Student Teachers' use of on-line resources in the preparation for their practicum

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Introduction

The increasing ease of internet access and the proliferation of web-based educational resources has provided New Zealand teachers with additional sources of materials for planning and teaching. Student teachers are exposed to Internet resources as part of their pre-service education, both during courses and in school-based experiences. In the B.Ed (Teaching) programme at Wellington College of Education, student teachers are introduced, not only to the use of the internet in general, but also to specific New Zealand web-based curriculum resources. College lecturers report anecdotally that in student teachers' planning there is evidence that web-based materials are being used.

This study was designed to investigate the level of third year student teacher use of web-based resources in the planning and preparation of their final school-based teaching experience. This experience requires them to plan, prepare and teach an on-going programme in a primary school classroom in the final two terms of their degree. Traditionally student teachers have sought resources from libraries and schools. All B.Ed (Teaching) student teachers have Internet access either through the College of Education, school or their own home. The study sought to answer the following questions in relationship to the final teaching experience:

How informed are student teachers about available Internet resources?
How do they locate suitable web-based resources?
How do they value web-based resources in comparison with other sources?
Which web sites are most used?
What use do they make of web-based resources?
How useful are the web sites to them?

Survey method

A paper-based questionnaire was administered to all third year student teachers who were present at a lecture shortly before their teaching experience began. This time was chosen because most student teachers had reached an advanced stage in their planning. The questionnaires were completed anonymously, although the student teachers had the option of adding their name. A total of 71 questionnaires were completed from a total cohort of 110.

Written questionnaires were chosen as the data collection instrument for several reasons. Anonymity was assured, which was critical in a situation where the researchers were also assessors of the respondents. This was the main reason why interviews were not considered appropriate, due to the possibility of undue influence and bias. (Sarantakos, 1998). The questionnaire allowed for quick and efficient data collection providing a stable, consistent and uniform measure, without variation.
Questionnaires do not allow probing, prompting or clarification of responses and it is not possible to check that the questions are clearly understood. However, in this case questionnaires were most appropriate for the collection of baseline data, which was a primary function of this study.

The first section of the questionnaire used in this study used an initial simple filter question to identify respondents who used the internet in their planning. This was followed by a question, which allowed non-users to clarify their reasons. The remainder of the questionnaire comprised fixed-alternative questions, where respondents were expected to select the

preferred option, combined with numerical responses. Although the response sets were designed to cover a wide range of options, in each case an "other" option was provided to allow for individual variation. (Sarantakos, 1998). The second section of the questionnaire was in the form of a matrix, which listed a range of easily accessible New Zealand curriculum web sites. These sites were all accessed through Te Kete Ipurangi (TKI). This list of sites was selected by the researchers to allow respondents to indicate:

- the frequency of use;
- the purpose for which the sites were used;
- the perceived value of the web-sites.

Space was provided to allow respondents to indicate other sites they used.

Literature

While there is a considerable amount of literature on the use of the Internet in both distance education and classroom use by students, there appears to be less interest in how teachers use the Internet for their own planning and preparation. The National (USA) Assessment of Educational Progress (NAEP) found that in 1999, 78% of public school teachers used computers or the internet at school to "create instructional materials and 59% of teachers reported using computers or the internet at school to gather information for planning lessons." (NAEP, 1999, p.13). Becker (1999) reports on the Teaching, Learning and Computing: National (USA) Survey 1998, which showed that 68% of teachers used the Internet to find "information resources for use in their lessons" and that 28% did this on a weekly basis. The Australian Schoolsnet survey in 1999 showed that 86% of teachers used the Internet for "research" and claimed that this "reflects the profession's recognition of the internet as a research tool, which acts to support their pedagogy." (p.4). A German study (Hedtke, et al, 2001) found that teachers were most interested in material that could be of direct use for their students. These teachers reported that they planned their lessons according to the available material and that they described themselves as "hunters". "They chase after everything that seems suitable for their lessons and hoard it in their private collection of material" (Hedtke, et al, p.3). The German teachers in this study were very enthusiastic about the possibility of the establishment of a pool of teaching materials arranged according to subject, class level and curriculum units to make the internet a useful education teaching aid. This "pool" of materials appears to be very similar to the well-established Te Kete Ipurangi (TKI) which the New Zealand Ministry of Education has developed as an internet portal for New Zealand teachers. TKI appears to be well used by teachers with around 78% of schools reporting that they use Te Kete Ipurangi (TKI) at least once a week (Ministry of Education, 2002a).

