

Chapter Eight

Introduction to the

AskNRICH Web-Board

*With many thanks to
NRICH, ‘Peter’
and all other AskNRICHers*

Doing Mathematics in Different Places: an Exploration of Young People's Activities as they
make Independent Use of a Web-Based Discussion Board

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PhD Thesis

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Each chapter has been edited to enable it, as far as is feasible, to 'standalone'.

The chapter numbers and numbering of sub-headings has been left unchanged from the original Thesis.

However, each edited chapter has its own page numbering and any cross-references *within* the chapters and *between* chapters on the NRICH website use these (new) page numbers followed by specifying the page number(s) in the original Thesis chapters.

Where appropriate, references may be given to other chapters (not included on the website) within the full Thesis, either by specifying the Section or providing the Thesis page number(s).

If in a chapter reference is made to any appendices, then the relevant appendix is attached at the end of that chapter.

Each chapter has its own list of references.

[The Thesis title, abstract and acknowledgement pages together with a table of contents for these edited chapters and glossary from the Thesis are also included. The table of contents of the full Thesis appears after Chapter Fifteen].

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Chapter Eight

Introduction to the AskNRICH Web-Board

.... and then one day [I] ventured into askNRICH. ... whenever I am stuck with a problem I always know that I can go onto NRICH and ask somebody to help me. [Peter aged 16, email communication]

8.1 Introduction

This and the following three chapters report on the analysis of AskNRICH based on three research questions (**RQ**) given in Table 8.1. Although each of the four chapters contributes to all of the research questions, Table 8.1 also shows which chapter is the major contributor to each question.

| RG3: to undertake the exploration of the AskNRICH artefact | | |
|---|--|-----------------------|
| RQ | Research Question and sub-questions | Thesis Chapter |
| RQ5 | What does AskNRICH offer to participants to enable them to pursue their mathematical practices? <i>Necessary background information about AskNRICH: What is it? What are the different sections of the web-board? What are the posting protocols on AskNRICH? Who are the participants? Why do they participate? How is AskNRICH typically used?</i> | Eight |
| RQ6 | What are participants' common practices when using the AskNRICH web-board? <i>What characteristics do participants of AskNRICH exhibit as they pursue their interest in mathematics? What mathematics teaching and mathematics learning roles are manifested within AskNRICH?</i> | Nine & Ten |
| RQ7 | What results from participants' practices when using the AskNRICH web-board? <i>What types of interactions are shown between the participants as they engage with mathematics? In what ways does the behaviour of AskNRICH participants emulate the working practices of professional mathematicians?</i> | Eleven |

Table 8.1 Research Questions for the Exploration of the AskNRICH Artefact

The purpose of this chapter is to set out essential background information about the AskNRICH web-board and its participants to provide a context for subsequent chapters. Thus this chapter explicitly addresses the first of the three research questions (**RQ5**) at an initial, basic level and implicitly contributes to addressing the other two.

This chapter has four further main sections. The first introduces AskNRICH through the participants' voices. In the second section the AskNRICH environment is described by: defining its nature; detailing the components that make up the web-board, and discussing the posting guidelines. The third section describes AskNRICH participants and reasons for their participation. A section providing statistical data on postings to the web-board completes the introduction to AskNRICH, and the chapter concludes with two summarising sections.

This chapter is primarily informed by a ten-month intensive study, including trawling the Archive, and three months of 'living' on AskNRICH by visiting the web-board on a daily basis [Thesis p108, p116]. The detailed information presented in this chapter is further warranted by my insider knowledge as a co-founder of NRICH who has subsequently maintained a 'parental' watching brief.

8.2 AskNRICH Portrayed through Participants' Voices

AskNRICH would not exist without its users; it thus seems appropriate to introduce it through the voices of four of them taken from three different sources. The first source is three comments made by respondents to the earlier web-survey:

AskNRICH is a good place to ask and answer questions, as well as discuss maths. *Female KS4 oh*¹

It's interesting to read comments from other people who are interested in maths so much, as these people are uncommon. Also, when I have the time to try some harder maths, it is a fun change to ordinary school maths. *Female KS4 oh*

I don't use the main NRICH website much; rather the forum section (AskNRICH). I feel the atmosphere is very good, and it's great to be able to talk and discuss with other talented mathematicians - an opportunity which I don't really have at school. *[Nick] Male Year13 hs*²

The person, anonymised here as Nick³, making the third comment above subsequently elaborated on his use of AskNRICH in email exchanges with me. His intensity of using

¹ undertakes NRICH problems only at home.

² undertakes NRICH problems both at home and at school.

³ co-incidentally **HelpA** in **ExThd2** discussed in Chapter Nine.

AskNRICH, albeit simultaneously with other sites, is illustrated by this response:

I first came across NRICH in the lower end of high-school; as I said, a teacher introduced me to it. I'm not sure exactly how old I would've been ... Hmm, the search function seems to indicate I first used AskNRICH in 2004⁴ or 2005. I was most active in 2007 probably... I was perhaps spending 10 hours per week on AskNRICH when I used it the most, though I would've been on other websites/forums, and MSN etc. at the same time.

[Nick email exchange]

Finally, during a face-to-face interview, John⁵, now an AskNRICH undergraduate team member, recalled that during the second half of his last year at school he found AskNRICH and has become ‘addicted’ to a daily logging on:

I think I had heard about it a couple of times but hadn't then sort of had forgotten as soon as I heard. But ... [Cambridge Mathematics Lecturer] was giving a talk and mentioned it and I thought it would be a good idea to check it out to see what it was like and it's kind of kind of addictive after awhile I mean ... well you go on it and it's not just sort of asking questions it is obviously partly that it is a very good resource outside of school ... and I think that it quite a fun thing to be able to sort of check up on you know a couple of times a day just to see what sort of discussion is going on.

