse Public License v1 (EPLv1)⁴¹

5. Characterization of conflicts between school contracts and FOSS licences

In addition to the legal concerns arising from an incompatibility between the FOSS licence and the contract, there remains the issue that many of the contracts reveal a degree of incompatibility in philosophy: where the students are provided with FOSS is it clear that the software's authors intended that the software was to be made available in a way which respected the FOSS freedoms, whereas, many of the terms in the contracts attempt to impose restrictions which conflict with that intention.

5.1. On inconsistencies with FOSS Culture

A number of well known applications are available under FOSS licences, and are associated with the free and open source movements. It would therefore be reasonable for students receiving such applications on their school laptops to assume that they may be able to exercise the four freedoms in respect of them.

A number of school contracts contain clauses which have the effect of limiting one or more of the four freedoms. Irrespective of whether those clauses cause legal issues in relation to the original FOSS licence (which we consider below), they do, at the very least, conflict with the culture of FOSS.

It is no accident that the concept of 'free software' was born in an academic environment. It has

³⁹ That is not to say that the school may not otherwise be in breach of licence terms: for example, by failing to provide the appropriate notices and attribution required by the licence (such as the NOTICE file required to be provided with distributions of Apache software). This issue is outside the scope of this paper. We further assume that the school is not amending the software prior to distribution – for example, it is distributing the installation package or the installed executables of Firefox as provided by Mozilla.

⁴⁰ Mozilla Public License v2 falls within a subset of copyleft licences which treat source code and object code differently: source code files are subject to full copyleft, and if distributed, must be distributed under MPLv2 (or, in some cases, another copyleft licence). The executable object code files, however, may be distributed under any licence and use may therefore be restricted. Anyone receiving the object code is entitled to receive a copy of the source (which must be under the original MPLv2 or, optionally, a similar compatible licence).

⁴¹ Eclipse Public License v1 is similar to MPLv2 in that the object code may be relicensed under a different licence, but the corresponding source must be made available under the original EPLv1.

been well-reported⁴² that Richard Stallman, the founder of the Free Software Foundation and the GNU project, developed his ideas of 'free software' while at MIT. The catalyst was the frustration arising from his inability to hack⁴³ a printer's driver software owing to the refusal by its supplier to provide the source code of that software. He had hacked similar software many times before: in those cases, the source code had always been available. In academia, there was an assumption that code would always be available to enable anyone to review, modify and share. It was an unwelcome revelation to Stallman that commercial entities (frequently) wished to restrict these freedoms, for commercial gain, in direct challenge to the academic norms, and in consequence the Free Software movement was born.

In academia, unrestricted access to knowledge and information is prized. The Free Software movement regards software as knowledge and information, and works to ensure that free access to computer software is similarly encouraged.⁴⁴ Schools' culture, as a subset of academia, similarly prizes access to knowledge and information. The schools contracts, therefore, to the extent that they have the effect of restricting use, analysis and sharing of software, are in opposition to this norm and are not conducive to fostering a learning environment which encourages exploration, interaction and collaboration (essentially, 'hacking' in the Stallman sense⁴⁵). This is exacerbated when it is considered that the contracts go further and may restrict use, analysis and sharing of other digital assets, such as text, music and images which may have similar pedagogical value.

5.2. Legal inconsistencies - classification of contract clauses

We classified clauses by determining whether they impinged upon each of the four freedoms. During such classification, it became clear that these were related to the bundle of exclusive economic rights reserved to the copyright owner (of software) by virtue of copyright law. Those rights are (1) copying; (2) modification and (3) distribution. The interaction can be shown in the following matrix (an 'x' in the box showing that, for the freedom indicated by the row containing the x, copyright licences covering the restricted acts in the marked columns are required, see table 1).

⁴² http://www.oreilly.com/openbook/freedom/ch01.html

⁴³ In Stallman's terminology, a 'hacker' is a programming expert who takes a playful, skilled and often oblique approach to solving software problems, possibly in a way that the original author never intended or envisaged, but it has no negative connotations associated with unauthorised access to systems, vandalism or copyright infringement. The term 'hack' is construed accordingly.

⁴⁴ So, a permissive, or 'academic' licence, described above, encapsulates the idea of granting the widest possible rights to recipients of the software, to use, modify and share the software, in tune with these norms.

⁴⁵ GPLv3, section 8

	Copying (reproduction right ⁴⁶)	Modification (translation, adaptation etc.47)	Distribution ⁴⁸
F0: Run ⁴⁹	X		
F1: Study and modify	X	x	
F2: Redistribute	x ⁵⁰		X
F3: Redistribute modifications	X	X	X

Table 1: Relationship between freedoms and exclusive rights reserved to the copyright owner.

The classification we have adopted follows the four freedoms, but in determining their legal effect, we have also borne in mind the categories of acts restricted by copyright. The three categories referred to above are derived from the Computer Programs Directive. Since the restrictions contained in the schools' contracts also, in certain cases, cover digital assets other than computer programs, we also, where appropriate, refer to the additional right of 'communicating to the public', derived from the Copyright Directive which may encompass rights such as performance of a play or a piece of music.⁵¹

5.3. 5.3 Review of contract clauses

We reviewed each contract, and extracted (and translated into English) those clauses which we determined to have an impact on any one or more of the four freedoms. In a number of cases the same (or a very similar) clause was found across more than one contract, in which case we have only commented once. Footnote 58 explains the referencing methodology further.

The contract clauses below are not an exhaustive list, but illustrative of relevant issues contained in the contracts.

Freedom 0: The freedom to run the program as you wish, for any purpose:

Restrictions here include limitations on use for particular activities:

A pupil who borrows a computer for his/her studies in school district C [primary/secondary school] may only use it to study. Unless the computer is being used for study, it should immediately be returned to the school [U1].⁵²

The equipment [hardware and software] must not be used for commercial purposes [U2].

