

From Apprenticeship Genres to Academic Literacy: Problematizing Students' and Teachers' Perceptions of Communication Activities in an ICL Environment

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Abstract

Comparatively little research has been done on students' perceptions of communication and communication activities in integrated content and language (ICL) environments. In the present study, student statements about communication and communication activities have been collected via interviews and surveys from students attending a mechanical engineering programme in Sweden. These statements are compared with statements from content teachers at the same programme. Results suggest that students and teachers share a common perspective that communication activities should address a couple of apprenticeship genres that students will use in their future professions. Consequently, there seem to be good reasons for identifying and practising the use of apprenticeship genres. However, the focus on a few genres is problematized as some students show frustration when encountering unfamiliar genres. The article therefore also discusses the potential need for a role where communication teachers facilitate communication activities such that students enhance their perceptions of communication and communication activities in order to better prepare themselves for addressing various types of communicative situations.

Introduction

The integration of content and language (ICL) in higher education (HE) can be organised in different ways but typically involves a combination of content teachers, communication teachers and students. The understandings and perceptions of the purpose of ICL activities among these participants are likely to influence how they act when involved in such activities. While teachers' perceptions of ICL have been commented on and investigated from various perspectives (see e.g. Barrie 2006, Jacobs 2005, Jacobs 2010, Jones 2009a, Jones 2009b, and Marshall *et al.* 2011), less has been done to investigate students' perceptions of what the purpose of ICL collaborations may be. This is particularly noteworthy as it has been shown that students' perceptions of teaching and learning activities strongly influence students' behaviour and therefore also their approach to learning (Trigwell, Prosser and Waterhouse 1999, and Entwistle, McCune and Hounsell 2003: 93). Consequently, it seems reasonable to assume that students' perceptions of ICL interventions and activities influence their engagement and learning in such modules.

In studies that address students' and teachers' perspectives of communication, communication has not primarily been discussed from the perspective of ICL, but insights

from these studies are still significant for the present study. In a study of academic writing, Thaiss and Zawacki (2006) were particularly interested in how teachers and students perceived standards of academic writing within their disciplines, and how students weighed their opportunities to express their own ideas at the same time as they tried to follow the standard conventions. In the concluding chapter of the book, Thaiss and Zawacki (2006) discuss a number of implications of their study on aspects of learning-to-write in tertiary education. For instance, they acknowledge the importance of letting students meet a variety of rhetorical contexts and the need for teachers to facilitate students' understanding of disciplinary conventions.

In a study similar to Thaiss and Zawacki's (2006) in that it involved both teachers and students, Lea and Street (1998) categorised student and teacher expectations and interpretations of written assignments in British higher education. They investigated issues of identity and power that dictate student writing practices and how practices and students' written assignments are viewed by students and faculty across the academic fields of the humanities, social sciences, and natural sciences. In this 1998 study, and in subsequent studies, Lea and Street relate their findings to three models or approaches to student writing in higher education: a study skills model, an academic socialisation model and an academic literacies model (Lea and Street 1998, 2006; see also Lea 2004). In the study skills model, communication is viewed as an individual trait, and the focus tends to be on lower-order concerns. The academic socialisation perspective involves a stronger focus on disciplinarity and discipline specific genres, but situations and genres are perceived as fairly stable, which means that the use of genres is perceived as unproblematic as soon as students have learnt the characteristics of those genres. In the academic literacies model, finally, the view of communication is more complex and involves features such as power, authority and knowledge structures. An important aspect of an academic literacies approach is to develop students' ability to learn communication practices that are useful in various situations and that facilitate students' shifting between situations, styles and genres. Lea and Street (2006: 369) emphasise that the models overlap so that the academic literacies model encapsulates the other two.

Many ICL interventions within the natural sciences and engineering in Sweden and elsewhere have highlighted the need to practise the use of a number of genres central to the discipline. Carter, Ferzli and Wiebe (2007) term such genres 'apprenticeship genres' and use this notion when investigating the role of writing in the socialisation into a discipline. They argue that apprenticeship genres have the potential of being perceived as legitimate genres that may socialise students into a particular discipline. It is argued that the genre socialises students into ways of knowing and understanding within that particular discipline, and that apprenticeship genres tend to familiarise students with particular behaviours and routines in certain contexts, such as the lab (see also Russell and Harms 2010: 241). What genres function as apprenticeship genres varies between disciplines, but irrespective of the discipline, they are described as sharing a socialising function (Carter, Ferzli and Wiebe 2007).