[John Interview]

These comments speak for themselves and provide a succinct introduction for AskNRICH.

8.3 The Nature of the AskNRICH Environment

This section provides an overview of the components and philosophy of AskNRICH and its basic level of operation. It expands on the relevant parts of the ‘About AskNRICH’ information on the web-board. All quotations italicised below were taken verbatim from the web-board at the time of writing.

⁴ Nick would have been aged 14 at about this time.

⁵ co-incidentally HelpC in **3Thds** of Chapter Eleven.

8.3.1 What is AskNRICH?

AskNRICH is the universal abbreviation for the Ask-a-Mathematician service created by the NRICH founders to provide a space where anyone of any age and from any place could ask ‘an expert’ for assistance with any mathematical problem. The primary source of expertise is currently a team, overseen by a member of the NRICH staff, comprised of mathematics undergraduates and postgraduates studying at Cambridge University. However, there is no exclusivity as to who can take the role of the expert, as this extract makes clear: *‘You can join in existing discussions or start a new conversation of your own. To post anything, you need to be registered, but this is free; just click on the link ...’*. Thus simply by registering anyone can voluntarily become a poster either seeking or offering help or indeed, as can occur, participating in both ways as they see fit. Anyone is free to come and go as they please.

AskNRICH is not a commercial organisation. The AskNRICH team members are volunteers living in the UK, thus the board makes it clear that: *‘We’re not one of those help services which guarantees an answer within so many hours’* and *‘at some times of day there might be quite a delay before anyone sees the thread’*. However, the Moderator ensures that one member of the NRICH staff will voluntarily look at the board at least once on all 365 days of the year. Nonetheless, as AskNRICH exchanges examined later will show, responses often come remarkably promptly – at times within minutes.

As the web-board language is exclusively English there can occasionally be some difficulties with nomenclature, usually overcome by asking for clarification. Additionally, some newcomers can have problems with posting mathematical notation. However, there is a specific section containing instructions on mark-up that enables the mathematics to be more easily read [threads in Chapters Nine and Eleven exemplify this].

The design of the web-board has so far remained unchanged from its inception. The significant design decisions involved the division of the board into separate sections addressing differing purposes and the creation of Posting Protocols for participation in the activities on the web-board. These aspects of the design are discussed within the two following sub-sections.

8.3.2 Sections of the Web-Board

There are three sections of the web-board devoted to different levels of mathematical problem. Although the three levels correspond in UK terms to mathematics studied by students of compulsory school age (5-to-16 year-olds), sixth form study (17-18) and university level, all sections are open to all ages. The first, **Please Explain (PE)**, is described as the section to '*ask about mathematics that you meet in school, or that your school maths lessons never explain!*'. The section, **Onwards and Upwards (O&U)** is for those '*who have started learning things like calculus*' and **Higher Dimension (HD)** for '*those studying maths at university level to discuss it with their peers*'. During every academic year since 2002, the Moderator has archived message threads that then become read-only but remain accessible partitioned according to the three section names.

All three sections listed above are on public (open) access, thus although it is necessary to register (which is free) in order to post to the board, anyone can visit AskNRICH and read any of the postings. However, only registered users have access to four additional private discussion sections: **NRICH talk** '*a place for discussions which are not actually about maths*'; **Who's Who** '*to find out a bit more about the people you are talking to*' – although this is dependent upon participants actually contributing a little about themselves in the first place and certainly not all do; **Reviews** '*of books, websites and other mathematical resources you think might be of interest to other NRICH members*' and **Follow it up** '*for discussions linked to maths events, whether local or national*'.

There is an implied guarantee that all questions in the **PE** and **O&U** sections will be responded to⁶, but: '*Don't expect us to do your homework for you - we'll give you a hand in the right direction, but we won't provide a list of answers*'. Thus the AskNRICH team is vigilant in detecting such posts and tries to ensure that, where help given relates to coursework, the poster prints out the thread to give to their teacher. Questions in **HD** are not guaranteed a reply as they may well be in a highly specialised field, although there appears to always be someone who can and will respond and thus the content is almost entirely constituted of peer-to-peer discussions.

⁶ This is further commented on in Section 8.5, Posting Statistics.

8.3.3 Posting Protocols

The Posting Protocols offer advice in the form of ‘ground rules’ and ‘user instructions’ for those participating in the Ask-a-Mathematician web-board. The ultimate intention was to create a stimulating, enjoyable, supportive and successful learning environment. The Protocols were formulated by people who had been classroom practitioners but were then involved in teacher training within the mathematics education department of the University of Cambridge. Thus the creation of the Protocols was embedded within what the designers of AskNRICH considered to be best practice for good classroom mathematics teaching and learning. In other words the Protocols were the result of the application of tacit knowledge and beliefs, based on personal experience, of what would produce the intended good learning experience. Furthermore, the design of the Protocols also addressed the new and different challenges and opportunities presented by using the medium of the web-board. Thus some of the Protocols include practical advice/instructions for the participants on how to work within the medium. The Protocols [Appendix 8.1] fall under three headings: “Asking questions”, “Answering other people’s questions” and “Writing an entry for Who’s Who”. The Protocols for ‘Answering’, are reproduced in Table 8.2, to provide further insight into the philosophy of AskNRICH and highlight some implicit assumptions about what constitutes good teaching.