⁴⁶ Computer Programs directive 2009/24/EC, Art. 4.1(a)

⁴⁷ Computer Programs directive 2009/24/EC, Art. 4.1(b)

⁴⁸ Computer Programs directive 2009/24/EC, Art. 4.1(c)

⁴⁹ There is an argument that if software is run on a SaaS basis, it may be being 'communicated to the public'. 'Communication to the public', while a restricted act under 2001/29/EC (Copyright Directive) is not specifically referred to in the Computer Programs Directive. van Eechoud (Harmonizing European Copyright Law: the Challenges of Better Lawmaking) argues that, by analogy with the Database Directive, the exclusive right of controlling communication to the public is not applicable to software. However, it will be applicable to other forms of copyright work.

⁵⁰ Theoretically, someone could take a copy of software they had received (on a CD for example) and redistribute it by passing the physical data carrier on: in this case, no copying will have taken place. In practice, this is becoming an increasingly rare mode of distributing software.

⁵¹ Copyright Directive Art. 3 2001/29/EC Art 3

^{52 [}U1] is a key to the relevant entry in the grid in the appendix, containing the original Swedish. Each contract extract in this paper is accompanied by a corresponding key.

The computer equipment must not be used in any commercial context, i.e. where the computer is used for any computing activities with a view to monetary gain [U3].

The computer may only be used for education [U4].

In addition to potentially conflicting with Freedom 0 in relation to the use of software, these restrictions may further directly contradict activities that schools frequently carry out: for example, schools may encourage students to start small businesses, or undertake activities which tie in directly with their academic studies, such as making and performing music (these restrictions will, naturally, impinge on both FOSS and proprietary software).

Use restrictions may also extend to restrictions on use in particular locations:

Copying or using the school's software outside school is not permitted [U5].53

The ... child ... has the right to make use of the computer [only] at school and in their own home [U6].

Aside from FOSS compliance issues, this latter restriction seems to have the (presumably) unintended consequence that the student cannot use the computer when away from home on holiday, in the local library, or when studying with a friend at his or her house.

These restrictions also highlight another issue, to which we return: is the restriction on the use of the hardware itself, or on the use of the software? This is particularly relevant when we consider whether the schools' contracts may be in legal conflict with the terms of the licences.

Freedom 1: The freedom to study how the program works, and change it:

Several contracts contain clauses which seek to restrain the students' right to modify the software:

Installed software may not be uninstalled and it is not permitted to install other software [M1].⁵⁴

Interestingly, some of them contain a justification for this:

The programs contained in the computer's default configuration may not be uninstalled since they are required for schoolwork [M2].

The software included in the computer's default installation may not be modified or uninstalled. It has been carefully selected to be used for school work and teachers will assume that all pupils with a personal computer also have access to this software [M3].

Freedoms 2 and 3: the freedom to copy and redistribute software, including modified copies:

Copying and redistribution are also prohibited in a number of contracts.

As well as prohibiting copying, the following extract also prohibits installation on computers belonging to other people (distribution).

It is also prohibited to copy the software on your computer and install it on other computers (e.g. at home) unless the school has given permission to do so [D1].

⁵³ At the time of writing the paper, the municipality reported only making proprietary software available. However, this does not mean that the relevant schools may not seek to provide FOSS under these rules in the future. Note also that, as in the English translation, the original Swedish is equally ambiguous as to whether this means 'outside the context of school-related activities' or 'outside the physical school premises'. We assume, from the context, that, since the students are expected to take the laptops home, that the former interpretation is intended.

⁵⁴ We do not regard a restriction on installation as a restriction on the software (so of relevance to FOSS licensing and the four freedoms), but as a restriction on hardware. Uninstallation, however, does modify the software, and is therefore a relevant restriction.

This clause prohibits both modification and distribution:

The pupil may not tamper with or distribute the software that the school provides [D2].

This clause prevents distribution:

File-sharing of copyrighted materials is prohibited at all times [D3].

The following clause is interesting: it acknowledges that the student has control over his/her computer, by confirming their administrator status. However, it only allows the software to be copied onto other computers with the school's permission: to require the school's permission to distribute GPL software licensed to the student is a further restriction.

You are a local administrator on your computer which means that you can install software on your computer. Hence, you are also responsible for ensuring that only software with valid licenses is installed on your computer. Copying the software on your computer and installing it on other computers (e.g. at home) is also prohibited unless the school has given permission to do so [D4].

6. Implications and resolution of legal inconsistencies between FOSS licenses and school contracts

In this section we analyse the implications of the identified inconsistencies, and suggest a possible resolution. To understand some of the legal reasoning, it is important to understand the meaning of the term 'distribute' as it is understood in copyright law.

6.1. On 'distribution'

The GPL family of licences⁵⁵ imposes specific conditions on a school when it distributes the software to the students. 'Distribute' is a specific term of art, and is defined with reference to copyright law, not the language of the GPL. GPLv2 (and LGPLv2.1) explicitly use the word 'distribute'. GPLv3 (and LGPLv3) use the words 'conveying' and 'propagating', but explain that 'conveying' includes distribution where a third party can make and receive a copy.

If the student gains access to the software without a legal distribution having taken place, the school will not have violated the relevant GPL licence. This is not so far-fetched as it seems: many web services are based on the service provider operating modified GPL software, in the understanding that although the end-user is able to benefit from the use of the software, the software is not actually distributed to them.⁵⁶ This is known as a SaaS (software as a service) model. By way of example, Google provides applications such as Google Docs and Gmail. These applications run on Google's servers and the end-user is given access to them through a webbrowser. The end-user has access to the applications' functionality, but not the underlying code which runs on Google's servers, under Google's control, at all times. Accordingly, no distribution has taken place,⁵⁷ and Google would be able to use modified GPL-licensed software to provide the applications, without being required to make the source available and license the modifications

⁵⁵ With the exception of the Affero GPL licences, which expand on the definition of 'distribute' somewhat. None of the schools reported providing any software released under Affero GPL.

⁵⁶ This has been characterised by some as a flaw in the GPL, and described as the 'ASP loophole', [https://www.fsf.org/blogs/licensing/2007-03-29-gplv3-saas] hence the introduction of the Affero GPL. Miriam Ballhausen Ballhausen, 2014 (http://www.ifosslr.org/ifosslr/article/view/103) has argued that under German Law, use of GPL code, even in an ASP model, could trigger the requirement to release the source. We do not consider that argument further, although initial discussions with Swedish counsel suggest it would not apply under Swedish Law.

