Across the great divide

Julian Brooks*,
CeReNeM, University of Huddersfield

Joanna Brooks,
Centre for Applied Psychological Research, University of Huddersfield

Pierre Alexandre Tremblay
CeReNeM, University of Huddersfield

*Corresponding author
mail@julianbrooks.net

Abstract
Free Libre Open Source Software (FLOSS) is licensed to allow users the freedom to copy, reuse, study and develop the software. As a term which efficiently encompasses both 'free software' and 'open-source' models, FLOSS may offer music practitioners and researchers the opportunity to develop and use such software without becoming mired in a particular stance. In this article, parallels between FLOSS and experimental music are explored, with a view to highlighting their compatibility. Through reflection on the recent composition, recording and distribution of three text scores, this article examines how the application of a FLOSS framework may assist with such work in an academic setting and how FLOSS tools might be utilized in such settings in the future as they become more prevalent, more reliable and more stable.

Keywords
FLOSS
composition
experimental music
bounded improvisation
laptop performance
Pure Data

Introduction to Free Libre Open Source Software (FLOSS)

FLOSS is licensed to allow users the freedom to copy, reuse, study and develop the software. Proponents of free software, concerned with philosophical freedoms and social solidarity, have sought to distinguish themselves from advocates of open-source software, whose approach has been arguably more pragmatic, with a primary focus on promoting peer development of software. As a nomenclature which efficiently encompasses both models, FLOSS may offer the opportunity for music practitioners and researchers to develop and use such software without becoming mired in a particular stance. The term entered common parlance following its usage by Ghosh et al. (2002) in

their research examining the usage of free and open-source software across the European Union. Whilst not a term which is universally popular or accepted, FLOSS has nonetheless quickly become the generic term for those wishing to sidestep the free software/open-source schism. Importantly, the title distinguishes between 'free' as in no cost, and 'libre' (which has no direct translation into English), meaning with little or no restrictions upon its use.

FLOSS developmental models

FLOSS projects can operate under differing governance models. The usage of a 'benevolent dictatorship' model implies a project under some form of centralized control. In many FLOSS projects the benevolent dictator is often, though not always, the originator of the project. Within group projects it is frequently useful for one individual to have the final say on any contentions that may arise and many of the most successful FLOSS projects follow this model (e.g. Linus Torvald and the Linux project – see Moody 2001). As work is undertaken on most FLOSS projects without financial remuneration, it is clearly of paramount importance that the 'benevolent dictator' wields the power afforded to them with sensitivity lest disgruntled parties abscond from the project, and potentially (given the nature of the open access licensing utilized for FLOSS) 'fork' the code base (Wheeler 2007). This development model and its application in FLOSS projects contains interesting parallels for composers, whose relationship with prospective performers of their work must also be handled with some sensitivity for a useful outcome. Most, if not all, student composers will be having to rely upon volunteers for performances and recordings of their works, and practical applications of the benevolent dictator model may serve as helpful examples of successful outcome. An alternative operational model, and one which often arises when projects have reached a certain maturity, is a consensus-based democratic model. These project communities operate through a horizontal meritocratic structure, allowing anyone willing to contribute at any level to do so, with the proviso of a proven ability. Perhaps the most well-known example of a FLOSS project operating this decentralized developmental model successfully is Apache (e.g. Weber 2004). In their research into the social structure of FLOSS software development teams, Crowston and Howison (2005) found that larger teams tended to have more of these decentralized communication patterns. Whatever the developmental model utilized, in all FLOSS projects as in academia, the importance of peer review is paramount. 'Peers' refers here to both the peer team of contributors and to end-users who are most often responsible for proposing features and discovering software problems or bugs (see 'Linus' Law', Raymond 1999).

FLOSS tools used in the current project

Pure Data (Pd) is a real-time graphical programming language for the creation of interactive computer music and multimedia production. The original author is Miller S. Puckette who is also the author of the so called 'Max paradigm' of computer languages (Puckette 2002). As a long-running and successful FLOSS project Pd has also built up a large base of developers creating extensions, or 'libraries' in Pd parlance, for the program. A meta-program maintained by Hans-Christoph Steiner exists, which combines many of the most popular libraries into a complete package and is entitled Pure Data Extended. With a strong network of often academic-based developers Pd has

become one of the most popular international platforms for live computer music. With many versions of the program in existence for a wide variety of digital media, and with one of the most permissive licences available for FLOSS tools (the BSD license) Pd is often utilized as a 'sound engine' in many commercial applications (the Electronic Arts Inc. video game 'Spore' being but one example).