| <i>Answering other people's questions</i> |
|--|
| <ol style="list-style-type: none">1. <i>Don't just tell them the answer (tempting when you've just worked it out yourself).</i>2. <i>Give hints and explanations to help someone understand for themselves.</i>3. <i>If you're not sure whether what you are saying is correct, say so, so that others can check.</i>4. <i>Remember that the team will probably answer, so if you don't know, leave it to them!</i>5. <i>If someone has already started to help someone with their question, think carefully before joining in. It's often best to let the original poster respond before giving them more to think about.</i>6. <i>If several people are trying to solve the same problem, and you want to avoid giving things away to those still working on it, you can post your answer in white by typing "In white: \white{your answer}". Those who want to can select the text to be able to read it.</i>7. <i>Be tactful if someone is getting things wrong.</i>8. <i>Be careful about humour; a light-hearted comment about a silly mistake will not always come across how you meant it when it's in print.</i> |

Table 8.2 Posting Protocols when Offering Help

Protocols 1 and 2 set the ‘good’ teaching tone of an adopted pedagogy that can ‘scaffold’ learning. Protocols 3 to 5 are there to reduce confusion, although the analysis of threads in later chapters shows that overlapping help [Protocol 5] generally appears to be advantageous. Protocols 7 and 8 give advice on basic social etiquette, probably even more important within an e-environment where there can be no “visual cues” [Garrison & Anderson 2003: 48] or “social cues” [Chen & Chiu 2008: 681]. The part of Protocol 6 stating that clues/answers can be temporarily concealed until the reader wishes to look at them, plays an important role in addressing different needs and experiences; a mixed-ability strategy.

As will become evident in later chapters the crucial guideline for “Asking Questions” is *‘Tell us what you’ve tried so far’*. This, together with the additional request: *‘To help our team of experts to answer at the right level, do tell us about why you are asking the question, and what you already know about the mathematics involved.’* facilitates the initiation of a dialogue based on contingent responses. The open access/public face of posting combined with the potentially young age of posters obliges AskNRICH to have an explicit posting etiquette. Thus the etiquette includes instructions on ‘Being Polite’ with the clear message: *‘We are proud that AskNRICH is a place where people are polite to each other. Let’s keep it that way’*.

The next section starts to discuss the range of potential participants in AskNRICH; the in-depth analysis presented in later chapters develops a much fuller picture.

8.4 Who uses AskNRICH?

This section provides initial, basic answers to:

Who are the participants – the AskNRICHers?

Why do they participate?

The response to both of these questions starts from one, now adult, participant’s description of who he *felt* he was, when he first found AskNRICH:

When I first came here I was a toddler (even though I was 15/16 years old). I knew nothing when it comes to mathematics, I barely knew some

basic algebra and geometry. NRICH practically opened the gateway to a whole new mathematics for me. It showed there are things beyond numbers involved in mathematics.

[International Participant, now aged 24⁷]

The web-board's open access ensures that there is variety in participation. There is the passive silent participation of 'lurkers' like Julia who in an interview revealed that for several years she had accessed AskNRICH regularly but never posted, instead looking interestedly at the discussions pertaining to her level and interest of study. Active participants range from people who only post a few times⁸ all the way to those who post on a regular, sometimes daily or even hourly, basis.

The threads studied in the Perspectives of the next three chapters were all initiated by questions posed by school-pupils asking for help. However it must be borne in mind that some posters offering help will be volunteer team members (including NRICH staff) who must also be considered as AskNRICHers allowing the serious pursuit of study.

Furthermore, participation within AskNRICH is dynamic and fluctuating. Thus, for the purposes of this study, an AskNRICHer is defined as anyone who has contributed in some way to the exchanges by posting on the web-board. More precise definition of an AskNRICHer is not straightforward⁹, but some information about them can be obtained directly.

8.4.1 Explicit Information Obtainable about Participants

Posts by NRICH staff and AskNRICH team volunteers are easily recognisable as they appear in green and cyan respectively and show their full name. However, posts by ordinary participants are essentially anonymous. The administrators are the only people who have access to real names and email addresses. Everyone is invited to choose a screen name when registering that becomes their sole identifier. Real names as posting names are also acceptable and some participants will choose first name and maybe initial of surname. Such

⁷ Comments from the web-board are accompanied with participant description based on web-board information (which can be limited).

⁸ Investigation of the reasons for both 'dropping out' and/or 'lurking' is beyond the scope of this study.

⁹ This problem parallels Gee's [2005] arguments on the difficulty of defining membership within a Community of Practice.

a format probably indicates gender but even what sounds real need not necessarily be so, thus screen names may reveal nothing. Age information is optional at registration (year of birth stopping at ‘before 1990’) and is used only for statistical data i.e. this is not available to other members or the outside world.

The number of posts¹⁰ by a participant is recorded and displayed in their posts on the web-board with their screen name and a classification of their status: new (up to 5), poster (6-25), regular (26-74), frequent (75-199), prolific (200-399) and veteran (400+). If a poster becomes at least ‘regular’ then it seems reasonable, given the voluntary nature of posting, to infer that they have a natural enjoyment of being involved, in various ways, with mathematics.

In addition, some information surfaces within a post e.g. *‘I am in year 9’*, *‘I go to the local comprehensive’*. Even more may be revealed within NRICHtalk, which is not accessible to non-registered users, where participants are invited to contribute a self-portrait to Who’s Who and thus other registered users (not the outside world) can learn a little more about them. However, there are many more active participants than entries in Who’s Who and a superficial scan of threads will show a diverse range of participants, across all continents and all ages.

Having described how each post provides some limited information automatically about the poster, the focus now turns to consideration of why posters might participate.

8.4.2 Reasons for Participating

Evidence of reasons for participating can mostly only be inferred from the content of posts or comments within them, although the interviews provided some explicit information.