⁵⁷ This analysis is slightly over-simplified: many SaaS applications do distribute portions of code, often JavaScript, for running on the user's computer, in the browser. To the extent that such distribution occurs, the licensor would have to comply with the relevant clauses of the underlying software licence.

under the corresponding version of the GPL.

It is not immediately clear that if the school loads software onto a laptop, and then lends that laptop to a student (so that the school retains ownership of the laptop), that there has been a distribution in the legal sense (so the school retains the licence itself, and is merely allowing the student to access the functionality of the software). It is also worth noting that, a number of municipalities have taken an initiative to form a separate entity to facilitate the administration of school laptops (possibly among other functions). The separate entity will generally purchase the laptops, lend them to the students, and may also be responsible for loading the software. Finally, another model involves municipalities signing a contract with a separate supplier, and that supplier installs the software and provides the laptops to the students.

Of the three models above, the final two appear to present a greater opportunity for distribution to take place (and hence the copyleft provisions of the GPL to apply).

A complex legal analysis to determine whether distribution has taken place is beyond the scope of this paper, but it is clear that there is a spectrum of use cases with a varying likelihood that distribution has occurred at law.⁵⁸

6.2. Legal Implications of inconsistencies

A number of the restrictions contained in the schools' contracts potentially cause legal issues for the schools concerned. As we have seen the contracts, where they are signed by under-18s, are unenforceable under Swedish law. We contend, however, that, even if this is the case, a failure to comply with the contracts may, *in extremis*, result in disciplinary sanctions being applied against the student, and that they still have the effect of 'further restrictions' under the GPL licences.⁵⁹

We have seen that a number of the schools in question deploy FOSS. On the assumption that those items of FOSS are installed by the school onto laptops which are then given to students, to the extent that the school is distributing the software (in the legal sense), the school will be required to comply with the relevant FOSS licence when distributing to the student. If the relevant licence is part of the GPL family for example, the school is not permitted to apply additional or further restrictions to any recipient's licence to the software. A practical example would be GIMP (an image manipulation tool with similar functionality to Photoshop⁶⁰ and is released under GPLv3 or any later version⁶¹).

The municipality which uses the following statement in its contract also provides GIMP:

Copying the software on the computer and installing it on other computers (e.g. at home) is also prohibited unless the teacher/system administrator has given written permission for it [C1].

The school itself receives the software under GPLv3 or any later version, so in order to comply with its terms when distributing the software to the student, the school has also to make the software available under that licence, crucially, without imposing any additional restrictions. Section 10, GPLv3, states:

You may not impose any further restrictions on the exercise of the rights granted or affirmed under this License

⁵⁸ There are European Court Cases which suggest that distribution of software can only occur when there is an accompanying transfer of a physical item: Peek & Cloppenburg KG v Cassina SpA Case C-456/06. This doctrine does pose a difficulty for software licensing within virtual machines (VMs) and when downloaded. This issue is outside the scope of this paper, but see also UsedSoft GmbH v Oracle International Corp (C-128/11)

⁵⁹ It is clear from the examples of further restrictions given by the Free Software Foundation, that they did not solely have enforceable contractual obligations in mind. http://www.gnu.org/licenses/gpl-faq.html

⁶⁰ Proprietary software provided by Adobe Systems Incorporated

⁶¹ Since GPLv3 is the current version of GPL, the analysis can, at the date of writing, only be undertaken under GPLv3

If the school distributes GIMP to students (in the terminology of GPLv3, 'conveys'), and in doing so, applies a restriction which seeks to limit the student's right to copy the software:

...You may ... propagate covered works ... without conditions... (GPLv3, Section 0)

where:

... Propagation includes copying... (GPLv3, Section 2)

by imposing a further restriction on a recipient's exercise of rights under GPLv3, the school would itself be in breach of GPLv3 if it makes such a distribution. The effect of this is two-fold. First, the school itself would be in breach of copyright by making an unauthorised distribution of the software⁶². Second, the school is in danger of losing its own licence to GIMP:

You may not propagate or modify a covered work except as expressly provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License [...further provisions allowing reinstatement in certain circumstances if the violation ceases]. (GPLv3, Section 8)

A similar example is Audacity, a sound recording and manipulation program, licensed under GPLv2. A municipality which has reported its schools using Audacity also places in its student contract the following:

The programs contained in the computer's default configuration may not be uninstalled since they are required for schoolwork [M2].

The analysis here is similar, but not identical to the GIMP/GPLv3 analysis.

The school obtains Audacity under GPLv2. GPLv2 provides that:

You may not impose any further restrictions on the recipients' exercise of the rights granted herein. 63

If the school distributes Audacity to students, a restriction on uninstalling (modifying) Audacity will be a further restriction under the school's licence to use Audacity. The school is therefore in breach of its own licence to use Audacity.

6.3. Partially resolved inconsistencies

In this subsection we highlight examples of clauses where contracts go some way to addressing potential inconsistencies.

Some schools only prohibit actions impinging on the four freedoms where that activity is unauthorised:

It is forbidden and a criminal act to copy software that is protected by copyright without authorisation [A1].

Some schools acknowledge that only appropriately licensed software may be used:

It is not allowed to install software for which you do not have valid licenses⁶⁴ [A2].

Some schools (try) to recognise that the model for licensing free software is different:

It is forbidden by law to copy the software, any violation will be prosecuted.

⁶² This does not adversely affect any rights the student receives: GPLv3, section 7.

⁶³ GPLv2 Section 6

⁶⁴ This does not admit that, in theory, it is possible to use software which is covered by a copyright exception or is in the public domain, but see footnotes 73 and 76.

Shareware and Freeware is not covered by this [C2].

Note the last sentence: we will charitably assume that the school meant 'free software' (in the sense understood by the Free Software Foundation) by using the term 'Freeware' (the specific term 'Freeware' is used as written in the original Swedish wording).

6.4. Resolution of inconsistencies

The most comprehensive way to resolve all inconsistencies (including those of culture) will be for the municipalities to review the contract(s) they have with the students, and ensure that:

- 1. They correctly characterise copyright, and avoid the assumption that all copyright materials (both FOSS and other digital asset) are not able to be copied (used or distributed); and
- 2. They acknowledge that free and open source software can have pedagogical benefits over and above its use as an application: namely that by studying, modifying, copying and sharing the code the student can gain a deeper understanding of software, its design, development and applications; and
- 3. They appropriately deal with restrictions which impinge on FOSS licences, ensuring that no conflicts remain.