'The diagram is the program' (Bouchard 2006, cited in Farnell 2010) is a popular and useful description as Pd 'patches' consist of boxes containing objects (doing things) and messages (how to do things), all connected by 'cables' that control the routing or 'dataflow'. Like most programming environments Pd initially necessitates a somewhat steep learning curve, and also requires a basic grasp of Digital Signal Processing theory (DSP) to begin to understand and control what is really happening. Experience as a student and teacher of Pd suggests that it is also possible to explore, begin to understand and more importantly make music with Pd through the concept of play.

A DSP theory book by Pd's author contains many examples made in Pd and includes pre-programmed patches for most of the books' examples (Puckette 2007). This publication is also freely available online, in keeping with FLOSS philosophy and in contrast to the publication strategies adopted by many academics. This volume, in addition to the operating manual, plus a detailed set of help files for all objects bundled within both versions of the program, act as a functional initial resource for Pd users. Several other books and online tutorials for Pd are also available (e.g. Farnell 2010; Kreidler 2009). As well as these resources, there also exists Pd's mailing list (http://lists.puredata.info/listinfo/pd-list) and a forum (http://puredata.hurleur.com), which are an excellent resource containing a wealth of data and expertise to aid in the support of users and aimed at all levels of experience.

Puredyne (http://puredyne.org) is a FLOSS operating system developed 'by digital artists, for digital artists'. The project was begun in 2004 by Aymeric Mansoux (http://su.kuri.mu) and has been supported for many years by the GOTO10 international community of artists and programmers (http://goto10.org). Puredyne was initially focused as a live-CD to simplify and aid in the running of workshops and other such pedagogical environments. However, from around 2007 up until 2012 Puredyne has been developed and maintained to act as a complete OS, finely tuned to contain many of the most popular FLOSS applications for the creation of audio and visual (AV) production. The first author has used Puredyne successfully to introduce the use of FLOSS tools in production across a wide spectrum of ages ranging from primary school children through to university undergraduates. Students have often been surprised to learn that these tools are available at no financial cost and are not illegal software or 'cracks'. Giving students the skills and knowledge to use software they can easily access themselves is a clear facilitation of pedagogical means, avoiding any need for the purchase of costly software licences they may never use again and offering an alternative to the conclusion that the use of 'cracks' is the only pragmatic alternative. The promotion of these 'for free' tools has appealed to educational establishments (e.g. Moore and Moore 2008), given the reality that illegal software usage is increasingly prevalent and simple to access.

Reflections on a project employing floss tools

Through an analysis of three text scores recently composed, recorded and distributed by the first author, this article describes how FLOSS tools such as Puredyne and Pd can be successfully used by music practitioners in an academic setting and how the developmental FLOSS model might be used as a framework to reflect upon this application. First, the performance group and their usage of FLOSS tools are described. Next, the three scores are introduced, together with reflections on the processes involved in the composition, recording and distribution of the pieces. Finally, a few of the myriad issues of FLOSS praxis are outlined, and the potential for the application of FLOSS tools in educational and academic music settings in the future considered.

It is worth being clear as to the philosophical stance from which the collection and analysis of this empirical material were undertaken. The project described here is an example of doctoral 'Practice as Research' (PaR) being carried out in the tertiary sector. PaR recognizes that it may be difficult for those undertaking performance-based subjects to easily articulate conclusions from their work in the form of a standard research report (e.g. Barrett 2007; Nelson 2006). PaR projects necessitate reflection on the creation and performance of output (e.g. O'Riley 2011) and self-reflection is by no means a new phenomenon in education (e.g. Dewey 1933). Phenomenology (e.g. Moran 2000), concerned with how things appear in experience, provides a clear philosophical rationale for such undertakings. More specifically, hermeneutic approaches to phenomenology, which assert that meaning is created in the world between ourselves, suggest that one should adopt a position of intersubjectivity in relation to such critical reflection. From this stance, we perceive the world through our engagement in it. It is only by accessing some shared framework of meaning through a process of social engagement and interpretation that we can access some understanding of each other's conscious worlds. Semetsky (2009: 443) draws on Deleuze's definitions of knowledge as 'a dynamic process of inquiry as an experimental and practical art embedded in experience' to suggest that education should be conceptualized as a process of both learning from and evaluating experience. It is hoped that the experiences described and reflected upon here to some extent achieve these aims.