AskNRICH provides an opportunity for any member of the general public who wishes to make use of the facilities on offer. Venturing into AskNRICH (as Peter phrased it in the opening quotation of this chapter) can be something of major importance and/or revelation

¹⁰ As AskNRICHers are usually interested in numbers, significant numbers in the eye of the beholder often do not go unnoticed!

for those who do enjoy mathematics; it can be the first time that some have found the chance to discuss mathematics. It can offer a safe, supportive and caring place in which to ask questions, something that later chapters confirm and is exemplified here:

I love the way everybody is so friendly, and not obnoxious when you post the most obvious of questions, which you see the answer to the minute you post it.

[Female Upper school]

I can't think of a more natural way to have learned math though. I would just pursue the topics and questions I was interested in, and I'd get guidance along the way, and maybe suggestions of other topics I ought to read about.

[International participant now aged 24]

Although there is no compulsion or expectation to do so, AskNRICH team volunteers often state a desire to be able to pay back as their reason for participating:

I joined the team because this website [had] encouraged me to get more interested in maths and I wouldn't be where I am without it.

[Final Year Cambridge Undergraduate]

and by Nick (quoted in the introduction) anxiously waiting in the wings:

I've been on NRICH for perhaps 3 or 4 years, though most intensively for the past 12-18 months. If I do get into Cambridge¹¹, I think I would like to become a team member and give something back for all the generous help I have received here!

[Nick final year at school]

The longest serving participant¹² who also has posted the largest number of posts (3100+) is now an AskNRICH team volunteer, aged 24 and completing a PhD. He started posting when he was 15 and is one of a growing number who have made the transition:

[from] being one of the people who asks the questions to one of the ones answering them. I learnt an awful lot through this board; I'm really glad to have the opportunity to repay the debt by helping other people.

[Longest serving poster]

John in his interview whilst mentioning being able to put something back, also sees it as a way of testing his own knowledge:

¹¹ Nick succeeded and became a Cambridge undergraduate. He made personal communications over the summer vacation to enquire how he could join the AskNRICH team and became a Cyan poster.

¹² excluding the moderator who, at the time of writing, has 3172 posts.

A very good test of how well you know material is whether you are able to explain it to someone else so in a way it is the only test [that you know the material] because it shows you fully understand it and you can answer questions on it.

[John Interview]

Providing a place to ask questions captures students who are naturally enthusiastic for the subject and enjoy challenging mathematics problems. Many come to AskNRICH because they wanted to learn some mathematics that was beyond the curriculum work in school, in effect they are teaching themselves. This will be further explored particularly in Chapter Ten that follows Peter through his experiences. In the meantime, this comment below is typical:

I have [been with] NRICH since I was 14 after I saw a poster of this discussion Forum in my school. I love to come here and ask a lot questions on maths topics that I teach myself. [School Student Aged 18]

Amongst these self-teaching and self-learning young people, there are, as evidenced in their postings, those, likely to be the most able at the subject in their year, who aspire to compete nationally and internationally in mathematical competitions. Many schools within the UK offer pupils the opportunity to take part in the Annual Mathematics Challenges and from these the highest scorers are invited to participate in Mathematics Competitions, culminating with the British Mathematical Olympiad (BMO). Thus one reason for participation is involvement in these competitions or through a Gifted and Talented (G&T) initiative. Indeed, the United Kingdom Mathematics Trust (UKMT) book mentioned in **ExThd2** [see Chapter Nine] is most likely to have been purchased as preparation for taking part in such competitions. As Nick's first comment in Section 8.2 reveals, AskNRICH does provide a means by which these young people, generally isolated as being the only one in a school, can communicate with others in a similar situation.

AskNRICH also has some older participants who are avid recreational contributors rekindling childhood passions. One AskNRICHer, giving an age of 65+ and indicating that he is making up for lost opportunities to increase his understanding of higher mathematics generally through contributing to discussion, more than asking specific questions. Another contributor is a father of three secondary aged pupils. He visualises helping others to make connections and take on new challenges just as he remembers as a primary aged pupil

begging his maths teacher to show him how to do long division and surprising them that he quickly understood the concepts.

This section finishes with an instance where the web-board, and the AskNRICHers, are put to the test. A new poster in **PE** received replies that assumed they had posted in the wrong section and thus were at a higher level than that expected for **PE**. When the Moderator stepped in stating '*given that you've posted in Please Explain, I guess you may not know most of the terms being used in the replies*' and continued to offer sympathetic simpler explanations, the original poster revealed all. '*Actually, I am a math teacher who is researching websites that can be used to explain things that my students might have trouble on. I picked a question that had given me some trouble when I first encountered it. You guys were the quickest to respond and definitely gave me more than I needed to understand the answer to my question. I will admit that the discussion went a lot further than I needed. I was able to follow along for the most part. Thanks for everything!*' (July 2006). This exchange illustrates the quality of response and the consideration and encouragement offered to new posters, often with an implicit invitation to continue to participate. Moreover it serves as an illustration of being unable to know anything about a poster unless they themselves reveal it.

Thus, as already stated, reasons for participation are wide-ranging and varied. To complete the introduction to AskNRICH the following section presents statistical data relating to the sections, threads and messages (posts) that are retrievable from the board.

8.5 Posting Statistics

This purpose of this section is to convey a snapshot of the traffic over one year on the three open sections of the web-board in terms of the numbers of threads and posts and the distribution of thread lengths. It starts by detailing the size of all data accessible for study.

In order to contain the number of active threads on the web-board, the Moderator periodically selects threads, judged to be inactive, to be moved to the archive or (occasionally) deleted. Given the resulting dynamic nature of the web-board, the data

presented here can only be that present on the day it was viewed. Although the more recent threads are likely to be a closer match to actual posting activities, the numbers presented within the archive are those for threads that remain, i.e. the number of archived threads is unlikely to equal the number that appeared on the board during that period.

