Student language usage patterns and teaching strategies for a bilingual higher education computing course

Graham Hall

Abstract

The language usage of a group of Welsh/English bilingual Computing Foundation Degree students is examined. Whilst all members of the group had previously attended Welsh medium primary and secondary schools in Gwynedd, the linguistic preferences of the group were found to be surprisingly diverse. At one end of the spectrum students showed a preference for speaking and writing in Welsh, including presentation of technical aspects of computing in Welsh. At the other end of the spectrum, students preferred to both speak and write in English. However, all members of the group were willing and able to produce bilingual software user interfaces as required by the clients of their final year projects.

Bilingual teaching strategies were investigated, with the intention of encouraging and developing students' use of spoken and written Welsh and improving their employment opportunities within Wales. Perceived advantages and disadvantages of different approaches to bilingual teaching are discussed.

1   Introduction

In September 2011, a Foundation Degree in Applied Computing in conjunction with Glyndŵr University was introduced at the Dolgellau campus of Coleg Meirion-Dwyfor. The course is delivered through the medium of Welsh and English in accordance with the policy of the Welsh Assembly Government to promote bilingual higher education (Welsh Assembly Government, 2010).

This study examines the language usage of the first group of six students who all completed the course successfully and graduated in the summer of 2013. Table 1 summarises the linguistic and educational backgrounds of the group.

Student	Background	Entry qualification
1	First language Welsh	Level 3 Engineering
2		A-level including Computing
3	Second language Welsh: English family but educated in Welsh medium schools	Level 3 Engineering
4		Level 3 Business Administration
5		
6		Mature student – technical experience of working with computer systems

Table 1: Linguistic and educational backgrounds of the study group

The course team delivering modules of the Foundation Degree consisted of two first language Welsh speakers and two acceptably fluent second language Welsh speakers, allowing the language choices of the students to be met.

2   Methodology

Practitioner research was carried out with the cohort of six students over the two years of their course. Transcripts were made from voice recordings of discussions with students, and copies were kept of examples of project and assignment work produced by students.

As the course was being delivered for the first time, various bilingual teaching strategies were tried, and student responses evaluated through informal group discussion and individual interviews with students.

Aspects of bilingual course evaluation are discussed by Coonan (2007) and Coyle (2013).

3   Findings

During the two year course the group formed friendships amongst themselves and developed a relaxed working relationship with their tutors. Informal language usage was generally bilingual, with a preference amongst the first language Welsh speaking students and tutors to begin conversations in Welsh. Where mixed groups of first and second language Welsh speakers were conversing socially, changes of language would occur naturally between turns according to the preference of the individual speaker.

Computing, in common with other technical subjects (Moore et al., 2013), presents particular difficulties for study through the medium of Welsh. Unfamiliar technical terms can become a problem in spoken language. Various coping strategies were observed, and are illustrated in the extract from a discussion between a tutor and student in Figure 1. The student is explaining the operation of a computer program which inputs text from an on-screen form, then splits it into sections according to the position of commas within the text.

The student has maintained the fluency of the dialogue in several ways:

- by directly code switching to the everyday English words '*commas*' and '*spaces*' when the Welsh equivalents did not come readily to mind.
- by directly using the English computing term '*string*' where the Welsh technical term was not known.
- by constructing '*Welsh*' words by applying grammatically correct Welsh endings to English words. Examples are:

    '*lwpyn*', in place of the correct Welsh word **dolen** (loop)

    '*identiffeio*' in place of the Welsh word **adnabod** (identify)

    '*parsio*' in place of the Welsh word **dosrannu** (parse, or apportion)

Issues of code switching are discussed by Losey (2009), Jones (1997), and Jones and Martin-Jones

Darlithydd: Nei di rhoi esboniad o'r rhaglen yma?

(Can you explain this program?)

