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Quantitative Literacy for Pre-service Teachers via the Internet

Jane Watson and Jonathan Moritz
University of Tasmania

Quantitative literacy involves not just basic number skills, often called numeracy, but also the ability to integrate basic skills in contexts that require high levels of literacy to interpret situations and make judgments. This paper discusses the development, implementation, and evaluation of a unit designed to assist pre-service teachers of mathematics to see the relevance of quantitative literacy to daily life, to understand and discuss aspects of quantitative literacy themselves, and to prepare and deliver lessons in schools using an internet site as a teaching resource. Forty pre-service teachers (a) selected a newspaper article and developed student questions and brief comments for discussion with teachers, identifying issues for mathematics teaching; (b) developed a teaching unit for one or more class lessons and implemented it in the classroom; (c) prepared an evaluation of the experience; and (d) discussed their colleagues' work in relation to these tasks online. Responses indicated most of the pre-service teachers could engage with these tasks and came to believe that they supported effective teaching in the classroom. Some difficulties are identified, however, related to the implementation of the project, and suggestions are made for future variations.

Numeracy, arithmetic, mathematics, quantitative literacy: the nomenclature changes periodically, as does the definition of terms. Recently the National Council on Education and the Disciplines (NCED) (Steen, 2001) used the phrase quantitative literacy to create links between mathematics and democracy. Compared with the other terms, quantitative literacy is a rather new invention. As used by the Australian Bureau of Statistics (McLennan, 1997) in its survey of adult literacy in Australia, the following definition of quantitative literacy dates from 1993:

> The knowledge and skills required to apply arithmetic operations, either alone or sequentially, using numbers embedded in printed material (e.g., balancing a checkbook, completing an order form). (Steen, 2001, p .7)

By 2000, the International Life Skills Survey used a more comprehensive definition:

> An aggregate of skills, knowledge, beliefs, dispositions, habits of mind, communication capabilities, and problem solving skills that people need in order to engage effectively in quantitative situations arising in life and work. (Steen, 2001, p. 7)

The NCED itself went on to describe various elements and expressions of quantitative literacy. Ten elements of quantitative literacy included confidence with mathematics, cultural appreciation, interpreting data, logical thinking, making decisions, mathematics in context, number sense, practical skills, prerequisite knowledge, and symbol sense. These elements are characteristics we

would like to see in the beginning teachers we send into the nation's classrooms. Quantitative literacy finds expression in citizenship, culture, education, professions, personal finance, personal health, management, and work (Steen, 2001). This variety of expressions illustrates how the relevance of quantitative literacy is as pervasive as that of general literacy.

Curriculum documents have for some time acknowledged that students should develop understandings of mathematical concepts that may be used in applied contexts. In the United States, the National Council of Teachers of Mathematics suggests that instructional programs should enable students to "recognize and apply mathematics in contexts outside of mathematics" (2000, p. 64). In New Zealand, a component of statistics at all levels of schooling is "interpreting statistical reports" (Ministry of Education, 1992). The objectives in *A National Statement on Mathematics for Australian Schools* (Australian Education Council, 1991) include, that primary students "choose and use mathematical skills to make decisions" (B1, p. 68) and "clarify and pose problems arising in practical or imagined contexts" (B2, p. 68), and for middle and high school levels, students "choose and use mathematical skills to assist in interpreting information from a variety of sources (e.g., newspapers, magazines)" (CD3, p. 72). Relative to this objective, Joram, Resnick, and Gabriele (1995) call for numeracy activities in the classroom that reflect the interpretation of numbers that appear in discourse in media such as magazines. Typical understandings required are related to measurement, percentages, percentiles, risk, rates, changes in rates, averages, ranks, sampling techniques, sources of bias, and the significance of very small and very large numbers. These appear daily in various contexts in newspaper articles and provide opportunities to develop almost all of the elements of quantitative literacy.