Table 8.3 represents the number of threads and posts for each of the sections on the web-board as retrieved on May 22nd 2008. The grand totals of 49285 posts and 5966 threads highlight the vast amount of mathematical discourse that is available (for anyone) to read and to study. Based on this grand total the mean number of posts per thread is 8.2, a value that has changed little across individual sections and years [see breakdown in Appendix 8.2].

| Period | Please Explain | | Onwards and Upwards | | Higher Dimension | |
|---------------|----------------|-------------|---------------------|--------------|------------------|--------------|
| | Threads | Posts | Threads | Posts | Threads | Posts |
| Active | 43 | 370 | 141 | 1208 | 173 | 1085 |
| Archive 07-08 | 69 | 570 | 468 | 4188 | 430 | 2385 |
| Archive 06-07 | 236 | 1908 | 952 | 8546 | 667 | 4364 |
| Archive 05-06 | 228 | 2518 | 1066 | 10658 | 781 | 6265 |
| Archive 04-05 | 29 | 141 | 22 | 132 | 5 | 23 |
| Archive 03-04 | 137 | 1083 | 207 | 1359 | 20 | 144 |
| Archive 02-03 | 23 | 85 | 269 | 2253 | 0 | 0 |
| Total | 765 | 6675 | 3125 | 28344 | 2076 | 14266 |

Table 8.3 Number of Threads and Posts (retrievable on May 22nd 2008) for each Section on Web-Board

Table 8.4 below provides data for **PE** and **O&U** relating to the total number of *retrievable* threads and posts each month¹³ for August 2007 to July 2008. These are the sections and the academic year relating to the Main Study. Again there is no guarantee that this represents all the threads posted during this time.

¹³ The month attributed to the thread is the month on which the last post was made.

| | PE Threads | O&U Threads | PE Posts | O&U Posts | Figure 8.1 Distribution of Threads between PE and O&U August 2007 to July 2008 |
|--------------|---------------|----------------|-------------|--------------|--|
| August 07 | 9 | 36 | 88 | 225 | |
| September | 5 | 68 | 34 | 668 | |
| October | 13 | 78 | 80 | 592 | |
| November | 12 | 109 | 100 | 930 | |
| December | 7 | 63 | 44 | 485 | |
| January 08 | 11 | 48 | 126 | 790 | |
| February | 19 | 58 | 178 | 482 | |
| March | 17 | 69 | 188 | 645 | |
| April | 8 | 36 | 42 | 240 | |
| May | 20 | 46 | 169 | 369 | |
| June | 11 | 44 | 171 | 296 | |
| July | 10 | 34 | 59 | 355 | |
| Total | 142 | 689 | 1279 | *6077 | |
| Monthly Mean | 12 | 57 | 107 | 506 | Mean number of posts for PE Threads: 9 |
| Median | 11 | 53 | 96 | 484 | Mean number of posts for O&U Threads: 8.8 |

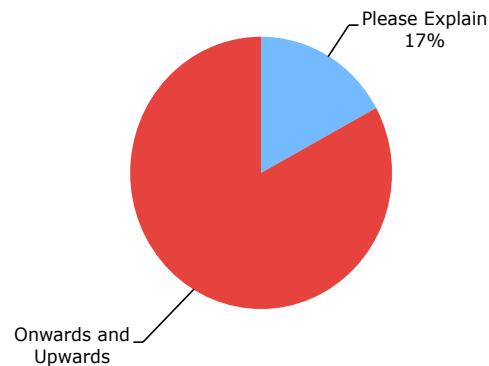
* Two threads of 401 (December) and 201 posts (March) were not included in these figures. The content of these two outliers would be more appropriate placed in NRICHtalk as general discussion.

Table 8.4 Number of Threads and Posts in Please Explain and Onwards & Upwards Sections of the Web-Board for the twelve months August 07 to July 08

Figure 8.1 indicates that during this period the number of **O&U** threads (689) is about five times that of **PE** (142), indicating that, for the two school-aged sections, work beyond GCSE level predominates. However, this statistic cannot be used to make any inference about the age of the posters as, for example, some who are of pre-GCSE age are doing mathematics beyond GCSE and therefore contributing to **O&U**.

For each of the threads (except for those in **PE** for June and July where data had accidentally been deleted by the Moderator) represented in Table 8.4, the number of posts were grouped into five different sizes: 1 to 3 posts (corresponding to problem posed, help offered and in an ideal world thanks given); 4 to 8, 9 to 15, 15 to 25 and over 25 [see Appendix 8.3

Tables 1&2]. Figure 8.2 below represents the frequencies for each size category for each section's total for the year (ten months for **PE**). The ratio between the heights of the **O&U** and **PE** bars for the first four categories is approximately the same at around 6:1 and for the longest posts category it is around 4:1. Thus during this period there was little difference between the sections in the distribution of lengths.