"Learners have ready access through ICT to a wide and well-focused range of learning resources that are selected, organised, and managed to be responsive to their needs and relevant to the curriculum" (Ministry of Education, 2002a, p19).

One of the roles of teachers in mainstream New Zealand primary schools is to deliver the prescribed curriculum. Effective teachers do this by "aligning educational goals, curriculum content, resources (including ICT), task design and assessment"(Ministry of Education, 2002b, p1). Through effective planning teachers organise teaching and learning experiences. "It is therefore considered critical that teachers have sound content knowledge of the material they wish to teach" (Education Review Office, 2000 in McGee and Fraser, 2001, p155). This knowledge is referred to as subject matter knowledge (Shulman, 1986). Teachers' subject matter knowledge may contribute to both their selection of particular curricula and to their critiques of specific curriculum materials (Grossman, 1990, p12). Lack of this kind of

knowledge may affect the level of discourse (Carlsen, 1988), or how teachers critique and use resources (Hashweh, 1987; Reynolds et al, 1988).

Teachers must also possess knowledge that is specific to teaching particular subject matter ie pedagogical content knowledge. This type of knowledge goes beyond knowledge of the subject matter to understanding the most regularly taught topics in the subject area, and the most useful forms of representation of the ideas, in order to make it comprehensible to the learners. An understanding of curriculum materials available for teaching particular subject matter, as well as knowledge about both the horizontal and vertical curricula for the subject are required. Experienced teachers access their own personal store of strategies for teaching particular topics, while student teachers are still in the process of building their repertoire. They require assistance and support in building up their own personal storehouse of pedagogical content knowledge.

Planning is evidence that thought has preceded the delivery of the teaching and learning programme. "However, written planning belies the fact that invariably, informal mental planning has preceded this step" (McGee & Fraser, 2001, p155). Although written planning is generally a requirement in New Zealand schools, much of a teacher's planning occurs 'in their heads' (McGee & Taylor, 2001, p 155). "…mental images teachers formulate as they prepare for instruction may be even more complex than their written plans." (Rosemergy, 1997, in McGee & Fraser, 2001, p161). This kind of planning does not necessarily follow a logical sequence and can occur away from the context of the classroom. Many decisions are made about aspects such as context, purposes, content, learning and teaching activities, resources, assessment and evaluation, as a teacher plans to the needs of their learners. The student teacher is learning to make decisions and plan for the needs of their learners whilst also grappling with the complexities of classroom life. Assistance to support their planning decisions could make the transition from student teacher to teacher more sustainable. The increasing availability of web-based resources, which address both subject matter knowledge and pedagogical content knowledge, can provide such assistance.

Discussion

Use of the Internet

This survey sought to establish the ways in which student teachers use Internet resources in the planning and teaching of their final teaching experience. Of the 71 respondents, 29% felt they were 'well informed', and 71% felt they were 'informed' about the internet resources available to support their teaching. This indicated that choices about the use of the Internet were based on informed decisions. 83% of respondents stated that they had used Internet resources in the preparation of their final teaching experience. Of the 11 (17%) respondents who stated that they did not use the Internet, six said they did not find anything useful, while five indicated that time constraints prevented them from using the internet. Other stated reasons for not using the internet were that there was no need to find other resources because all planning was provided; that books were more efficient; and that for some, lack of confidence in the use of the internet was a factor.