An Internet Site: Chance and Data in the News

As part of our previous research (Watson, 2001) and professional development work (Watson, 1998a) with teachers, we observed that teachers were enthusiastic about newspaper articles containing significant mathematical content, and we were encouraged to make available the news articles we had gathered. Hence in 1996 as part of a national professional development project in chance and data (Watson, 1998a, 1998b, 1999a) we created a website in cooperation with The Mercury newspaper in Hobart, named Chance and Data in the News, available at http://ink.news.com.au/mercury/mathguys/mercury.htm. The newspaper's Education Editor allowed for any article from this or affiliated newspapers to appear online in a similar format to the newspaper. Over 200 full-text newspaper articles were available, most with Teacher Discussions and Student Questions written by us, linked together, as shown in Figure 1. The news articles were categorised into six groupings, the first five related to Chance and Data, and the sixth to aspects of Numeracy throughout mathematics, as shown in Figure 2. The articles were also indexed by topic content such as sports, smoking, and transport, for use in project work related to current affairs in social science, science, health, economics, politics, and sports.

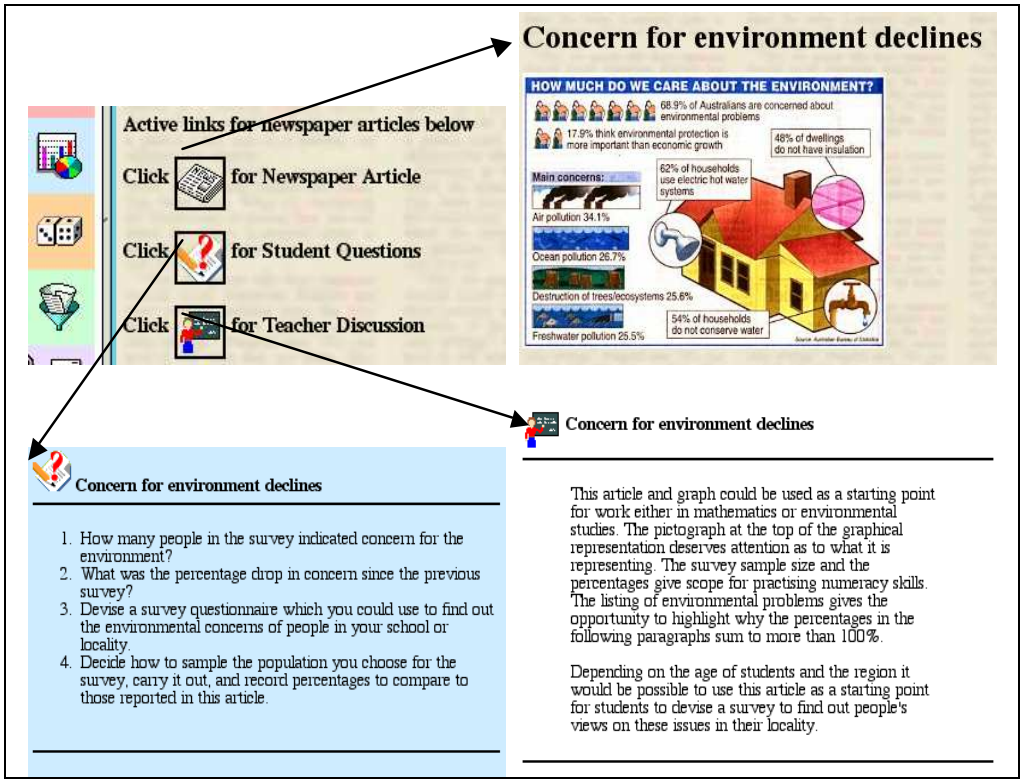

Figure 1. Links within the Chance and Data in the News website.