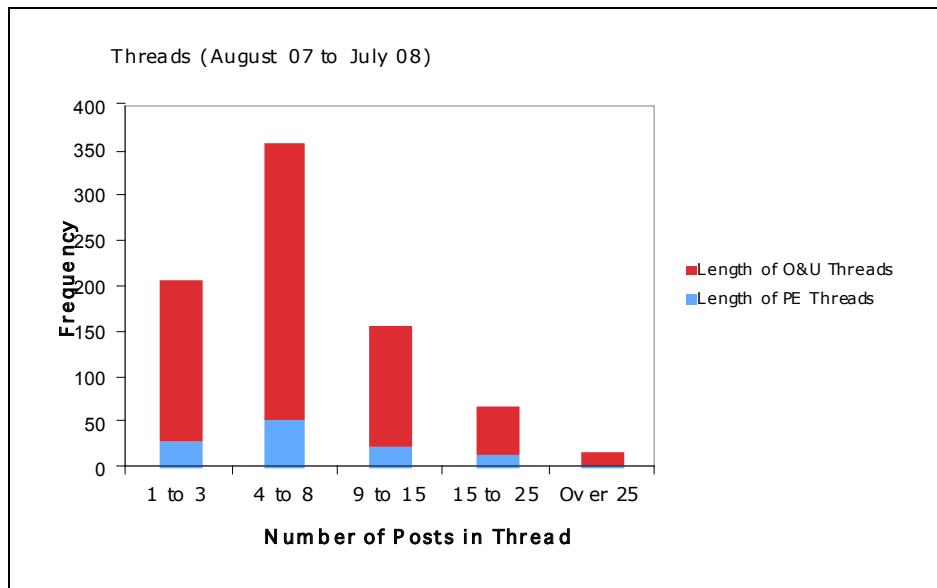
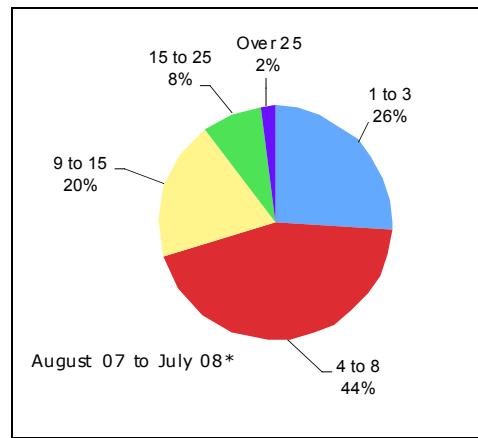


Figure 8.2 Frequency in each Length Group for PE and O&U threads

The thread length data from each of the two sections is combined and re-presented in Figure 8.3 to indicate the percentage of all threads that fall into the designated sized category. The most common size, accounting for nearly half (44%), is 4 to 8, indicating that at least some ‘conversation’ has taken place beyond the minimum that would results from: ask, receive help, give thanks. Adding in those threads of length 1 to 3 then 70% of all threads used in this data are completed within 8 messages.



* Please Explain threads available up to May 08 only

Figure 8.3 Percentage of Threads in each Length Group

Although, as stated earlier, there is an implied guarantee that requests in **PE** and **O&U** will be responded to, 18 (2%) of the total number of threads were of length 1, all in **O&U**. However, inspecting the contents of these threads shows that no request has been ignored.

These posts are, for example, information giving, or multiple error postings as a new user gains familiarity with the mechanics of posting, or as one thread's title makes clear self-answering: '*Slope fields and integral curves: sorry have solved problem myself*'.

Furthermore, no judgement may be made relating the length of thread to the quality of the content within it, as it may take as few as two posts to have a rich exchange.

The final two sections summarise this chapter.

8.6 Features Summary 1

In order to provide a means of managing the presentation of the large quantity of findings from this study, at the end of this and each of the next three chapters, a selected set of Features are catalogued. These Catalogues (five in all) form parts of a diagram illustrating all Features around a five-sided figure showing their interwoven interrelationships portrayed in Figure 8.4 [next page]. This diagram is the basis of the summarising of findings contained in the 'interlude chapter' [Chapter Twelve]. The Features selected for each chapter's Catalogue are always present in that chapter, although not all Features present in the chapter are necessarily included in the Catalogue since they may have a stronger relation to another chapter's catalogue. Similarly, for the same reasons, later chapters may contain further or better examples than the one used to underpin inclusion in the earlier Catalogue.

Thus by the end of the four chapters all Features within the complete diagram will have been thoroughly considered. The Features Catalogue for this chapter, relating to Structural/Medium, is presented in Figure 8.4. The Catalogues of the other chapters are also shown greyed-out.