Locating Internet resources

Respondents were asked to use a numerical scale of 1-4 (with 4 being highest), to indicate the level of use of four specified methods of locating Internet resources (see Table1). It was clear that using Te Kete Ipurangi (TKI) was the most common method of locating resources, both in terms of the total number of responses and also the highest number in the heaviest use

categories. Search engines and recommendations from others were also frequently used, while general browsing was less used. These responses are perhaps not surprising given the student teachers' familiarity with TKI through their College of Education courses and the organisation of TKI material around the New Zealand curriculum. Some other methods of locating resources were noted including web sites mentioned in books and readings.

Table 1 **Methods used to locate Internet resources (n=59)**

	1	2	3	4	No response
recommendation from others	6	25	10	8	10
browsing	13	19	10	4	13
TKI	4	26	7	17	5
Search engines	7	21	7	14	10

Value of various sources of support in planning and preparation

In order to establish the relative importance of internet resources in student teachers' planning and preparation, the respondents were asked to rank a list of potential sources using a five-point numeric scale, with 5 being the highest. (see Table 2)

Table 2 **Sources of support used in planning and preparation (n=59)**

Resource	1	2	3	4	5	No response
College Courses	2	3	19	12	14	9
School resources	4	9	14	16	9	7
Teachers	7	8	16	8	13	7
Own knowledge	5	14	14	16	5	5
Library books	3	7	13	15	4	17
Internet sites	2	12	23	12	6	4
Other students	3	1	16	9	7	23
College staff	5	8	14	7	6	19

The responses indicate that although Internet use was high in the total number of responses (55 responses), this position alters when only the highest value categories are considered. Internet use is then ranked fifth in order of value after College courses, School resources, Teachers, and Personal knowledge (equal third) and Library. These results would tend to suggest that "traditional" sources of support for planning and preparation are still the most valued, but care needs to be taken in interpretation. Although the question asked for "value" of the resource to be ranked, it is not clear from these results whether ease of access may have influenced these rankings. For example, School resources may be highly valued because they are immediately available being in situ. Clearly, further investigation is needed to clarify this point.

Student teacher frequency of web site use

Respondents were asked to record on a grid the level of their use of a specified range of New Zealand web sites. A four-point numeric scale was used (with 4 being the highest use). Each web site on the list was used at least once, but the most-used sites were quite clear. The ten most-used sites were analysed further (see Table 3). Te Kete Ipurangi and NZ Maths were used by almost 90% of the respondents. However, when only the most frequent responses are

considered then TKI is clearly the most used web site being accessed by 75% of these student teachers. This is not surprising given the "one-stop-shop" cross-curricular nature of TKI. Apart from TKI, of the other web sites accessed by more than half of the respondents, two are Mathematics based NZ Maths and Figure It Out. One site, English-Online, is focused on the teaching of English. The other two sites focus on assessment i.e. Assessment Resource Banks and The New Zealand Curriculum Exemplars. These responses indicate that the students teachers appear to be following the heavy school emphasis on Mathematics and English and the interest in the new approaches to assessment. The other sites in the "top ten" seem to be related to the investigation of other curriculum areas, which were part of the teaching experience planning. (See below for a summary of the web-site content and structure). Respondents were also asked to add the names of any other web sites they used in their planning and preparation. A range of sites was recorded, but each site was used by only one respondent. The sites included search engines such as Google (www.google.com) and Askeric (http://ericir.syr.edu/) and a range of U.S.A. teachers' web sites.