Examples of recasting problematic clauses in a more acceptable fashion are presented in table 2.

Ref	Original Wording	Suggested Improvement
M3	The software included in the computer's default installation may not be modified or uninstalled. It has been carefully selected to be used for school work and teachers will assume that all pupils with a personal computer also have access to this software.	The software included in the computer's default installation may not be modified or uninstalled unless the specific licence applicable to that software permits you to do so. However, since the software has been carefully selected to be used for school work, teachers will assume that all pupils with a personal computer also have access to this software in its original configuration. Modifying or uninstalling the software may make it difficult or impossible to complete the course. Where you do want to modify the software, and the licence allows you to do so, we suggest you make a separate copy of it and modify that, leaving the original version available for use in your studies.
U3	The computer equipment must not be used in any commercial context, i.e. where the computer is used in any computing activities with a view to monetary gain.	The computer equipment must not be used in any commercial context, i.e. where the computer is used in any computing activities with a view to monetary gain, unless that use is required as part of your studies or otherwise permitted by your school. If you want to use any FOSS installed on the computer for commercial or other non-educational purposes, we suggest you copy it to a different computer of your own for that purpose.
D1	It is also prohibited to copy the software on your computer and install it on other computers (e.g. at home) unless the school has given permission to do so.	It is also prohibited to copy the software on your computer and install it on other computers (e.g. at home) unless the school has given permission to do so, or copying and installation is permitted by the licence applicable to that item of software.
D3	File-sharing of copyrighted materials is prohibited at all times.	File-sharing of materials subject to copyright is prohibited except where you have a valid licence (such as a Creative Commons or FOSS licence), or it is otherwise permitted under copyright law.
C2	It is forbidden by law to copy the software, any violation will be prosecuted. Shareware and Freeware is not covered by this.	The law prohibits copying software unless you have a valid licence to do so, or you are otherwise permitted to do so under copyright law. Free and Open Source software is licensed under terms which do permit you to copy the software, but you should read the applicable licence carefully to make sure you comply with any conditions it contains.

Table 2: Examples of how problematic clauses can be improved.

To balance the schools' legitimate expectation that the laptops will contain certain applications which will function as intended for pedagogical purposes, we propose that it would be acceptable to say that, notwithstanding the student's exercise of his/her rights under FOSS, at least one instance of the application in question is present and configured in the way required by the relevant course (see suggested wording for M4 in the grid above).

The minimum resolution (from a legal perspective) is for the schools to make a legally binding declaration, to all students who have received laptops from the schools, that the schools will not assert their rights under the student contracts to the extent that those rights are inconsistent with the rights granted to the student under the terms of the relevant FOSS licences (which avoids an in-

depth analysis and redrafting the student contracts to ensure compliance.⁶⁵ However, this solution may work from a legal perspective, but it does little, in itself, to foster the exploration, experimentation and collaboration which FOSS facilitates.

It has been suggested that cloud computing may avoid many of these issues. Although this may remove issues related to software licensing per se,⁶⁶ it still means that the students will have to enter into application access agreements, which raise their own issues (which we briefly consider later). Further, since the students will no longer be able to run the software itself (as opposed to being granted access to its functionality), even if it is FOSS (unless it is subject to one of the small number of licences which seek to close the 'ASP loophole'), they will be unable to benefit from the Four Freedoms.

These issues are not limited to software: not only is the software itself affected by these restrictions, but content (such as photographs, text, videos and music) are also copyright works which are potentially subject to licences, such as the Creative Commons suite of licences. In a similar manner to free and open source software licences, Creative Commons licences are intended to encourage reuse and redistribution. There are a number optional components of the licences, which are denoted by the tags BY, SA, ND and NC, as selected by the copyright owner.

For example, someone may take a photograph and want to make it available under a Creative Commons license which only allows recipients to use it without modification, provided that the photographer is credited. In that case, she would choose CC-BY-ND,⁶⁷ BY indicating that attribution is required, and ND indicating that the recipient may only use the work as-is, without making any modifications ('no derivatives'). The other tags are SA (share-alike, which is similar to copyleft) and NC (which means non-commercial). With the exception of NC and ND licences,⁶⁸ the CC variants are, effectively, FOSS licences and grant the four freedoms. The CC licences do (like the GPL family of licence) prohibit the imposition of additional restrictions which contradict the rights granted by the licence. Thus, where restrictions in the school contract cover other materials⁶⁹ which be licensed under CC licences, a similar analysis to that undertaken in relation to GPL holds true. Where the item in question is not computer software, copyright law allows for the additional exclusive right of authorisation, which is the right of communicating to the public. Further discussion of this is outside the scope of this paper.⁷⁰

7. On misconceptions concerning copyright

Copyright is a right which arises automatically upon the creation of certain categories of work (for example, literary, graphical, photographic, musical) and belongs to the author of the work (or his or her employer). It grants a number of rights which are exclusive to the rights holder: primarily, the exclusive right to copy the work, make adaptations of it, distribute it to the public and (in relation to works other than computer programs) communicate the work to the public. These rights last for a significant period of time (generally, under EU law, 70 years from the death of the

⁶⁵ A similar mechanism is employed by the Open Invention Network: see section 5.4 of its license agreement: http://www.openinventionnetwork.com/joining-oin/oin-license-agreement/

⁶⁶ But see footnote 56

⁶⁷ The current latest release of the Creative Commons suite is 4.0. See https://creativecommons.org/licenses/by-nd/4.0/ for more information.

⁶⁸ Prohibiting the use of software for commercial purposes is a breach of Freedom 0 – the freedom to run the program as you wish, for any purpose. Further, it's not clear what 'commercial purposes' means.