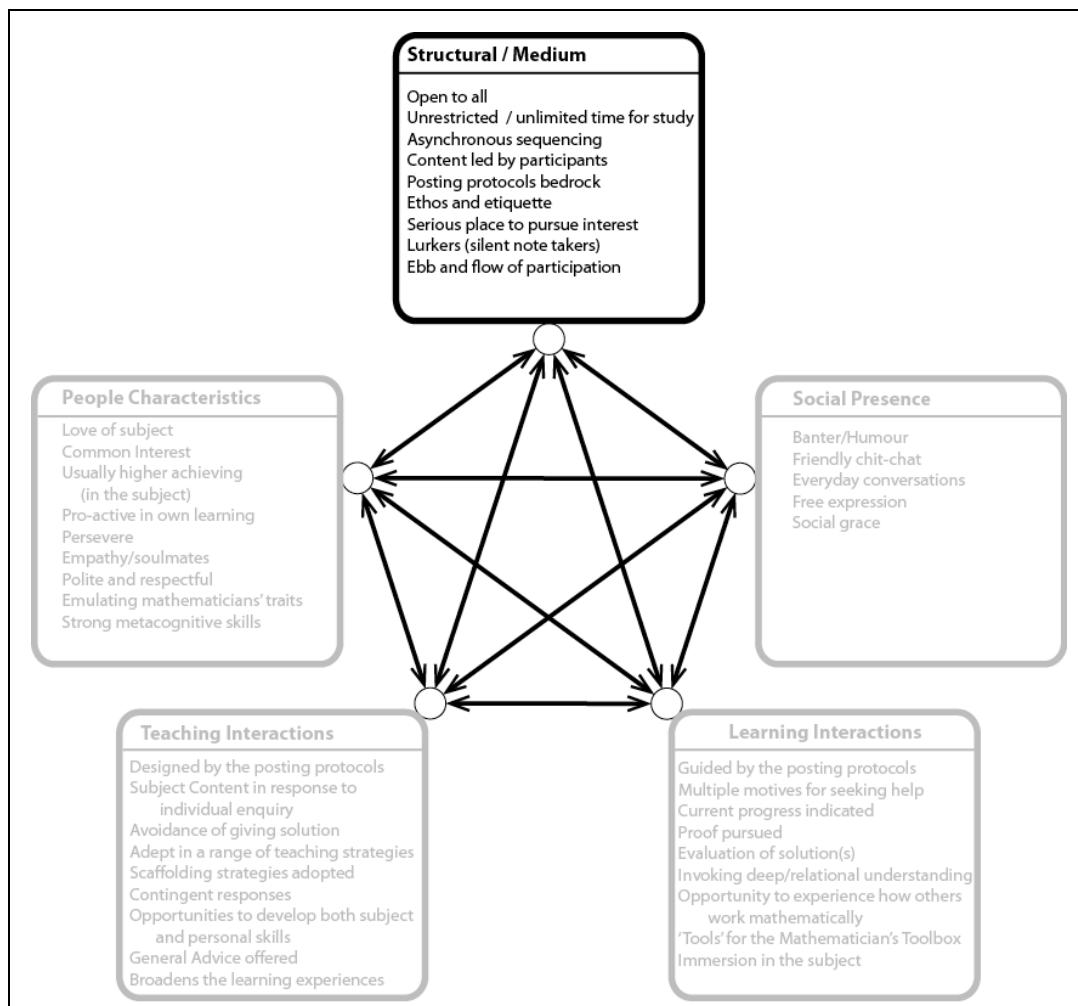


Figure 8.4 Features Catalogue: Structural / Medium

8.7 Conclusions

This chapter has set the scene in order to frame the further discussion in the remaining chapters. In essence it provides essential background information on AskNRICH, introduced through the voices of some of its participants, the AskNRICHers. The chapter has included a description of the different sections of the web-board. It has presented the Posting Protocols that, as later chapters will demonstrate, form the bedrock for the teaching and learning activities that take place within AskNRICH and the AskNRICHers' well-mannered conduct. The statistical data presented has conveyed the vast amount of mathematical discourse and other focused activities that can be accessed from the 5966 threads and 49285 posts available for study.

Although, intriguingly, the true number and motivations of people who might read and study AskNRICH material is unquantifiable due to the presence of passive lurkers, some data on active participants who actually post can be obtained. This comprises information about who the AskNRICHers might be and some of the variety of reasons for their participation.

Overall, AskNRICH is shown to be an environment in which young people, often high-attainers working beyond the school curriculum, can be enthusiastic about mathematics, find help (that may not be available elsewhere) that enables them to develop their mathematical skills, and build their confidence among like-minded peers and mentors. The AskNRICHers' complimentary comments make clear how much they feel they gain by participating and being in-touch with such like-minded others, often returning later to voluntarily 'pay back'. As the AskNRICHers imply, and the next three chapters will continue to demonstrate, there is an obvious quality to the discourse.

The following three chapters, building on the content of this chapter, present analysis from different Perspectives using selected threads to typify the activities and behaviours evident in AskNRICH. The next chapter will use analysis of two exemplar threads in the portrayal of the common practices evident amongst AskNRICHers.

Postscript

When returning to the early evaluations of NRICH recently, I noticed that the following quotation had been included [Jared 1998: 17].

Hey why so little space [on the questionnaire] for AskNRICH. It's brilliant. I can ask all the questions [I want]. The answers are fascinating because they take you further than you were asking plus you can have a decent conversation with someone who knows much more maths than you, about maths.
[Female student aged 17]

With respect to the current work, it would appear that little has changed, the sentiments expressed by this student, who, at the time of writing, will be approaching her thirty-first birthday, have been echoed by many others over a decade later.

References

Chen, G., & Chiu, M. M. (2008). Online discussion processes: Effects of earlier messages' evaluations, knowledge content, social cues and personal information on later messages. *Computers & Education*, 50(3), 678-692.

Garrison, D.R., & Anderson, T. (2003). *E-Learning in the 21st Century*. London: RoutledgeFalmer.

Gee, J.P. (2005). Semiotic social spaces and affinity spaces: from *The Age of Mythology* to today's schools. In D. Barton & K. Tusting (Eds.), *Beyond Communities of Practice: Language, Power and Social Context* (pp. 214-232). Cambridge: CUP.

Jared, E. (1998). *NRICH evaluation report 1997-8*. Cambridge: NRICH.

Asking questions

- Start a new thread for each question, unless they are closely related.
- Try to post in the right section. If you're not sure which is right for you, it doesn't matter too much, so just pick one; don't post it in every section as the team will see it whichever section it's in.
- Give your thread a title which indicates the maths involved. (Bad titles include *Help!!!*, *Another question*, etc.)
- Tell us a bit about where the question comes from; your textbook, a website, a competition, one you thought of yourself, etc.
- Don't expect us to do your homework for you - we'll give you a hand in the right direction, but we won't provide a list of answers.
- Try to avoid using attachments; not everyone can read them.
- It can help if you tell us what you are studying in maths. Sometimes the way we explain it will depend on what you know.
- Tell us what you've tried so far. If you just post a textbook question, we're likely to ask you what you've tried.
- Don't use text-speak or lots of abbreviations as these can make your post harder for other people to read. You are more likely to get a reply if people don't have to spend a long time decoding your question before they can answer!
- Be patient; you won't necessarily get an answer immediately, and posting again every hour won't help; the team will see your post when they next look.
- If you don't get a reply after a day or so, then it is fine to post again to the same thread to draw attention to it again.
- It's always nice when people tell us that what we've said has helped!