The primary aim of the present study is to describe students' and content teachers' perceptions of communication and communication activities in a context where communication is integrated into engineering education. On the basis of this description, the aim is then to discuss and problematise what these perceptions mean for students' development as communicators and more generally for the organisation of ICL. The notion of apprenticeship genres is central to the study because the approach to communication in the programme investigated is essentially an apprenticeship genre approach. The notion of apprenticeship genres will, however, not be used primarily as a notion for studying socialisation into the discipline as Carter, Ferzli and Wiebe (2007) did, but rather as a perspective that may inform how an apprenticeship genre approach seems to influence students' and teachers' perceptions of communication and communicative activities as well as students' development as communicators.

The term *communication* is used to refer to activities that the students participate in, such as writing and oral presentations, but it also more generally alludes to what communication is used for in the students' education. In several parts of the study, we discuss our results in

terms of writing rather than the more generic term 'communication'. The reasons for using 'writing' are that a great deal of previous research has focused on writing rather than communication and that students in Sweden are more used to talking about communication as 'speech and writing' or 'language' rather than as 'communication'.

Integrating Content and Language in a Mechanical Engineering Programme

The purpose and design of ICL in higher education is intrinsically related to and shaped by the context in which it is developed. It is also highly likely that students' and teachers' experiences, and hence also their perceptions, of ICL are affected by this context and the design of ICL activities. We will therefore briefly account for the integration of content and language at a mechanical engineering programme at Chalmers University of Technology, Sweden, focusing on the integrated modules and interventions scaffolded by communication lecturers (see Figure 1).

Year 1	Year 2	Year 3
Introduction to Mechanical Engineering: ICL intervention 1	Construction and manufacturing: ICL intervention 2	Bachelor's thesis project: ICL intervention 3
<i>Student activities</i> Report writing Peer response Oral presentations	<i>Student activities</i> Report writing Peer response Oral presentations	<i>Student activities</i> Thesis writing Peer response Oral presentation
<i>ICL interventions</i> Lectures Workshops Writing tutorials Writing feedback	<i>ICL interventions</i> Lectures Workshops Presentation tutorials Presentation feedback	<i>ICL interventions</i> Lectures Writing tutorials Presentation tutorials

Figure 1. Three integrated communication modules are distributed over the first three years. The integration takes place in project development courses during years 1 and 2 and as part of the collaborative bachelor's thesis project in year 3.

The focus on the report and oral presentation genres in the first three years has grown out of an attempt at communicating within the discipline and in connection with traditional engineering tasks. The communication activities have been sequenced over the first three years to offer multiple opportunities for practice in collaborative settings and in multiple contexts, and a summary of the ideas behind the design of the ICL interventions on the programme can be seen in Figure 2.

- The communicative interventions have been designed to:
- situate and sequence interventions in disciplinary content courses over the first three years
 - focus on various aspects of communication in various courses
 - practise the composition of genres central to the discipline (e.g. written technical reports, oral presentations about product development projects and the Bachelor's thesis)
 - let students gradually meet more challenging tasks, both in terms of disciplinary content and learning and in terms of communication deliverables
 - raise students' awareness of the writing process and audience through teacher-scaffolded activities such as peer response
 - accustom students to critically and constructively comment on and receive comments on texts via recurring peer response activities
 - practise communicating in teams

Figure 2. The main ideas behind the design of the ICL interventions in the programme.

These interventions aim at strengthening students' ability to communicate in speech and writing, but as communication teachers we also want students to be able to develop communication strategies that facilitate the ability to adapt to new situations that they will meet in their future careers. In order to be able to do so, we ultimately want students to develop awareness of the connection between language and content in their discipline and of the importance of selecting, preparing and adjusting material for different situations and audiences. In addition to these ICL activities, it is also important to point out that there are other writing tasks and assignments on the programme, particularly in year 2 and 3, in which communication teachers are not involved.

Data Collection and Analysis

The collection of student data involved interviews and a survey with open-ended questions with free text answers from the students, whereas the teacher material consisted of interviews only. The reason for using both interviews and a survey for the students was that we wanted to include as broad a range of the student population as possible at the same time as we wanted to give students the chance to qualify and develop their answers in the interviews. In addition, the combination of these two methods allows us to perform future studies in which we can investigate whether the method for data collection seems to influence the types of answers given.