The performance group

HELOpg (helopg.co.uk) was founded in 2009 and is made up of a small group of core performers, all either current postgraduate researchers at the University of Huddersfield (UK) or alumni and occasional guests (see Hewitt et al. 2010). With regards to the developmental model of FLOSS delineated previously, HELOpg consciously operates as a meritocracy, allowing each and every group member to assume the role of benevolent dictator for specific group projects (arranging a concert, composing pieces, creating recording, writing papers, designing software, etc.). This model is often described as a 'Rotating Dictatorship' (e.g. Ghosh et al. 2004) and is exemplified by the organizational structure of the 'Perl' programming language (Weber 2004). All group members have an interest in FLOSS ideology and, given the usual dominance of the Apple Macintosh amongst digital musicians both inside and outside academia, the ensemble is unusual in that the majority of members currently exclusively incorporate a variety of FLOSS tools in performance. Several group members have recently started to publish code freely online (details of online resources

are provided at the end of this article) and the group are in the process of creating a library for shared performance parameters via a 'zero-config' (instantaneous real time synchronization) non-hierarchical network (helopg.co.uk/projects/slime-system) with all players contributing code, compositions and stress-testing of the environment. A further key feature that distinguishes HELOpg from many other laptop orchestras is its operation as a non-unified ensemble exploring individually designed interfaces devoid of a common hardware or software architecture. The group has deliberately chosen to avoid the development of a 'meta-instrument' structure, opting instead to develop individual praxis to promote interaction between performers and the construction of the aforementioned library is anticipated to further this collaborative practice.

Since its inception, HELOpg has been a free-improvisation-based ensemble. In line with the classic British Free-Improv model (e.g. Tilbury 2008; Nyman 1999; Bailey 1993), members have tended to engage in minimal discussion of performance material before, during or indeed after the performative event. However, the compositions described in this article were composed in response to an issue raised within HELOpg (and faced by many free-improv ensembles) – how to begin a live concert performance. There existed amongst the group a communal and eventually articulated sense that performances were slow to build as performers adjusted to their surroundings. In discussion, it became apparent that all members of the group perceived true and free improvisation as requiring an involved state of heightened or deep listening, sensitivity and immersion akin to the psychological concept of 'flow' (e.g. Csikszentmihalyi 1991; Brown and Sorensen 2009). The onset of performances were experienced by the group as initially uncomfortable with the perceived need to 'come up with something good and quickly' hampering performers in achieving this desired immersed state. Other challenges for performers linked to this includes how to diversify the emergent soundworld and, importantly, how to avoid the ensemble falling into obvious comfort zones.

In an attempt to provide some pragmatic solutions to the difficulties raised by the group in relation to the opening of performances, the first author and group member composed a series of short text scores. The use of loosely detailed instructions has a successful precedent in the creation of experimental music (Pisaro 2011). Cardew (cited in Nyman 1999: 126) refers to the function of certain of his compositions as being 'to clear the space for spontaneous music making'. Similarly, the pieces described here were intended as an aid to assist group members acclimatize to their surroundings and to facilitate the development of the elusive 'group mind' effect. In practice, several HELOpg performances, together with group members' feedback, have demonstrated that the scores produced for this purpose can successfully fulfil this function.

The pieces

All pieces were composed in 2010 and recorded in 2011. Both the scores and recordings are available online at http://helopg.co.uk/scores/ and http://helopg.co.uk/2011/09/22/recent-text-score-recordings/.

The compositions presented here (version 2) have been reformatted in line with the sensible and pragmatic advice of Michael Pisaro (2011), who offers that it is easier for performers when text scores are displayed on a single side of paper. This was also

apparent from within rehearsal when all players reformatted the pieces for performance. Apart from the discussed changes, no score has been edited or rewritten by the composer, and as such they are intended to serve as authentic documentation through which a snapshot view of the time and purpose for which they were created is captured.