Tasks to Develop Quantitative Literacy for Pre-Service Teachers

In order to address the issues of quantitative literacy raised at the beginning of this paper, we developed a Quantitative Literacy component as part of the mathematics unit within the two-year post-graduate Bachelor of Teaching (BTeach) program at the University of Tasmania. The Chance and Data in the News internet site was used as the basis for this component. As an introduction to working with news articles, 40 students (pre-service teachers) were asked to read a paper entitled "Linking Numeracy with Literacy in the Middle School Classroom" (Watson, 1999b, accessible from the lecturer's internet site), which described two news articles, one about a meteor's approach to the earth, and the other about success in altering the angle of incline of the Leaning Tower of Pisa. Each article was accompanied by five possible adaptations for classroom use linking numeracy and literacy.

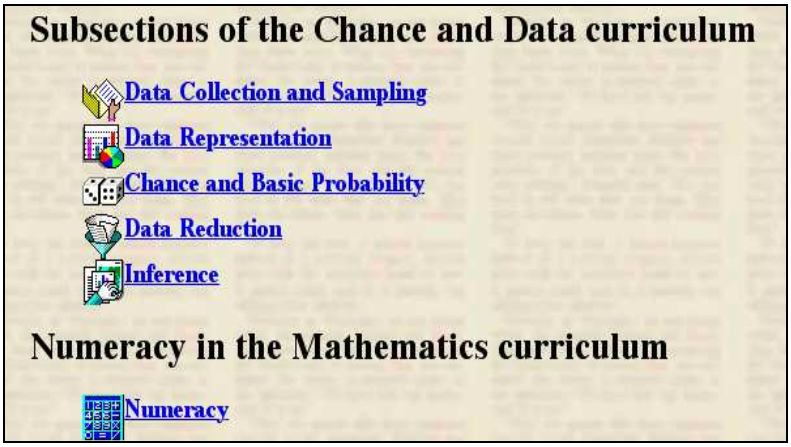

Figure 2. Categories of the Chance and Data in the News website.

Students were then given two handouts. One four-page handout was prepared with explicit step-by-step instructions to access and use the Chance and Data in the News website; this was considered important even though all students had experienced training in the use of information technology. A second four-page handout was prepared with instructions, describing four tasks to be completed and how they would be assessed to account for 15% of the total mark for the methods courses in which students were enrolled.

- Task A required the students to select an article from The Mercury or affiliated newspaper that they felt could be used as part of their mathematics program during school experience to illustrate quantitative literacy as a part of everyday life. They then had to provide a Teacher Discussion about why the article was relevant and how it could be used in the classroom, as well as a set of at least five Student Questions, similar to those found on the internet site. Students were told that their responses for this task would be incorporated into the internet site at the end of the year (with their approval).
- Task B required the students to submit lesson plans based on their articles for a class they would be teaching as part of their school experience during the year.
- Task C asked for written evaluations of the lessons, submitted after school experience.
- Task D required students to comment on the news articles, Teacher Discussions, and Student Questions developed by five of their colleagues. This was designed to provide feedback on each other's work and to promote discussions.

Responses to Tasks A, B, and C had deadlines across the two University semesters, and were marked by the lecturer and returned to students. In order to

facilitate Task D, the news articles, Teacher Discussions, and Student Questions developed by the BTeach students were placed on an internet site within the University of Tasmania's WebCT environment in a format similar to the Chance and Data in the News website. The use of WebCT gave students experience in another aspect of information technology, particularly as WebCT courses have been developed by the Tasmanian Department of Education for use in government schools (Department of Education Tasmania, 2002). One benefit of the WebCT environment was that it allowed restricted access only to BTeach students, so that students could have on-line discussions in the confidence their comments were not visible to the outside world. Another benefit was ease in setting up discussion forums, grouped by topics for each news article, and with the software recording and providing access to the discussions.