Table 3 Web sites used most often in planning and preparation (n=59)

Web site name	1	2	3	4	Not used
Assessment Resource Banks	6	9	6	13	25
Assessment Tools Search	4	4	3	6	42
Curriculum in Action (Health)	5	8	4	3	39
English On-line	7	11	10	10	21
Exemplars	11	5	5	11	27
Figure It Out (Maths)	8	6	11	13	21
NZ Maths	5	5	17	26	6
Social Studies On Line	6	5	10	6	32
T.K.I.	1	6	2	44	6
Unwrapping the Arts	7	5	2	2	43

Most frequently used sites

Te Kete Ipurangi www.tki.org.nz

TKI is the New Zealand Ministry of Education bilingual portal with integral "web communities", which provides educational material for teachers, school managers, and the wider education community. The material and links on TKI are edited and maintained by staff who are teachers. The structure of the site is organised around the learning areas of the New Zealand Curriculum and the initiatives of the Ministry of Education.

Assessment Resource Banks http://arb.nzcer.org.nz

This site links the user to a bank of assessment items in English, Mathematics and Science. Users are required to log in with a password before searching either by strand or level within the stated essential learning areas. Items are accompanied by marking guides and discussion around the degree of difficulty of items.

Assessment Tools Search www.tki.org.nz/e/assessment/ao

This site of professional support material is currently under development. It will enable the user to select assessment tools linked to specific achievement objectives within English,

Mathematics and Science. The user may search by subject, level and strand. The site will provide the user with links to NZ Maths, English On-Line, Assessment Resource Banks, asTTle, Exemplars and School Journal References.

Curriculum In Action www.tki.org.nz/r/health/cia/i
This site is the on-line version of The Curriculum In Action support booklets for the Health and Physical Education in New Zealand curriculum. It is organised in the key areas of learning, and then in levels within these. In the site there are also sections titled Introduction, Links to Curriculum, Key Concepts, Planning Considerations, Learning Outcomes, Learning Experiences, References, Resources and Contacts.

English On-Line http://english.unitecnology.ac.nz/
English On-Line has three main parts: English units, an interactive section, and a resource centre (English On-Line Resource Centre).
The site is sectioned into English Units, Classroom, Professional, Students, Interact, and Happening Now. The units span Years 1-13 and have planning assistance available within them. Within the interactive section there are Book Back Chat, Writers' Window, Kids' Read, Barb Wired and What's Hot, to which users may contribute. The English On-Line Resource Centre includes reviews, readings and monthly reading lists.

New Zealand Exemplars www.tki.org.nz/r/assessment/exemplars
Exemplars in English and Mathematics are currently available on-line through the TKI Assessment community. These are examples of quality work across levels 1-5 in each of the stated curriculum areas. They are accompanied by annotations relating to learning context, learning conversations and indicators of what the work is showing. Exemplars in Science, the Arts, Oral and Visual Language are due later in 2003.

Figure It Out www.tki.org.nz/r/maths/curriculum/figure/
This site is the on-line version of the Figure It Out series of curriculum support booklets to supplement existing Mathematics programmes, and is part of the Literacy/Numeracy strategy. This site allows users to view the booklets and the Answers and Teachers' Notes. The site is organised in levels (Levels 2-3, Level 3, Levels 3-4, Level 4), and within each level there are Contents, Acknowledgements, Introduction, Answers, Teachers' Notes and Copy Masters.

NZ Mathematics www.nzmaths.co.nz
This site comprises units of work organised in the strands of the Mathematics in New Zealand curriculum. They are based around the curriculum levels 1-8. In addition to the main strands there are also units under the heading of problem solving, and there is a Te Reo Maori section. An Information Centre has a Help facility, a newsletter, technical help and a seminar/feedback section. A Numeracy Project section is under development which will eventually comprise project material, result databases, on-line facilitation and references. A Bright Sparks section contains eight applets of problem solving type activities.

Social Studies On-Line www.tki.org.nz/r/socialscience/curriculum/SSOL/
This site is similar to English On-Line. It has a bank of units from levels 1-13 of the Social Studies in New Zealand curriculum. It also includes Virtual Field Trips, Web Quest and unit planning resources.