Given the rationale for which they were written, the duration of each piece is deliberately shorter than is customary for many improvised/experimental pieces and they purposefully bear greater similarity in this respect to a standard piece of pop music. Rather than specify pitch, rhythmic material or gestures, scores are comprised of intentionally simplistic text, with poetic (or lyrical) instruction open to (indeed requiring) performers' own appropriation. As a creative device, this approach is not sound specific and one could arguably create a delicious meal using these same text scores. In a well-known quote widely attributed to Charles Mingus, it is suggested that 'making the simple complicated is commonplace' and that creativity should 'make the complicated simple'. The simple instructions are intended to enable performance by differing groups of differing abilities and skills across a wide range of sound generating tools. In the context of the specific function for which they were created, they are a tool for HELOpg to employ at differing performance events which allow for a structured yet flexible entry to the performance space. Performers have framing devices placed around performance situations providing a construction within which they then have the freedom to work as they wish. Such devices may include processes, instrumentation, time frames, pitch and rhythmic material and, whilst rarely all applied concurrently, such tools can be used by performers to facilitate what may be termed bounded improvisation.

Completed scores were e-mailed out on the HELOpg mailing list two weeks before recording commenced, and all performers were requested to have ready a patch on a laptop, code or a set of electronic tools or effects that would be exclusive for each piece. This was intended to allow for both the possibility of combining several recorded versions and also to allow repeated performance of the pieces. Thus, whilst never the same set of events in different performances, they would have a compositionally relevant individual trace and set of procedures specific to each. The work of Alain Badiou has previously proven useful for experimental composers' consideration of their own praxis (e.g. Kudirka 2011; Pisaro 2006). Indeterminacy is a key feature of experimental music and the freedoms inherent within these text scores may be experienced by a performer of the pieces in terms of what, in Badiou's work, may be described as 'non-constructible multiple[s] [which] provide the material that a subject requires in order to transform a situation […] a form of unordered consistent presentation' (Smith 2006: 76).

As a group which primarily engages in free improvisation, there was some apprehension amongst several performers prior to recording. It was a clear decision made during the compositional process to introduce language perhaps unusual in this particular (laptop) setting – for example, 'Planes of Consistency' utilizes the length of a performers breath as a synchronization mechanism for phrase length. The intention remains that performers from both sides of the digital/acoustic divide be able to

function and create a cogent piece of music through the scores. Whilst inspiration is a fickle and personal tool, the group expressed a wish to have some information from the composer regarding his thinking behind the scores. The three scores have as their starting point a literary basis – statements struck the first author and composer of the pieces as 'music'. The intention is not to claim any great insight or understanding of these often complex topics and authors. Rather, reading material and specific phrases were used as personal artistic triggers which were welcomed as stimuli to composition. Appropriating Deleuze and Guattari's ([1980] 2003) 'regime of signs' serves as a useful explication of this pragmatic approach to composition. According to Deleuze and Guattari, 'regimes of signs' are any specific formalization of expression and thus social, aesthetic, cultural, literary and political phenomena can be considered as such. Deleuze and Guattari describe a regime of signs as being made up of four components: the generative, the transformational, the diagrammatic and the machinic. In the compositional process involved in creating these pieces of music, the generative component relates to the stage in which the composer explores and absorbs influential content in whatever form it presents itself. The creation of the score is the transformational component of the process. Diagrams are constructed within the various performers' chosen software environment and the final 'properly machinic', or 'concrete' component is the rehearsal and performance of the piece in question. Whilst a simplistic appropriation of the framework, thinking of the compositional process in this way has proven personally useful, creating a superstructure that offers some ordered way to reflect on the myriad of influences that impact on composing and creating. Whilst what may be extracted as a starting point for inspiration may have no bearing on what it is they were intended to be for or represent, according to Deleuze and Parnet 'all mistranslations are good […] they multiply its use […] they create yet another language inside its language' ([1987] 2002: 5). A specific example may be found in the score for 'Planes of Consistency', in which the final lines of the score read:

'Discursive multiplicity of expression
Nondiscursive multiplicity of content'

These lines (Deleuze and Guattari [1980] 2003: 74) were in this instance included to convey the sense that a connection between individuals was created by their presence in the same place doing the same thing at the same time. There is no further requirement for 'playing together' as long as each player is committed and fulfils their role in the work. Other key touchstones shared with the group were an exploration of phenomenology (we do not live in our heads but in our interactions with the world), a rejection of Cartesian mind–body duality, and the joyous nature of communal music-making; that it is fun.