Summary of Responses

Of the 40 students who took part, 15 were completing the primary specialisation, 18, the middle school specialisation, and 7, the secondary mathematics specialisation. Of these, one secondary student withdrew from the BTeach course half-way through the year. One middle school student completed Tasks A, B and D, but not Task C. Ten students (four middle school and six primary) did not complete Task D: six students failed to access the WebCT site and four others reached the site but did not post any discussion items.

The Student Questions and Teacher Discussions written by students (Task A) differed according to the grade levels that the students expected to be teaching during the year. Some of the questions for primary students were integrated with other topics and less mathematical, as in the case of the article, "Outcry over plan to cull elephants" (The Mercury, 13 March 2001, p. 13). The Teacher Discussion written by the BTeach student <S1> suggested using the article for a SOSE-Mathematics-English unit, including questions such as, "List at least five different ways that numbers are used in this article" and "List and explain at least five words that are used to describe change in this article." Both questions are relevant to linking numeracy and literacy. Other questions, more specifically related to SOSE, considered whether the elephant problem is one for Africa or the world, who are the stakeholders described in the article, and what benefits could the selling of ivory have for the authorities. Another primary student <S2> chose the weather pictographs for three sites in Tasmania on p. 2 of The Mercury, for six consecutive days. Her questions focused on other ways of presenting the information in graphs; finding maxima, minima, and averages for the cities for the six days and comparing them; and discussing factors that affect the temperature and how meteorologists make predictions.

At senior levels, Student Questions explored a range of mathematics and social issues. For example, one student <S3> chose an article titled "Boozing's shock toll revealed" (The Mercury, 19 March 2001, p. 10), in which there were claims that "more than 62,900 person-years of life are lost annually" based on "3290 alcohol-related deaths in Australia in 1997", and that "drinking to excess including road accidents and violence caused 46 per cent of life years lost" compared with "33

percent due to chronic conditions such as cirrhosis and cancer, 6 per cent for stroke and 14 per cent for suicide." Questions included "Q1: The data in the article are represented in 'person-years of life lost annually'. How do you think they were worked out?" and "Q8: What is the problem you would encounter if you tried to construct a pie-chart from this information?" Notes for Teacher Discussion included, "The article also has the potential to be included in discussions about the impact of the use of alcohol by young people on the community in SOSE. There is the potential to discuss the ramifications of a person's death extending far beyond the effect it has on the immediate family that has suffered the loss."

The lesson plans (Task B) varied greatly in quality, but no more so than for similar tasks required by other parts of the BTeach program. In some cases the lesson plans had large gaps where we were unsure what would be happening in the class or how the numeracy content would be integrated with the context.

The evaluations (Task C) varied from being platitudes on how well the children had reacted, to being thoughtful discussions of pros, cons, and future possibilities. All students except one used one or more newspaper articles during their school experience. The one student withdrew from the internship but continued enrolment in the methods course. Only 15 students (39%) presented evaluations on teaching lessons based on the original articles they had selected. The main reasons for changing sources related to the grade level taught being different from the one that was chosen for the article or to there being a particular theme for an integrated program in the classroom that was better suited to another article. When a different article was selected, it was generally chosen from those on the Chance and Data in the News site or from those of other students in the course.

The overall quality of contributions for Task D varied greatly and not all students posted as many as five contributions. One contributed six and one, seven. Overall, the marks for the Quantitative Literacy component of the course (15%) were generous compared to the marks for other course requirements. The average mark for the 39 who were enrolled at the end of the year was 12% out of 15% as there was a desire to encourage students to complete the tasks. This marking also reflected the major goal of the task, which was participation in using newspapers and the website to promote quantitative literacy as the link between mathematics and wider society.