⁶⁹ It is theoretically possible for software to be licensed under a Creative Commons Licence – and for non-software content to be licensed under a FOSS licence, but this is not recommended, not least because the structure and terminology contained in those licences is not appropriate when applied to an unintended medium. Having said that, the Creative Commons foundation has announced that materials licensed under CC-BY-SA 4.0 may now be relicensed under GPLv3 (but not vice versa): http://creativecommons.org/weblog/entry/46186

⁷⁰ There also exist additional rights, such as moral rights, which are outside the scope of this paper.

author). Computer programs are, under EU law, protected by copyright as literary works.⁷¹

The rights holder can permit others to use the work (for example, a software company can permit its customers to use the work) by issuing a licence: it is useful to remember that a licence is defined as a permission to do something which would otherwise be illegal.

However, aside from obtaining a licence, there are several other ways in which someone can lawfully make use of a copyright work without obtaining a licence.

The Berne convention forms the basis for copyright in almost all countries worldwide. Articles 9, 10 and 10bis permit countries to legislate certain 'free uses' of copyright materials which do not require authorisation. The Copyright Directive makes use of this permission, and in Article 5, it allows various exceptions to be incorporated into the laws of member states. In practice, the extent and scope of these rights varies from member state to member state. Swedish law has a number of separate statutory exceptions to copyright which allow, for example, the use of extracts of texts in academic papers without the consent of the rights holder provided that attribution is given. For example, assume a student wishes to incorporate short extracts from a work of literature in an essay criticising that work. This right is a specific exception to copyright under Swedish law so no licence would be required,⁷² provided that appropriate attribution is given. Despite these clear rights, some of the contract statements suggest that no materials downloaded from the internet may be used at all, even if licensed, or subject to a statutory excemption.

Further, there are many materials available on the internet that are licensed under licences which also permit and encourage use, reuse and dissemination, such as the Creative Commons suite of licences (see above).

Examples of statements which suggest that certain uses of copyright materials are never legitimate are as follows:

File sharing of copyrighted materials is prohibited at all times [D3].

Examples of materials with illegal or inappropriate content are: material protected by copyright [X1].

Copying programs and data files that are protected by copyright is not permitted [X2].

Copyright also applies to the Internet. It is therefore not allowed to copy or make use of copyrighted texts, movies, images or music pieces etc. [X3].

Examples of statements which ignore fair use,⁷³ or the public domain are:

Unauthorized copying of software or use of unauthorized software entails personal liability towards licensors [X4].

Some statements go further, and indicate that copying materials is a criminal offence.⁷⁴

It is forbidden by law to copy the software, any violation will be prosecuted [X5].⁷⁵

^{71 2009/24/}EC

⁷² If more than 70 years have elapsed since the death of the author, the work will have entered the public domain, and copyright law will impose no restrictions at all.

⁷³ Swedish law does not have a concept of 'fair use' as such, but the term is used as shorthand for the bundle of exceptions which exist in certain circumstances, such as the right granted to cite and quote materials in an academic context, provided that appropriate attribution is given. See Chapter 2 of Law 729 of 1960 on copyright in literary and artistic works (Kap 2, Lag (1960:729) om upphovsrätt till litterära och konstnärliga verk).

⁷⁴ Copyright infringement may be a criminal offence in Sweden, subject to some exceptions (for example copying software for private use if the original has not been used in a commercial or public sector context).

⁷⁵ Although this statement [C2] also goes on to exclude 'Freeware' and 'Shareware' from this requirement.

When installing software that violates copyright law, the pupil risks a police report being filed [X6].

Occasionally, the school mangles terminology:

Copying software other than so-called freeware is not permitted. Copying other types of software is forbidden by law [X7].

In this case, we assume that by using the term 'freeware', the school means 'FOSS' (and other forms of licence, such as shareware, where copying is explicitly permitted). Note that this statement also ignores the possibility of fair use.⁷⁶

Some statements confuse a number of issues:

Most software has rules for its use. Licenses for school software are handled by the computer department. It is absolutely necessary that the school can show that there are paid licenses for software used. The school takes no responsibility for unlicensed software installed by pupils [X8].

By suggesting that some software has rules for its use, it implies that some software has no rules. That's true, but there is very little software which falls under this category (possibly software which has been released under the CC0 licence which attempts to be a dedication to the public domain, or where that fails, an extremely liberal licence removing as many restrictions as possible). Even liberal FOSS licences like BSD retain some 'rules', in terms of retaining a disclaimer or attribution, for example. This statement strongly suggests that proprietary paid-for licences are the norm.

Installing or copying software or other material protected by copyright law or agreement is forbidden. You are solely responsible for ensuring that the necessary licenses are available for all materials that are not directly provided by the school [X9].

It's not clear how software can be protected by 'agreement' (as opposed to copyright law). The first sentence suggests that installing or copying all material protected by copyright is forbidden (even with a valid licence, or where fair use applies), whereas the second sentence, in contrast, suggests that installing such software is legitimate as long as there is an appropriate licence.

Under Swedish law, it is forbidden to ... copy software and games that are not free of charge. Explanation: What would those who make software live off if nobody pays? [X10]

This seems to suggest that free (gratis) software can be copied without restriction (which is not necessarily true), and attempts to explain the rationale behind copyright (a rationale which is refuted by the very existence of the free software referred to in the first sentence).

8. Analysis

From an analysis of our results, we make a number of observations. Concerning the provision of FOSS in Swedish Schools, we found that FOSS provided was licensed under a wide variety of different licences, the licences in question covering the spectrum of strong copyleft (e.g. GPL) through to permissive (e.g. Apache) licences. Concerning the relationship between schools' contracts and FOSS licences, we found that there were several inconsistencies, some of which

^{76 ...}and the public domain, but the reality is that, owing to the length of the copyright term and the relatively recent invention of stored-program computing, it is unlikely that any software is in the public domain– at least in jurisdictions like Sweden where copyright works cannot be dedicated to the public domain (although the economic rights can be waived).

International Free and Open Source Software Law Review

demonstrated a mismatch between the explicit contract wording and FOSS culture and others of which had legal implications. The legal implication of the inconsistencies was that the schools themselves could be in breach of the specific FOSS licence(s) applicable to the FOSS which the school provided. Our results show that the inconsistencies could be resolved by applying a simple (but strictly legalistic approach), or adopting an approach in which both FOSS culture, and the legal implications, are effectively addressed. Finally, analysis of our results shows that the contracts, together with other documents which were obtained as part of the broader study, contain a number of misconceptions as to the nature and effect of copyright and certain licensing models. From our results it seems evident that those preparing the contracts have failed even to consider certain licensing models, or whether copyright works may be lawfully used in specific circumstances without a licence.