Another important point discussed in rehearsal involves the beginning of each piece. Although the first 30 seconds or so of each composition involves no sound material from the participants, they are one of the most crucial and intensive aspects within the performance. Although each artist has a pre-prepared set of tools, much of the final decision making and sound source parameters are determined in this initial time. For each of the pieces, performers must create the bulk of the sound material used within the piece in this brief time span by either generating the sounds to be processed, sampling or coding material. In effect, performers are being asked to make sound material choices to ensure that each performance is apt and fitting to that time and that

place, invoking anthropological theories of 'place' espoused by, for example, de Certeau ([1980] 1984) and Auge ([1992] 1995). The documented versions of the three pieces have had the bulk of these silences removed as they serve little purpose for their auditory dissemination.

Recordings

Three versions of each piece were recorded. Original recordings took place in 8.0 surround sound, with a stereo pair of speakers for each performer and the performers and speakers arranged in an inward facing circular pattern. There had been a number of previous rehearsal sessions in which the group had attempted to record and mix output from (free improvisation) rehearsal sessions. These attempts were by and large unsuccessful and abandoned, due to a general unwillingness amongst members to 'tamper' with another individual's performance through either editing or post-processing, resulting in a dearth of 'polished' group output. In this instance, being permitted to take the role of 'benevolent dictator' allowed the first author to assume a multifarious shifting position from composer, to performer, then on to producer and it was clearly agreed from the outset that he had the freedom to edit materials as he saw fit. In contrast to the prior arduous and unsuccessful attempts at production of the group's work, production of these pieces was a straightforward process. At the beginning of the sessions, a decision was taken to allow the removal of small sections of performance out of the final mix. It was decided no rearrangement or additions to the recorded material would be undertaken but all tracks have added reverb, a simple convolution effect with the samples taken from a separate project (Tremblay and McLaughlin 2009). Previous attempts to mix HELOpg improvisations, lacked overarching direction, but in this case the score was consistently referred back to as a guide when decisions to be made in the production process arose. In the case of one track (The Phenomenal Field) for example, post processing was added to the various parts in line with instructions in the score and a different process added to each performer's track such as bit crushing, filtering and equalization.

Distribution

In line with the standard FLOSS ideology of 'release early and often' (e.g. Raymond 1999), recordings were posted online using the popular music-based website Soundcloud shortly after the mixes were completed. The site is easy to navigate, and the desire of many of the contributors to share their material with an audience, seemed congruent with the aims and philosophy behind the works. In retrospect, the business model applied by this and many other sites promoting the so called 'Web 2.0' approach which arguably exploits user-content with an aggressive marketing model (increasingly prevalent within much contemporary online activity, see Kleiner 2010) may not have been the best choice for output. For future projects, a site such as Archive.org, popular with several FLOSS-based practitioners including GOTO10 and underpinned by a business model and mission statement more congruent with current FLOSS ideology, may be more appropriate. This said, and remaining pragmatic, after generating several hundred individual plays of the three tracks a decision to not take the music down from the site has been taken, particularly as they have been embedded and linked to, in several other online environments. As a further example of the multifarious uses that belonging to an online peer-based FLOSS community can serve, by far the biggest spike

in people visiting the Soundcloud page came when posting an ‘off-topic’ message to both the Pd and Puredyne mailing lists. As Soundcloud also offers a global map of listeners locations, it is satisfying to know, as HELOpg, that many unknown individuals from all over the world have listened to our music.