Examples of Responses

Examples of responses to Tasks A, B, C, and D are shown in Figures 3, 4, 5, and 6 respectively. The article was selected as one that provoked considerable discussion for Task D. The article (Figure 3) was based on a humorous account of a record-breaking pumpkin and offered many opportunities to consider measurement in the classroom. It was selected by a primary pre-service teacher <S4>, who used it with an upper-primary class. All of the participants in the discussion in Figure 6 were either primary or middle school students. We suspect that the reasons the article was popular with the pre-service teachers included the ease of understanding the language involved for students, its direct relationship to

the measurement component of the mathematics curriculum, the possibilities for employing hands-on activities in the classroom, and the chance

Source: The Mercury, 9 March, 2001, p.3

Overweight, gone to pot

A SOUTH Australian couple have grown Australia's largest- ever pumpkin, weighing 286kg and with a 3.7m circumference.

Ken and Rosemary Holden, from the tuna fishing town of Port Lincoln, had the giant pumpkin officially weighed in front of witnesses, including a justice of the peace, yesterday.

Mr Holden said the pumpkin would probably be donated to the local hospital for soup, which he had calculated could serve 1200.

"It makes lovely soup," he said.

Mr Holden had to build a special shelter out of shadecloth around the growing pumpkin to protect it from the sun and wind.

The pumpkin, Dill's Atlantic Giant, was fed with a large amount of animal manure, phosphorus, nitrogen and potassium.

The couple had another pumpkin that reached 334kg, but it split and was ineligible for the record.

Student questions

1. Why do you think it was estimated that the pumpkin could feed 1200 people? How might this have been worked out?
2. List all the numbers mentioned in the article.
3. What are some of the numbers that you can make using the digits mentioned in the article? (Only use each digit once) Try to make 3 digit, 4 digit, 5 digit numbers etc. Write at least ten new numbers.
4. What do you think the total weight of the people in your class would be? (Make a guess). How different would this figure be from the weight of the record pumpkin?
5. Find a way to measure accurately the total weight of the people in your class. What is the correct total? How far off were you?
6. How many people in your class would the weight of the record winning pumpkin be equal to?

Teacher discussion

The student discussion questions for the article, Overweight, gone to pot, are aimed at encouraging students to focus on the concept of weight, and to relate this to their own lives. The questions also focus on encouraging students to think mathematically, as there is a strong emphasis on problem solving. Students are required to use estimation, choosing correct calculations in order to solve problems, as well as experimenting with digits in order to make their own numbers. Students are also required to relate the weight of the pumpkin back to their class, by working out how many people in their class the weight of the record pumpkin would be equal to. (Note - need to bring a set of scales to class!)

Figure 3. Task A example for K-6 by a BTeach student <S4>.

to make links with other curriculum areas. It is also possible that the article became more popular as teachers chose to discuss an article that had already created discussion. Although the original student questions in Figure 3 do not address the full potential of the article, they provide a good starting point. Some of the comments from the WebCT discussion include suggestions for other activities and student questions (Figure 6).

Lesson Plan for Upper Primary - Overweight, gone to pot

PURPOSE:

- To relate concepts in the article to a "realistic" situation
- For students to experiment with numbers
- For students to make realistic predictions

INTENDED OUTCOMES:

ENGLISH 3.8a - Integrates a variety of strategies for interpreting printed and visual texts.

MATHS 3.11 - Counts, orders, estimates and describes with whole numbers, common fractions and decimal fractions for money or measurement (extension activity).

MATHS 3.20 - Makes sensible numerical estimates using units that can be seen or handled and uses words such as between to describe estimates.

TASK SEQUENCING AND ENGAGEMENT:

- Read through article and questions with class. Ask how they would go about answering each question. Ask students how they could find out the accurate weight of the class.
- Students work through the questions.
- Explain that when students are weighing themselves they do this outside the classroom and they write their weight but not their name on a piece of paper and put it in a box (This is to avoid embarrassment if any child is sensitive about their weight.): students do this one at a time; make sure that it is set up.
- Students can then work through adding the total class weight together and comparing it to the weight of the record pumpkin. (This can be done as a whole class)
- When students have finished, bring everyone down to the mat to discuss their findings (Write findings on board): Compare results. What did students like most and least about the activity? What did they learn?