A common thread emerges both from the statements we identified as containing misconceptions, and other supporting documents we have obtained in the course of the study. Specifically, there was no case in which a statement or assumption about copyright mistakenly suggested that the student had more freedom to use, copy, modify or distribute any software or other material than was permitted by law. On the contrary, every such statement suggested that the rights that the student had were narrower than those guaranteed by law.

One explanation of this may be that the schools were naturally conservative, and assessed that it was less risky (and simpler) to adopt a more restrictive stance in communicating to the students than was strictly necessary. However, given that the nature of many of the statements increases risk, in terms of inviting infringement of FOSS licences as discussed above, and given that many statements suggest an insufficient understanding of the licensing context and copyright law itself (for example, references to 'freeware') we are not convinced that the contracts, in the main, are the result of a careful risk-assessment exercise.

It may also be the case that the wording of the contracts dates from earlier governmental initiatives for increasing IT skills (before the widespread adoption of FOSS applications) which tended to favour proprietary solutions.

Another, more interesting explanation may lie in the fact that the public's exposure to messaging about copyright has been dominated by the rights holders. This is illustrated by the prevalence of anti-piracy messages in videos, DVDs and BluRay discs, both in Sweden and elsewhere, which mischaracterise copyright infringement as theft, and fail to mention any rights of fair use. Messaging from the Swedish Government⁷⁷ itself reinforces this:

You should not take someone else's movies, music, text or images, and put them on the Internet without permission of the author. This means that you may not share their music or film collection on the Internet, for example, via a file sharing program. However, they may of course add music, pictures, or anything that you yourself have created.⁷⁸

There are plenty of public domain works which may be freely published,⁷⁹ including many prominent works of literature from Strindberg⁸⁰ to Shakespeare,⁸¹ many of which will have

⁷⁷ Document published by the Swedish Government, Ministry of Justice: Regeringskansliet (2005) Upphovsrätten vid nedladdning och annan kopiering av musik, film och bilder, Justitiedepartementet, Sweden.

⁷⁸ Swedish original: Man får inte ta någon annans filmer, musik, texter eller bilder och lägga ut på Internet utan tillstånd av upphovsmannen. Detta betyder att man inte får dela med sig av sin musik - eller filmsamling på Internet, t.ex. via ett fildelningsprogram. Däremot får man förstås lägga ut musik, bilder eller annat som man själv har skapat

⁷⁹ See, for example, Project Gutenberg: https://www.gutenberg.org/, with the warning that the rules under which works enter the public domain vary significantly from jurisdiction to jurisdiction, so it is not automatically safe to assume that works on that site are free of copyright in your jurisdiction. In a Nordic context, project Runeberg aims to make available classic Scandinavian literature on a similar basis to Project Gutenberg http://runeberg.org/

⁸⁰ e.g. https://www.gutenberg.org/files/48052/48052-h/48052-h.htm

 $^{81 \}quad e.g. \ http://www.gutenberg.org/cache/epub/2264/pg2264-images.html$

significant pedagogical value. It is highly misleading to suggest that all works are only capable of dissemination with the author's permission⁸² (leaving aside, for the time being, that the author is, very often, not the rightsholder in any event).

Further, although the first sentence introduces the concept of author's permission, the second sentence assumes that this will never be given. By way of example from the field of images, there were, at the time of writing,⁸³ 355,110,899 photographs and other images on flickr.com for which the author had given precisely this permission.⁸⁴ By contrast Getty Images, one of the most prominent commercial image banks in the world, lists less than a quarter of this total: 80 million images.⁸⁵

File sharing programs, including peer-to-peer networks like bit-torrent have significant noninfringing uses. Many FOSS companies use bit-torrent to distribute their software, especially where the file size is particularly large such as a Linux distribution.⁸⁶ The BBC incorporated peerto-peer networking in early versions of iPlayer, released before it had access to the bandwidth needed to stream directly.⁸⁷

Sweden, as home to the (in)famous Pirate Bay torrent-indexing site,⁸⁸ is no stranger to controversy surrounding copyright infringement. Stockholm, has, in consequence been described⁸⁹ as the "world capital of Internet piracy" and Sweden was the first country to implement the IPR Enforcement Directive (IPRED) (2004/48/EC). Reporting of the Pirate Bay case in Sweden (and elsewhere) tended to imply that file sharing is *per se* unlawful activity, conflating the peer-to-peer technology itself and its role in facilitating infringement and hence reinforced misconceptions about the lawfulness (or otherwise) of file-sharing.

Similar misconceptions, biased towards the rightsholders, have permeated through to schools, and in a number of cases, documents which were obtained as part of the broader study specifically referenced the misleading paper published by the Swedish Government referred to above.

In general it is to be welcomed when students acquire a basic understanding of copyright in schools and our analysis shows that some schools have initiatives for promotion of such an understanding amongst students. However, given that an understanding of copyright may be a learning goal for students, including students as young as those in the sixth grade,⁹⁰ then it is a concern that there are misconceptions concerning copyright in some schools.

A failure to understand copyright properly, and lack of knowledge about the availability of software and materials available under FOSS and Creative Commons and similar licences may lead to several problems, including:

- 1. Exposure of the school to liability by failing to comply with FOSS licences itself;
- 2. Failure of the school to take advantage of the pedagogical opportunities presented by the ability of FOSS licences to facilitate to exploration, sharing and collaboration;

⁸² It would be possible to strain the interpretation of 'someone else's...text' so that it meant 'text the copyright of which is owned by someone else', which would exclude works in the public domain. However, an instinctive reading of 'someone else's...text' does not immediately exclude Strindberg and Shakespeare from that category. Given that this is a document intended to clarify the public's rights, the phrasing is misleading.

^{83 13} October 2015

⁸⁴ Under various Creative Commons licences, or public domain dedication or notices: https://www.flickr.com/creativecommons/

⁸⁵ https://en.wikipedia.org/wiki/Getty_Images

⁸⁶ e.g. Ubuntu: http://www.ubuntu.com/download/alternative-downloads

⁸⁷ https://en.wikipedia.org/wiki/BBC_iPlayer

⁸⁸ It's misleading to call it a file sharing site, as it never hosted the files themselves.