Conclusions

In terms of the FLOSS development model, and to borrow from FLOSS parlance, fulfilling the function of a ‘mature and stable project’ has allowed HELOpg to move away from the stage of ‘Benevolent Dictator’ to a more ‘Consensus-Based-Democracy’. Each individual within the unit now has the confidence to exploit projects (code, performances, recordings or compositions) in their own particular research area. The familiarity of group members certainly assists in allowing the rotating dictatorship to be easily assumed and dropped by any member of the group depending on the particular project. Additionally, membership of and participation in the group also suggests that working with individuals who are aware of and proponents of FLOSS fosters an environment within academia that promotes creative and successful collaboration to the benefit of all involved. This was evident on a wider scale through the creation of these and other works, through interaction with and involvement in the Pd mailing list, an invaluable source of support for this project, specifically for more complex concerns around issues of sound-spacialization. The answers to some problems faced were easily solved through a search of previous posts. When queries were not so easily remedied, Pd-list members willingly shared their knowledge or created example patches to demonstrate how best to achieve the desired outcome. In addition to this, several developers of the various Pd libraries have adapted their original code and libraries to become a solution to the specific issues faced in this project.

But, whilst recognizing all the strengths of this innovative community with the immense respect, gratitude and affection which it is due, this is not to portray it as a utopian or indeed unified entity. Various disagreements between individuals and factions rumble on, chief among which is why one would (or indeed should) work within a FLOSS framework if not contributing original code, applications or documentation. As FLOSS tools become more stable and more common, some argue that this question is becoming, or is perhaps already redundant. From the other side of the divide, it is suggested that one may not choose to use FLOSS tools given the reality that their usage requires additional investment of time. In an academic environment, privileging learning, knowledge and innovation, this may not be so problematic – and for artists too perhaps. Singer Jeffrey Lewis encapsulates this approach in his song ‘Time Trades’ in which he notes that, ‘one good idea could cost you thousands of your days, but it’s just time that you’d be spending anyway’ (2011). For proponents of FLOSS tools, there are many and varied worthwhile rewards made possible by this extra investment of time. For those who identify themselves as working in the area of experimental music, there are a number of congruencies between the two movements which mean the two affiliate well. Both are consciously decentralized, with an idealized history and yet increasingly prevalent. Whilst both seek to invoke change, they share a pragmatic (left leaning) politics. These shared historical and current aims and ideals may attract those working within music and academia to FLOSS tools.

> Using FLOSS automatically gives an artists work an extra dimension, a political statement that is embedded in the choice to use FLOSS instead of proprietary software. This political statement may seem unrelated to the artistic concept of the work but it is far from trivial.[…] This awareness often leads to the choice of open licenses for the artistic work itself, feeding developed ideas and technical implementations of the ideas back into the community, enabling the reuse of code and facilitating the sharing of knowledge. (Mansoux and de Valk 2008)

By giving artists' work this 'extra dimension', FLOSS tools may be used to explore and perhaps challenge existing pedagogies in relation to music education. Gould (2012) uses the Deleuzian concept of the 'refrain' to reflect on what she describes as the currently limited pedagogical approaches available to practitioners in music education. The refrain is described by Deleuze and Guattari ([1980] 2003) as that which marks out territory and creates boundaries. Gould (2012) suggests that for musicians and music educators such territories may include conventions, genre, stylistic practices, music concepts and performance skills. For Deleuze and Guattari 'music is a creative active operation that consists in deterritorialising the refrain' ([1980] 2003: 300), Gould (2012) concurs, arguing that music education is constrained and limited by manifestations of the Deleuzian refrain.

If this is the case, how might FLOSS tools assist in 'deterritorializing the refrain'? Again drawing upon Deleuze, Cole (2008: 20) suggests that 'otherness' can work to challenge the legitimacy of established norms. He describes 'languages of otherness' such as 'revolutionary', 'punk', 'anarchist' that promote 'subversion of legitimisation of the state, civil society and scientific language'. Cole (2008) specifically highlights 'computer technology' as an important part of any Deleuzian curriculum of otherness. By providing a realistic alternative to closed source 'norms', FLOSS tools can provide their own language of otherness. Coupled with increasing availability and thus promoting affective knowledge through experience (the necessary condition for effective learning according to Deleuze [Semetsky 2009]), FLOSS tools may serve in a very practical way to extend innovative territories and move beyond the Deleuzian refrain in music education.