Figure 4. Extracts from a Task B lesson plan by a BTeach student <S4> for the article in Figure 3.

Some students experienced difficulty in comprehending exactly how heavy 286 kilograms was. [...] I brought in a pumpkin from the supermarket which weighed approximately 2 kilograms, and as a class we talked about how much heavier the record winning pumpkin was. [...] The lesson took a different turn than originally planned but it worked well. [...] As a class we looked at a variety of objects in the classroom eg books and chairs, and predicted which would be heavier and why. Students came up with the idea of using scales to accurately measure their weight. [...] No one refused to participate and there was no one in the classroom who had a weight issue. Later on I could hear students saying "I weighed x kilograms" [...] They seemed generally interested and excited about finding out what their accurate weight was, as most students seemed to have no idea. Students worked in groups to add up the total class weight using a calculator. As part of the final discussion at the end of the session we discussed students' predictions. Students were asked to explain *how* they arrived at these predictions. [...]

The lesson in general fitted in well with our mathematics program, as we had been working on measurement activities. [...] We were able to use this activity as a way to discuss another type of measurement. I think that it was very important that students were able to compare the weight of the record pumpkin with something more concrete (their collective class weight), as this seemed to enable students to think about how heavy the pumpkin actually was. [...] Although there were students in the class who had literacy difficulties, this did not matter as we read through the article as a whole class. Also students were able to work in pairs if they wished, which overcame any individual learning difficulties.

Future Improvements. [...] I would like to spend more time on the initial discussion and ask students in groups to weigh specific objects in the classroom first, as the most difficult part of this activity for students seemed to be comprehending how heavy 286 kilograms was. I would also like to list as many things as I can that are approximately this weight in order to provide students with a reference frame.

Figure 5. Extracts from a Task C evaluation by a BTeach student <S4> for the lesson plan in Figure 4.

Message no. 30: posted by <**S1**> on Mon Sep 17, 2001 20:37 This article would offer some great opportunities for interactive student involvement. However, one would have to be cautious about weighing individual children in front of others for fear of ridicule and harassment if they happen to exceed the perceived norm.	**Message no. 53:** [Branch from no. 30] posted by <**S5**> on Mon Sep 24, 2001 10:36 I agree, I would be particularly careful examining children's habits according to such as survey. It is good that children can relate the experience to their own lives, however there are some issues within this that need to be approached carefully.
Message no. 83: [Branch from no. 30] posted by <**S6**> on Thu Sep 27, 2001 09:47	**Message no. 110:** [Branch from no. 30] posted by <**S7**> on Sat Sep 29, 2001 22:35

<S4>, I really like your first question about how they worked out how many people the pumpkin would feed. I think it is a good problem solving activity that would be a good one to do in groups. I would focus on getting students to describe how they came to their solution and to justify it to the rest of the class.	As I was reading your discussion of this article I was asking myself, "what about those children who are larger/smaller than the average?"... this worried me a little. I agree with <S1> that the teacher would need to be careful about how they approach this topic with students.
Message no. 91: posted by **<S8>** on Thu Sep 27, 2001 12:58 I really like the way you have used this article. I think the activities would be very enjoyable for the students. Like <S6>, I too like the first question. It is important to get students thinking about how such statistics are derived.	**Message no. 116:** [Branch from no. 110] posted by **<S9>** on Sun Sep 30, 2001 21:35 A sequence of learning experiences could be planned related to a circle, such as introduction of the dimensions - circumference, radius, arch, center etc. for an upper primary grade while taking the opportunity to teach a middle to lower primary class the concept of weight. In either case, students could research to find out about records of other unusual animals or vegetables in the country or in the world to extend the learning experience into other curriculum areas.
Message no. 79: posted by **<S10>** on Wed Sep 26, 2001 20:20 Great article with lots of possibilities. I would do a unit, with the children setting up a plan for their own garden to grow a giant pumpkin (or other vegetable), showing the size of land required, number of seedlings to be planted to ensure at least one to survive, estimates of required plant food, water etc. How long it would take to grow to a set size, things to protect the plant (from vermin, environment, children!). Then to actually set up an environment to grow their own plants (an easy option, given that it can be kept inside, would be a mini mushroom farm). Children predict how many mushrooms will grow, how long they will take to grow, what weight will be produced, how much it will cost, and if they were sold in a shop how much they would receive, if they repeated the process would they expect the same results and/or what variations could be expected.	**Message no. 119:** [Branch from no. 30] posted by **<S11>** on Mon Oct 01, 2001 11:58 I really like the way <S4> has included some problem solving/estimating questions for this articles, because often these newspaper articles are used for more straightforward comprehension and calculations. Things that might come out of the calculating how the pumpkin could feed 1200 people might could include - size of cups or bowls, price sold for (or were they free), how many pots would be needed to cook or heat the soup if it was to be served within a small time frame, what size would those pots be? Maybe there could be a way to contact the people involved in the story to find out how the whole do went. I agree with <S1>'s comment about weighing people in class. You would have to know your class well before deciding if that part of the task would be worthwhile.