⁸⁹ See page 391 in: Fung, W. M. J. and Lakhani, A. (2013) Combatting peer-to-peer file sharing of copyrighted material via anti-piracy laws: Issues, trends, and solutions, Computer Law & Security Review, Vol. 29(4), pp. 382-402. http://dx.doi.org/10.1016/j.clsr.2013.05.006

⁹⁰ In the Swedish schools system, this means the year in which children turn 12.

- 3. Failure of the school to make use of materials available under free licences; and
- 4. Additional and unnecessary expenditure caused by different types of lock-in.⁹¹

From our results, we observed a number of related issues arising from documents obtained as part of the broader study. Licensing issues arose not only in relation to software; licensing issues can arise in the use of associated digital assets. For example, in addition to licence conditions for the provision of software, there is the related issue of understanding font licensing.

Analysis of one of the documents obtained as part of the broader study revealed that staff (including teachers in schools) were required to conform to a style guide containing specific rules as to format, appearance and layout of documents. As part of that requirement a named typeface was mandated for use, namely Calibri.⁹² Calibri was originally created by Microsoft Corporation for use in Office 2007, and, although it comes bundled with Microsoft's Office suite of products and is therefore widely available, its use does require a licence, either as part of the bundled Microsoft package, or on a separately paid-for basis through Microsoft's licensee Monotype. We note that such a requirement implicitly promotes use of assets under a proprietary licence (either indirectly, under the licensing of Office, or directly through the requirement to obtain a proprietary licence for the font from Monotype).

From this analysis it may be considered that only FOSS licences are affected by misconceptions and inconsistencies. However, our results also show that licences and access rights relating to SaaS are affected.

From our results we find from analysis of the requested documents that a number of public sector schools have agreements with a number of different cloud (SaaS) providers and that those schools expect their students to use the cloud services provided. However, in our study we have not obtained any documented evidence to suggest that schools have undertaken the recommended risk assessment and review of conditions for use of specific cloud services before providing these services to students. Lack of such a risk assessment may be seen as surprising given that such recommendations have been developed and published by the organisation which represents all public sector schools.⁹³

For example, amongst contracts obtained from schools we identified that potential disputes related to students' use of services provided in a cloud solution will be handled in a U.S. based court (California) since schools have agreed to such conditions in the contract. We would have expected this to be an issue covered in an appropriate risk assessment.

Our results show that software is made available to students under the age of 13 (and that, therefore, schools contracts apply to such students). Previous research results from Swedish schools⁹⁴ identified that some schools "forbid people under the age of 13 to use Facebook" and some enforce "the rule to not access Facebook is agreed upon via contracts written when the computer is provided." However, interestingly, in the contracts analysed in this studysuch rules were not identified.

9. Discussion and conclusion

To meet future challenges it has been suggested from industry that Sweden needs to promote

⁹¹ Lundell, B. (2012) Why do we need Open Standards?, In Orviska, M. and Jakobs, K. (Eds.) Proceedings 17th EURAS Annual Standardisation Conference 'Standards and Innovation', The EURAS Baard Series, Aachen, ISBN: 978-3-86130-337-4, pp. 227-240.

⁹² Style guide for an organisation obtained during data collection.

⁹³ See page 20 in: E-delegationen (2010) ibid.

⁹⁴ See page 99 in: Hatakka et al. (2012) ibid.

creativity and include coding skills in its school system, as early as in the primary school system.⁹⁵ One may conjecture that adoption of FOSS may constitute one important enabler for successfully addressing such challenges.

From our analysis, we have found that the existing schools contracts suggest a bias (which may be unintentional) towards the implicit promotion of proprietary software and SaaS.

Since no documented risk assessment from analysis of conditions for use of cloud services was obtained in our study, one may conjecture that the outcome of such a risk assessment of conditions for use of cloud contracts for individual students in schools and their guardians would have taken issues concerning managing disputes involving students in different jurisdictions into account. Further, we were surprised to find that we were not able to identify any documented risk assessment in our study, especially since software and services are provided (under different conditions) to young students in schools.

To fully take advantage of the learning opportunities presented by FOSS, schools must both foster an environment in which the benefits of FOSS, including the benefits of FOSS culture (providing exploration, sharing and collaboration) as well as the software's functionality are more fully exploited. Avoiding contracts which inhibit the provision and use of FOSS is an important step towards this goal. Further, before adopting any type of SaaS or software (whether proprietary or FOSS), the acquiring bodies should follow the recommendation to undertake a risk assessment which considers the effect on the acquiring body and the users (in this case, the individual teachers and students). Since students are in a special type of relationship with the school (they are not employees of the organisation which provides the software or SaaS, but nonetheless it may, in effect, be compulsory for them to use the provided solution), the risk assessment needs to be carefully undertaken to take this relationship into account.

We take care in making our recommendations that they do not exclude or disfavour proprietary licensing. We have provided example modifications of contract clauses. The examples are constructed to demonstrate how changes are able to address the concerns relating to FOSS without discrimination either in favour of FOSS on the one hand, or proprietary solutions, on the other. From this it can be seen that the exercise of reviewing the contracts to render them both legally compliant and in accord with cultural norms which are also applicable to FOSS is not complex.

The suggested resolutions offered in this research do not require disproportionate effort to adopt in an educational context, and as well as resolving the specific legal issues, the fuller solution of recasting certain clauses in the contracts addresses cultural concerns and helps to address the (perhaps unintentional) imbalance of implicit preference for proprietary solutions.