When it is clear that experienced practitioners are able to translate easily and rapidly across systems, it seems somewhat unreasonable to reify any one (closed source) system for the operation of digital audio workspace. Nonetheless, it is arguably the case that currently FLOSS tools are often best suited to either high or low specification hardware, leaving a middle ground conceivably made up of many universities and students unable to utilize FLOSS tools on the hardware they have available to them. According to a 2010 survey undertaken by OSS Watch (a service in the United Kingdom for further and higher education advising on the procurement, use and development of free and open-source software), most higher education establishments in the United Kingdom already run at least some FLOSS on their desktops and servers (Shuyska and OSS Watch 2011). The report notes a slow but steady trend towards an increased usage of FLOSS in higher education and suggests that this increase is likely to continue (Shuyska and OSS Watch 2011). As FLOSS tools become ever more prevalent and facing

an increasingly competitive job market on graduation, providing music technology students with at least some basic coding skills and experience becomes an increasingly important topic for inclusion on a syllabus. Moore and Moore (2008) convincingly elucidate the compelling reasons for the usage of such tools, specifically in musical and collaborative projects in a higher education setting: (1) cost saving; (2) easy access to the latest software; and (3) teaching outcomes that are based on theory and practice, rather than promulgating and perpetuating the myth of 'industry standard' (Moore and Moore 2008). As demonstrated by the project described in this article, FLOSS offers a pragmatic way to adhere to the philosophy of 'open-source' technology.

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Directory Of Online Resources Referred To In Text

Recordings of the 'Three Text Scores' available here:
http://helopg.co.uk/2011/09/22/recent-text-score-recordings
Pdf of the collected scores for the 'Three Text Scores' available here:
http://helopg.co.uk/scores/
Further information about HELOpg is available here:
http://helopg.co.uk/

Code available online from members of HELOpg here:
https://github/samBiotic
https://github/witt0191
http://adamjansch.co.uk/code
http://sdfphd.net/a/doku.php?id=software

Pure Data resources referred to in the text:
Mailing list: http://lists.puredata.info/listinfo/pd-list
Forum: http://puredata.hurleur.com

Puredyne: http://puredyne.org/
Current wiki for Puredyne community:
EightyColumn http://eightycolumn.lurk.org/Eightycolumn
GOTO10: http://goto10.org/

Soundcloud page: http://soundcloud.com/julianbrooks
Archive.org: http://www.archive.org

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Contributor details

Julian Brooks is a sound artist currently working towards a Ph.D. in composition at the University of Huddersfield, UK. As a composer, performer and improviser he is an active member of the experimental music group 'edges ensemble' and the laptop ensemble HELOpg. Julian has successfully utilized FLOSS tools in a variety of educational settings as both teacher and student and is keen to further the usage of such tools to support and develop creativity in musical education settings.
Contact:
CeReNeM, Music Department, University of Huddersfield, Queensgate, Huddersfield, HD1 3DH, UK.
E-mail: mail@julianbrooks.net

Dr Joanna Brooks is a Research Fellow in the Centre for Applied Psychological Research at the University of Huddersfield. Her primary research interests focus on applied research topics in health and education settings, specifically around issues relating to 'significant others' such as family members and close peers. She has a special interest in using qualitative research methodologies to research lived experience, and particular expertise in phenomenological approaches.
Contact:
Centre for Applied Psychological Research, School of Human and Health Sciences, University of Huddersfield, HD1 3DH, UK.
E-mail: J.M.Brooks@hud.ac.uk

Pierre Alexandre Tremblay (Montréal, 1975) is a composer and a performer on bass guitar and sound processing devices, in solo and within the groups ars circa musicæ (Paris, France), de type inconnu (Montréal, Québec), and Splice (London, UK). His music is mainly released by Empreintes DIGITALes and Ora. He is Reader in Composition and Improvisation at the University of Huddersfield (UK) where he also is Director of the Electronic Music Studios. He previously worked in popular music as producer and bassist, and is interested in videomusic and coding. He likes oolong tea, reading, and walking. More information at www.pierrealexandretremblay.com
Contact:
CeReNeM, Music Department, University of Huddersfield, Queensgate, Huddersfield, HD1 3DH, UK.
E-mail: p.a.tremblay@hud.ac.uk