Unwrapping the Arts www.tki.org.nz/e/arts
This site is organised in the strands of Visual Arts, Dance, Drama, Music from the Arts in New Zealand curriculum. The user is required to select one of these strands and then a level

(from 1-5) within the strand. The site then 'unwraps' learning examples with advice for teachers on a planning and assessment, elements and terms, and resources. This site will ultimately link to the national exemplars in the Arts when they are phased in later in 2003.

Purpose of web site use

Respondents were asked to identify the purpose for which they used the listed web sites. Four categories of use were provided; Planning, Information, Printouts and Ideas only. Most respondents recorded that they used web sites for more than one purpose and in many cases for all four categories of use. (see Table 4) 27% of web-site use related to Planning, 27% to Information, 23% to Printouts of web material and 24% to finding Ideas only. When the uses of the most popular web sites are examined the pattern is similar with more use being made for planning purposes than the others. While this survey gives only a general "self-reported" view of internet use, this evidence suggests that these student teachers were doing more than just "cutting and pasting" lessons from the internet.

Table 4. Use of top ten web-sites (respondents could select more than 1 category)

Web site	Planning	Information	Printouts	Ideas only
Unwrapping the Arts	5	12	7	9
English On Line	26	29	23	20
Social Studies On Line	14	17	14	16
Figure It Out	24	27	24	22
NZ Maths	46	41	41	32
Curriculum in Action	9	9	8	11
Assessment Tools Search	10	10	10	8
Assessment Resource Banks	16	18	16	17
Exemplars	15	17	10	21
T.K.I.	47	42	38	36

The usefulness of the web sites

The respondents were also asked to rate the usefulness of the listed web sites using a four-point numeric scale (with 4 being the highest). While there were fewer responses in this section of the questionnaire, there is some evidence that the student teachers were exercising some judgement in their selection of web sites. The responses generally follow the pattern of the earlier sections. The most heavily used web sites, TKI and NZ Maths are both the most valued in terms of their usefulness. These two sites gained the greatest total of responses and also had most responses in the highest value category. Some interesting comments were recorded in the optional section. One respondent commented that Figure It Out was "OK, but very wordy" and another that they preferred to use the printed book version of the web site. One respondent found TKI "hard to use", but other comments were more positive, "great for New Zealand teachers", "good range" and "links are good". One respondent wrote that their "internet use was prompted by assignment requirements" and this certainly indicates an area to explore further in future.

Table 5. Usefulness of top ten web-sites

Web site	1	2	3	4
Unwrapping the Arts	1	4	4	2
English On Line	1	4	5	13
Social Studies On Line	1	2	4	8
Figure It Out	0	4	7	13
NZ Maths	0	3	9	26
Curriculum in Action	0	4	2	4
Assessment Tools Search	2	1	4	2
Assessment Resource Banks	1	5	5	11
Exemplars	2	8	5	6
T.K.I.	2	5	6	29

Summary

This survey has provided a set of baseline data, on which further study can be based. The survey showed that most of these student teachers were actively using the Internet in their preparation for their final teaching experience and that they generally felt that the choices they made were informed. It is very clear that these student teachers see TKI as a central tool in their use of the Internet, being valued for its own information and its links to many other relevant sites. The Internet is only one of a range of resources that student teachers use in their planning and preparation for teaching, and for this group, human and printed resources were generally more valuable. Mathematics, English and assessment web sites were the most heavily used and valued by these student teachers. The web sites were used for a variety of uses with planning being the most frequently mentioned purpose for Internet use.
The level of use of a web site seems to be closely related to the perceived usefulness to the student teachers.

This study has helped to identify future areas of research. Whilst the questionnaire method has allowed the collection of data efficiently and in breadth, it is clear that the addition of focus groups may be helpful in exploring in more depth the underlying reasons for student teacher Internet use. It is intended that a further study will be undertaken in the latter part of 2003.

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