⁹⁵ BCG (2015) Launching a New Digital Agenda: How Sweden Can become the global leader in Digitization and Technology, The Boston Consulting Group, June. http://www.bcg.dk/documents/file191290.pdf

10. Appendix

Ref.	English translation	Original Swedish text
U1	A pupil who borrows a computer for his/her studies in school district C [primary/secondary school] may only use it to study. Unless the computer is being used for study, it should immediately be returned to the school.	Elev som lånar dator för sina studier i Rektorsområde förskola/grundskola ska enbart använda den till studier. Om inte datorn används för studier ska den genast återlämnas till skolan.
U2	The equipment [hardware and software] must not be used for commercial purposes.	Utrustningen får inte användas i kommersiella sammanhang.
U3	The computer equipment must not be used in any commercial context, i.e. where the computer is used for any computing activities with a view to monetary gain.	Datorutrustningen får inte användas i några kommersiella sammanhang, dvs att Datorn används i datoraktiviteter i vinstgivande syfte.
U4	The computer may only be used for education.	Datorn används för utbildning.
U5	Copying or using the school's software outside school is not permitted.	Det är inte tillåtet att kopiera eller använda skolans programvara utanför skolan.
U6	The child has the right to make use of the computer [only] at school and in their own home.	Vårdnadshavarens i detta avtal angivna barn äger rätt att disponera datorn i skolan och i sitt egna hem.
M1	Installed software may not be uninstalled and it is not permitted to install other software.	Installerad programvara får inte avinstalleras och det är inte tillåtet att installera annan programvara.
M2	The programs contained in the computer's default configuration may not be uninstalled since they are required for schoolwork.	De program som ingår i datorns grundinställning får inte avinstalleras då de skall användas i skolarbetet.
M3	The software included in the computer's default installation may not be modified or uninstalled. It has been carefully selected to be used for school work and teachers will assume that all pupils with a personal computer also have access to this software.	De programvaror som ingår i datorns grundinstallation får inte ändras eller avinstalleras. De är noga utvalda för att användas för skolarbetet och pedagogerna kommer att förutsätta att alla elever med personlig dator också har tillgång till dessa.
D1	It is also prohibited to copy the software on your computer and install it on other computers (e.g. at home) unless the school has given permission to do so.	Det är också förbjudet att kopiera programvara som finns på datorn och installera på andra datorer (t.ex. hemma) om inte skolan har gett tillstånd till detta.

D2	The pupil may not tamper with or distribute the software that the school provides.	Eleven får inte manipulera eller sprida den programvara som skolan tillhandahåller.
D3	File-sharing of copyrighted materials is prohibited at all times.	Fildelning av upphovsrättsskyddat material är alltid förbjudet.
D4	You are a local administrator on your computer which means that you can install software on your computer. Hence, you are also responsible for ensuring that only software with valid licenses is installed on your computer. Copying the software on your computer and installing it on other computers (e.g. at home) is also prohibited unless the school has given permission to do so.	Du är lokal administratör på din dator vilket bland annat innebär att du själv kan installera programvaror på datorn. Därmed ansvarar du också för att endast programvaror med giltiga licenser installeras på datorn. Det är också förbjudet att kopiera programvara som finns på datorn och installera på andra datorer (t.ex. hemma) om inte skolan har gett tillstånd till detta.
C1	Copying the software on the computer and installing it on other computers (e.g. at home) is also prohibited unless the teacher/system administrator has given written permission for it.	Det är också förbjudet att kopiera programvara som finns på datorn och installera på andra datorer (t ex hemma) om inte lärare/systemadministratör har gett skriftligt tillstånd till detta.
A1	It is forbidden and a criminal act to copy software that is protected by copyright without authorisation.	Det är förbjudet och kriminellt att otillåtet kopiera programvara som skyddas av copyright.
A2	It is not allowed to install software for which you do not have valid licenses.	Det är inte tillåtet att installera program som du inte har giltiga licenser för.
C2	It is forbidden by law to copy the software, any violation will be prosecuted. Shareware and Freeware is not covered by this.	Det är enligt lag förbjudet att kopiera programvaran, överträdelse beivras. Shareware och Freeware omfattas ej av detta.
X1	Examples of materials with illegal or inappropriate content are: material protected by copyright.	Exempel på material med olagligt eller olämpligt innehåll är: material som är skyddat av upphovsrätt.
X2	Copying programs and data files that are protected by copyright is not permitted.	Det är inte tillåtet att kopiera program och data filer som skyddas av copyright.
X3	Copyright also applies to the Internet. It is therefore not allowed to copy or make use of copyrighted texts, movies, images or music pieces etc.	Upphovsrätten gäller även på Internet. Det är därför inte tillåtet att kopiera eller utnyttja upphovsrättsligt skyddade texter, filmer, bilder eller musikstycken mm.
X4	Unauthorized copying of software or use of unauthorized software entails personal liability towards licensors.	Otillåten kopiering av programvara eller användning av otillåten programvara kan medföra ett personligt ansvar gentemot licensgivare.
X5	It is forbidden by law to copy the software, any violation will be prosecuted.	Det är enligt lag förbjudet att kopiera programvaran, överträdelse beivras.

X6	When installing software that violates copyright law, the pupil risks a police report being filed.	Vid installation av programvaror som bryter mot upphovsrättslagstiftningen riskerar eleven att polisanmälas.
X7	Copying software other than so-called freeware is not permitted. Copying other types of software is forbidden by law.	Det är inte tillåtet att kopiera program andra än s.k. freeware. Övrigt är enligt lag förbjudet.
X8	Most software has rules for its use. Licenses for school software are handled by the computer department. It is absolutely necessary that the school can show that there are paid licenses for software used. The school takes no responsibility for unlicensed software installed by pupils.	De flesta programvaror har regler för hur de får användas. Licenser för skolans programvaror hanteras av datorinstitutionen. Det är absolut nödvändigt att skolan kan uppvisa betalda licenser för de program som används. Skolan tar inte ansvar för olicensierade programvaror som installerats av elever.
X9	Installing or copying software or other material protected by copyright law or agreement is forbidden. You are solely responsible for ensuring that the necessary licenses are available for all materials that are not directly provided by the school.	Det är förbjudet att installera eller kopiera programvara eller annat material som skyddas av upphovsrättslagen eller avtal. Du är själv skyldig att se till att nödvändiga licenser finns för allt material som inte direkt tillhandahålls av skolan.
X10	Under Swedish law, it is forbidden to copy software and games that are not free of charge. Explanation: What would those who make software live off if nobody pays?	Enligt svensk lag är det förbjudet att kopiera program och spel som inte är gratis. Förklaring: Vad ska de som gör program leva av om ingen betalar?

Extracts from Schools Contracts, in Swedish and the corresponding translation in to English

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Software, copyright and the learning environment