Myfyriwr: Mae'r rhaglen yma yn rhannu string i mewn i rhannau, ag i wneud hon mae e'n ddefnyddio commas er mwyn dewis pa rhan o'r string i tynnu allan. So, drwy'r defnyddio'r commas ag yn ddefnyddio'r botwm 'parsio' mae'n bosib i rhannu un string i mewn i tair string. Hefyd maen bosib i ddefnyddio'r 'dot trimmio' i gael gwared o'r spaces, ynte.

(This program splits a string into parts, and to do this it uses commas to choose which part of the string to take out. So, by using commas and using the 'parse' button it is possible to divide the string into three strings. Also it is possible to use'dot trim' to get rid of spaces.)

Darlithydd: Beth sy'n digwydd yma?

(What is happening here?)

Myfyriwr: Wel, drwy defnyddio lwpyn, mae'n bosib i mynd drwy pob un rhannau sydd wedi cael ei difeidio gyda commas ag i rhoi nhw mewn strings arall.

(Well, by using a loop, it is possible to go through each of the parts which have been divided by commas and put them into other strings.)

Darlithydd: Beth yw textName?

(What is textName?)

Myfyriwr: TextName dot Text yn identiffeio bocs sgrifenni wedi rhoi i mewn y sgrin defnyddiwr er moyn ddangos enw y cwsmer pan bod y rhaglen yn rhedeg.

(TextName dot Text identifies a textbox put onto the user screen to show the name of the customer when the program is running.)

(2004).

Figure 1: Extract from a dialogue illustrating coping strategies in Welsh

Programming in Welsh again produces special difficulties. Figure 2 is an example section of program written by a student who has tried to maximise use of the Welsh language. This is part of an educational software program which tests students on the input of technical terms in a quiz. The program is checking the input, and allocating part marks for an answer which is almost correct.

Generally in programs, three components are present:

- Commands, which are part of the programming language and can only be written in English. Examples here are: **if, else, for** and **Items.Add**.
- Identifiers, such as the names of variables. These are part of the program, but any suitable names may be chosen by the programmer – for example, a variable to store the total number of customers might be called *customerTotal*.
- Comment lines, which do not form part of the program but are present to help explain the program code. Comment lines are preceded by a '*//*' group.

In this example, the student has provided comments in Welsh and has also used Welsh variable names, such as: *camgameriadau* (mistakes), *cyfnewid* (swap), and *cyfriAteb* (answerCount). The result might be termed 'enforced code switching'.

```
int camgymeriadau

// os oes un camgymeriad mae un marc yn cael ei roi. Ni fydd dim

// cangymeriadau - rydym wedi edrych am hynna yn barod yn yr IF cyntaf

(if there is one mistake then one mark is given.  There will not be no mistakes – we have looked for this
already in the first IF)


if (camgameriadau == 1)
{
listBoxl.Items.Add("1");
}
else
{
// os oes dau gangymeriad efallai bod dwy lythyren wedi  eu cyfnewid

(if there are two mistakes then perhaps two letters have been swapped)


if  (camgameriadau == 2)
{
// newidyn i gadw cyfrif o'r nifer o weithiau mae cyfnewid dwy

// lythyren wedi  digwydd


(variable to keep count of the number of times that swapping of
 two letters has occurred)


int cyfnewid = 0;
for (int i  = 0;  i  <  (cyfriAteb  -  1);  i++)
{
// y lwp sydd yn edrych drwy bob llythyren

(the loop which looks through each letter)
```

Figure 2: Extract from a computer program coded in Welsh.

The example above is unusual, with students more commonly writing their entire programs in English, or using English identifiers and only adding comment lines in Welsh.

Students were given a free choice between the use of Welsh or English for most assessed activities. The single exception was that students should conform to the language requirements of their clients for their final year projects, where bilingual software user interfaces might be essential for legal or business reasons.