Figure 6. WebCT discussion for the article in Figure 3.

Evaluation of the Quantitative Literacy Course Component

From the lecturer's point of view the Quantitative Literacy component of the Year 2 BTeach mathematics program met the objectives of introducing students to a variation on the traditional mathematics curriculum, to the idea of quantitative literacy as a complement to literacy in the overall curriculum, to the news media as

a source of lesson material, and to WebCT as a mode of discussion among peers. The fact that many students chose a different article as a basis for a lesson once they were in a classroom was not considered a failing of the project. In fact it demonstrated the flexibility both of the newspaper medium and of the students by the second year of their BTeach program.

Comments made by BTeach students in the evaluations of their lessons or units illustrate some of the reactions they felt.

> There was an insightful comment made by one student concerning the comparison of Australian air safety and air safety in the USA: "But does this mean that private flights are more dangerous in Australia?" The discussion that followed this observation resulted in the students estimating the number of private planes per head of population in Australia compared with that of the USA. <S12>
>
> Shock and horror accurately describes student response when asked to calculate what the percentages added up to in the graph (112.3%). <S13>
>
> The activity was to allow me to assess the students' thinking with respect to percentages and to provide drill and practice for the students in an interesting format. The information given in the article was wrong, allowing for discussion of the need for critical literacy skills. Overall, the lesson went quite well. The initial outcomes and expectations of the lesson were limited in their scope compared to what was achieved in the lesson. <S3>
>
> While I was uncertain to how the students would react to the use of the articles in the classroom, and from the knowledge that they were [not] the greatest risk takers, I was pleasantly surprised that they were engaged from the very beginning … To look critically on the lesson, I was unsure as to whether I should have begun the class with the discussion as it lead directly to the idea of misrepresentation. Should I have given out the articles and let them [put] forward their own thoughts and develop their own ideas? <S14>

Some of the students themselves offered unsolicited evaluations on the requirements for quantitative literacy on the course. It was noticeable that the grumbles about doing such a trivial project by the secondary students and such a complex project by the primary students, disappeared by the time Task A was completed. Although some questions turned out to be inappropriate for the exact level students ended up teaching, generally they were appropriate. Some of the "conversion experiences" are reported in the following extracts. The latter two were from mature-age primary pre-service teachers.