Answering other people's questions

- Don't just tell them the answer (tempting when you've just worked it out yourself).
- Give hints and explanations to help someone understand for themselves.
- If you're not sure whether what you are saying is correct, say so, so that others can check.
- Remember that the team will probably answer, so if you don't know, leave it to them!
- If someone has already started to help someone with their question, think carefully before joining in. It's often best to let the original poster respond before giving them more to think about.
- If several people are trying to solve the same problem, and you want to avoid giving things away to those still working on it, you can post your answer in white by typing "In white: \white{your answer}". Those who want to can select the text to be able to read it.
- Be tactful if someone is getting things wrong.
- Be careful about humour; a light-hearted comment about a silly mistake will not always come across how you meant it when it's in print.

Writing an entry for Who's Who

In this section, you can tell others a little about yourself. Anything posted to this section will be "queued", so that it is checked by a moderator before it appears. We will *not* allow you to post personal details like your address, school or e-mail.

The sorts of things you *can* include are:

- Country or region you live in
- The type of school you go to (for university students, you may say which university)
- The level of maths you are studying
- Your other interests

Number of Threads and Posts (retrievable on May 22nd 2008) for each section on web-board and mean length of thread for postings from 2005

| Posts May 22nd | Please Explain | | Onwards and Upwards | | Higher Dimension | |
|-----------------------|----------------|-------|---------------------|-------|------------------|-------|
| | Threads | Posts | Threads | Posts | Threads | Posts |
| Active | 43 | 370 | 141 | 1208 | 173 | 1085 |
| Archive 07-08 | 69 | 570 | 468 | 4188 | 430 | 2385 |
| Archive 06-07 | 236 | 1908 | 952 | 8546 | 667 | 4364 |
| Archive 05-06 | 228 | 2518 | 1066 | 10658 | 781 | 6265 |
| Archive 04-05 | 29 | 141 | 22 | 132 | 5 | 23 |
| Archive 03-04 | 137 | 1083 | 207 | 1359 | 20 | 144 |
| Archive 02-03 | 23 | 85 | 269 | 2253 | 0 | 0 |
| | 765 | 6675 | 3125 | 28344 | 2076 | 14266 |
| <hr/> | | | | | | |
| Mean length of thread | | | | | | |
| Active | | 8.6 | | 8.6 | | 6.3 |
| Archive 07-08 | | 8.3 | | 8.9 | | 5.5 |
| Archive 06-07 | | 8.1 | | 9.0 | | 6.5 |
| Archive 05-06 | | 11.0 | | 10.0 | | 8.0 |

Table 1 Postings to Onwards and Upwards: AUGUST 07 TO JULY 08

| Month | Number of Posts | Number of Threads | Number of length 1-3 | Number of length 4-8 | Number of length 9-15 | Number of length 15-25 | Number over 25 with values |
|--------------|-----------------|-------------------|----------------------|----------------------|-----------------------|------------------------|----------------------------|
| August | 225 | 36 | 10 | 19 | 5 | 2 | 0 |
| September | 668 | 68 | 14 | 31 | 15 | 4 | 4 (35, 49, 51, 61) |
| October | 592 | 78 | 20 | 35 | 15 | 7 | 1 (48) |
| November | 930 | 109 | 34 | 41 | 24 | 9 | 1 (117) |
| December | *485 | 63 | 19 | 24 | 13 | 7 | 0 |
| January | 790 | 48 | 12 | 23 | 6 | 5 | 2 (55, 401) |
| February | 482 | 58 | 12 | 32 | 8 | 5 | 1 (30) |
| March | **645 | 69 | 21 | 27 | 16 | 4 | 1 (201) |
| April | 240 | 36 | 7 | 23 | 5 | 0 | 1 (35) |
| May | 369 | 46 | 8 | 22 | 11 | 4 | 1 (27) |
| June | 296 | 44 | 12 | 19 | 11 | 2 | 0 |
| July | 355 | 34 | 10 | 10 | 6 | 6 | 2 (34, 51) |
| Total | 6077 | 689 | 179 | 306 | 135 | 55 | 14 |

* Excluding the one thread of 401 posts

** Excluding the one thread of 201 posts (but indicated in the extreme right hand column)

Table 2 Postings to Please Explain: AUGUST 07 TO JULY 08

| Month | Number of Posts | Number of Threads | Number of length 1-3 | Number of length 4-8 | Number of length 9-15 | Number of length 15-25 | Number over 25 with values |
|--------------|---------------------|-------------------|----------------------|----------------------|-----------------------|------------------------|----------------------------|
| August | 88 | 9 | 0 | 4 | 4 | 1 | 0 |
| September | 34 | 5 | 2 | 2 | 0 | 1 | 0 |
| October | 80 | 13 | 4 | 5 | 4 | 0 | 0 |
| November | 100 | 12 | 2 | 7 | 1 | 2 | 0 |
| December* | 44 | 7 | 2 | 4 | 0 | 1 | 0 |
| January | 126 | 11 | 0 | 5 | 3 | 3 | 00 |
| February | 178 | 19 | 4 | 7 | 3 | 4 | 1 (26) |
| March** | 188 | 17 | 6 | 4 | 5 | 0 | 2 (42, 54) |
| April | 42 | 8 | 4 | 3 | 1 | 0 | 0 |
| May | 169 | 20 | 5 | 11 | 2 | 1 | 1 (63) |
| June | 171 | 11 | *Data not available | | | | |
| July | 59 | 10 | | | | | |
| Total | 1279* (1049) | 142* (121) | (29/121) | (52/121) | (23/121) | (13/121) | (4/121) |

In the two days between collecting the data for the total number of posts and threads per month and the decision to return and track the length of each thread, the board's moderator decided to move the data to the archive. In so doing, they inadvertently pressed the wrong key and the June and July threads were unfortunately and irretrievably deleted!