Almost every assignment script submitted by the students was written in English. The only exception was that all six of the group submitted projects incorporating bilingual user interfaces. Project topics included: a website for a local town council, a point of sales system for a local hardware shop, and an interactive web page to provide a timeline of development of the Ffestiniog Railway (Figure 3).
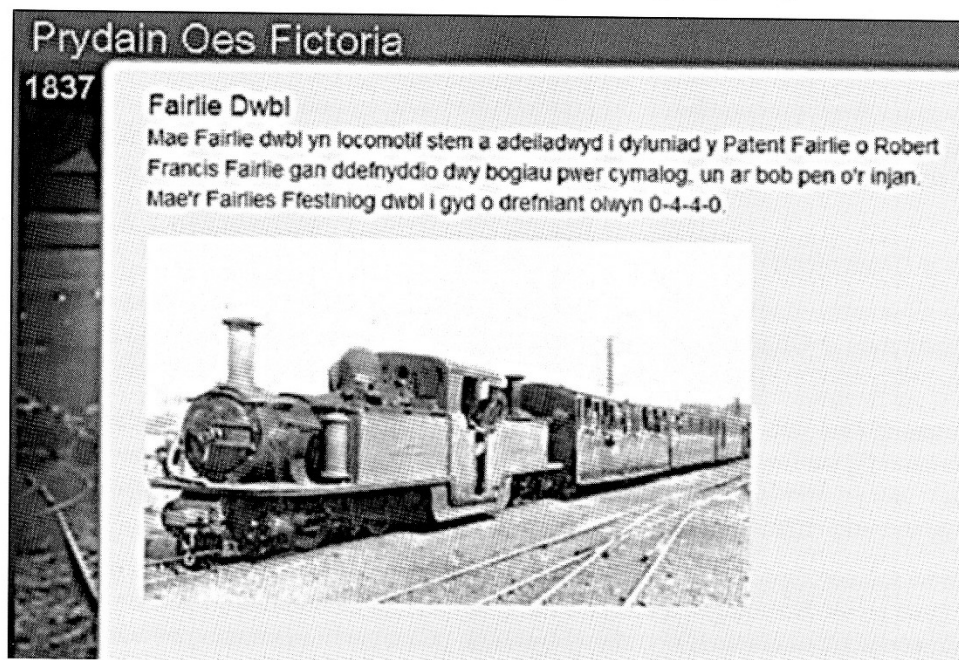

Figure 3: Screen display from the Ffestiniog Railway history project.

Interesting professional discussions centred around the relative merits of displaying Welsh and English together on pages, or providing button links to single language Welsh or English versions of the screens.

Two students included evidence in their project reports that they had held interviews with their clients through the medium of Welsh, or had undertaken questionnaire evaluations of the completed software in Welsh with users.

The final assessment of projects was by oral presentation, attended by the course tutors, project clients and invited members of the college management team. This event was naturally stressful for the students, and a free choice of presentation language was offered, with students only being assessed on the quality of the content. Linguistic choices made by the students are shown in Table 2:

Student	Oral presentation	PowerPoint and visual aids
1	monolingual Welsh	bilingual Welsh/English
2	bilingual Welsh/English	
3	monolingual English	
4		
5		
6		

Table 2: Students' linguistic choices for the formal project presentation.

During the course, the author experimented with different forms of bilingual delivery. These were evaluated on the basis of perceived student attention and participation, through informal group discussion following the event, and informal discussion with students during individual tutorial sessions. Methods attempted were:

- Bilingual oral delivery, with material presented first in one language, then summarised or elaborated in the other language. This was supported by bilingual PowerPoint presentation.

- Oral delivery in Welsh only, with bilingual PowerPoint presentation.
- Oral delivery in English only, with bilingual PowerPoint presentation.

Students appeared content with either of the single language modes of instruction, preferring these to a bilingual oral presentation which they felt was slow and repetitive. The main problem with single language Welsh presentation was perceived to be the use of unfamiliar Welsh technical terms in computing, which the students were unwilling to learn and saw as an unnecessary burden.