> Presenting mathematical concepts in context immediately provides cross-curricular opportunities and enhances the learning experience. I have used the article again with another class with similar results and feel encouraged to use other articles when appropriate. <S3>
>
> In general I found that the lesson generated excellent mathematical discussion in the classroom. I found it surprising to realise how confused many students are about terminology and mathematical data. <S15>
>
> All my previous worrying as to how to introduce articles such as these into the classroom has now disappeared. <S14>

> Although I felt trepidation about presenting this class with a newspaper article, it really worked beautifully. The entire class was interested, and actively participated in class discussion. I was genuinely surprised. <S13>
>
> Thank you for your contact this year. I gained valuable experience from these assignments as it forced a change of mindset in teaching practices! <S16>
>
> For me personally, I have gained, what I consider are valuable critical literacy skills. As I now read newspapers, I consider the purposes, audiences and consequences of an article. I can now take this new knowledge back into my classroom. Why Maths articles? Because generally, numbers are easy to recognise in print. We use numbers prolifically in our daily life and language. Articles that include Maths are written in a literate form/genre. Literacy and Numeracy should be addressed equally in any school/classroom curriculum so this provides opportunities for both to be addressed at the same time and for students to recognise there is a connection between the two. For students who don't see maths as important or necessary or valuable, it presents opportunities for that positive recognition and realisation. <S1>

The most disappointing aspect of the project from our point of view was the use of the WebCT site. Almost all students procrastinated in becoming involved in the WebCT discussions until the end of the course. This meant that the opportunity of providing feedback for each other that could be helpful in editing questions or using other ideas was missed. Some students claimed difficulty in using the site and another four-page document was prepared with detailed instructions. In implementing the Quantitative Literacy component again we would make the requirement for WebCT interactions periodic throughout the course, e.g., two each month, to ensure ongoing discussion. As the lecturer making comments within the WebCT discussion, sometimes it was difficult to be insightful given the generalities of students' comments. This is an area that requires more thought for greater benefits to accrue.

Other suggestions for the future include making a requirement like this Quantitative Literacy unit universal across the BTeach program. Students in other secondary curriculum areas can easily find articles with links to their subjects. Numeracy should be just as much a cross-curricular responsibility of high school teachers as literacy. Using a phrase like Quantitative Literacy may help the cause in this regard. Even at the primary and middle school levels, there is greater opportunity to plan cross-curricular activities using articles, and this we would encourage more strongly in the future.

Only one pre-service teacher reported actually using computers to access articles on the internet site during class time, and this was with a small group of students. In the long term on-line access would be one of the objectives of a school-based quantitative literacy program. Although impossible to require as part of a pre-service internship project, we would discuss the idea with BTeach students in case they could make enquiries about computer access at their internship schools.

The Chance and Data in the News internet site was a convenient starting point for this project that had been created out of a previous project with in-service teachers related specifically to the Chance and Data strand of the mathematics curriculum. We intend to rename the site "Numeracy in the News" to reflect the

broader aims of quantitative literacy and the breadth of articles now available, including those selected by the BTeach students.

Conclusion

The current debate in some parts of Australia on "new basics" (Education Queensland, 2000, 2001) and "new essential learnings" (Department of Education Tasmania, 2001) opens the door to the integrated approach to numeracy, literacy, and use of information technology as employed in this project on quantitative literacy. If pre-service teachers have hands-on experience in this area, they are much more likely to try similar activities within the new curriculum frameworks once they are out in the classroom full-time. If the disciplines, like mathematics, are to survive the onslaught of more nebulous essential learnings, then demonstrating their usefulness in ways so eloquently stated in the recent work of the NCED (Steen, 2001) quoted at the beginning of this paper is necessary. We believe that projects like this quantitative literacy project will assist teachers to help high school graduates become quantitatively literate citizens in society.

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Authors' Note:

Recently the name of The Mercury web site has been changed to "Numeracy in the News"?

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Authors

Jane M. Watson, Faculty of Education, University of Tasmania, GPO Box 252-66, Hobart TAS 7001. Email: <jane.watson@utas.edu.au>.

Jonathan B. Moritz, Faculty of Education, University of Tasmania, GPO Box 252-66, Hobart TAS 7001. Email: <jonathan.moritz@utas.edu.au>.