A compromise which seemed to work well was to present non-technical aspects of computing in Welsh only, such as project specifications and client requirements, and to change language to English when discussing technical aspects such as programming.

4   Discussion & Conclusions

As a result of the study, it became clear that the group of students had surprisingly diverse linguistic preferences in relation to both spoken and written Welsh. Social norms, as much as linguistic ability, seemed to determine the choice of language in any particular situation (Selleck, 2013).

It was pleasing that all members of the group were willing to produce written Welsh when requested to do so by a client, but it was disappointing that most of the group were reluctant to write course assignments in Welsh. This is an issue which certainly deserves further investigation, perhaps through a study of the written linguistic practices of schools in Gwynedd.

During the study, the Welsh language presented by the students orally or in writing was often not fully correct. Grammatical mistakes are evident, and borrowed English words are introduced which may be unacceptable to purists. However, over-emphasising linguistic weaknesses could lead to a loss of student confidence and a further reluctance to use Welsh. Social psychological studies into motivating students to use Welsh could form a valuable direction for future research.

Whilst an acceptable and workable model for bilingual course delivery was developed for this particular student group, it would not be possible to use a similar approach with all groups. The choice of teaching methodology would have to depend on the linguistic backgrounds and abilities of the particular students.

Four possible bilingual models for delivering the Computing Degree were identified:

Optional bilingualism

Resources such as PowerPoint presentations and worksheets are produced bilingually. Students may use whichever they prefer. The teacher attempts to provide all instruction bilingually, repeating or developing points in both languages, so that all students can follow the lesson in the language of their choice.

Advantages:

Makes Welsh speakers feel included socially.

Satisfies the statutory requirements to provide a bilingual course.

If done well, it can produce an interest and respect for the minority language.

Disadvantages:

A large amount of work is required from the teacher in producing materials bilingually.

The pace of the lesson can be slow. This can be frustrating for both the monolingual and bilingual students.

There is little likelihood of students developing their language skills.

BICS CALP model (Baker, 2011)

based on the theory that language can be divided into everyday conversational language (Basic Interpersonal Communications Skills), and specialist technical language (Cognitive Academic Language Proficiency).

Welsh is used for communication in everyday language, such as explaining tasks in general terms. General resources are provided only in Welsh, with translations available on request.

English is used for technical tasks such as programming.

Advantages

Students can improve their understanding of everyday conversational Welsh. Students benefit from teaching each other.

No requirement to learn parallel sets of technical terms in two languages.

There is a limited requirement to repeat concepts in both languages, so the pace of the class is faster.

Disadvantages

Non-Welsh speakers may feel that they are under pressure to develop their language skills.

There is an assumption of no requirement for the use of specialist Welsh technical language in the workplace or in higher education.

CLIL: content and language integrated learning (de Zarobe, 2013 and Coyle, 2007)

A deliberate attempt is made to teach the Welsh language through providing vocabulary. Non-first language Welsh students were expected to discuss and write in Welsh on occasions. Welsh language is corrected as necessary.

Advantages

Students actively improve their spoken and written language skills, which can have both social and employment advantages.

Disadvantages

Additional workload on students.

Some students may have no interest in developing Welsh language skills.

Necessity bilingualism

Students use Welsh where this is required by outside agencies, for example: in producing bilingual web pages or database user screens. Help is provided by tutors on an individual basis with translation work.

Advantages

Students are able to provide products which meet the needs of clients, and develop an appreciation of the value of the minority language.

Students gain some language skills within in a personally motivating project environment.

Students gain software skills related to the presentation of bilingual materials.

Disadvantages

Limited development of language skills. Students remain dependent on translation services when they enter employment.

Author

Graham Hall is a lecturer at Coleg Meirion-Dwyfor, Dolgellau, where he teaches modules of the Foundation Degree in Applied Computing and the BA Honours Degree in Post Compulsory Education and Training.

Email: graham.hall@gllm.ac.uk

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