The language of the interviews and survey was Swedish as Swedish is the language of instruction during the first three years of the programme. Quotes from surveys and interviews shown in this article have thus been translated into English.

The survey was distributed electronically to all students in years 1-3 during the spring of 2011 and an additional collection of student statements was made among first-year students in the spring of 2012. The response rates were between 24% and 39% for the different groups, and all in all 171 student surveys were collected. The comparatively low response rate was probably due to the survey being distributed electronically. Students had to access the survey by following a link in an email message. It is likely that this procedure affected the response rate negatively. However, we primarily use the data to identify the most common perceptions of communication and communication activities and believe that these have been represented in the 171 answers that we collected.

Interviewees for the student interviews were selected by means of a random number generator. After the selection, students were invited via email to participate in the study. The invitation clearly stated that participation was voluntary and out of 30 students invited, 15 agreed to be interviewed. The interviews were semi-structured and lasted between 15 and 40

minutes. All of these interviews took place in a classroom at the authors' department. The interviews were recorded after the interviewees had given their consent. The interview and survey questions can be found in appendices 1 and 2, respectively.

The teacher data consisted of semi-structured interviews with five teachers from the mechanical engineering programme. The questions did not directly address the integration of content and language as we wanted to avoid leading teachers' answers into the direction of writing-to-learn. Instead, we wanted to see whether they brought up writing-to-learn and writing within their discipline as aspects of why ICL modules were part of their engineering programme. These interviews lasted between 25 and 40 minutes and were carried out at the interviewees' department. For the complete set of teacher interview questions, see Appendix 3.

The data collection was not unproblematic, partly because we work as teachers in the programme. There was therefore an obvious risk that interviewees would try to give us the answers that they thought we wanted. We tried to address this problem by emphasising that the interview was not an evaluation of the programme or of their or our work in the programme.

To reflect students' and teachers' perceptions of the integration of content and language as reliably as possible, teacher and student statements were sorted into themes or categories. The interviews were listened through carefully several times, and statements that seemed relevant to the analysis of content and language integration were selected and sorted into themes. These analyses were first done individually, then notes and categorisations were compared, and differences between the analyses were discussed. In the end, we arrived at a shared classification of statements. A similar procedure was used for the analysis of the student questionnaires, i.e. questionnaires were analysed individually and then classifications and categorisations were compared and discussed.

Results and Discussion

The analysis of student and teacher statements about communication activities rendered four main categories:

- *communication as a communication product,*
- *communication as transferring information,*
- *communication as part of becoming an engineer,*
- *communication as a tool for learning.*

On the whole, both students and teachers seemed to have similar perspectives on the role and function of the communication activities in the programme, and both teachers and students made comments that fall within the four categories. It is important to note, however, that there is considerable variation between individuals when it comes to ways of articulating the role and function of communication within engineering education. This spread in perceptions is true for both content teachers and students, as statements in the survey as well as the interviews encompass a broad range of views. It is also important to highlight that individuals also may display this range where one understanding of communication activities does not mutually exclude another, more complex or even seemingly contradictory, standpoint.

In the following subsections, this section, we first describe the four categories based on students' and teachers' perceptions of communication and communication activities on the programme, and then go on to discuss and problematise effects of the approach to ICL in the programme.

Communication as a communication product

When discussing what the purpose of integrating communication in their programme is, a majority of the students and most content teachers highlight the product of a communicative

activity, typically a report or an oral presentation. Many of the responses contain the words 'report' and '(oral) presentation'. Another indication of the strong focus on communication products is that, when asked about what students need to be able to communicate about, content teachers often respond by referring to what types of documents and presentations students will have to produce as engineers (for example reports, presentations and posters).

The common denominator of statements placed in this category is thus a focus on communication products, rather than on the function or purpose of communication as such or of the communication product. Within the category, statements can be placed along a continuum, as illustrated in Figure 3.



Figure 3. Illustration of the continuum along which statements about communication as a product have been placed.

At one end of the continuum, statements emphasise the form and correctness of communication products. For instance, one student describes the reason for integrating communication on their engineering program as being 'to write a proper report' (student survey, year 1), and a teacher states that:

They learn a basic structure with abstract, table of contents, introduction, and to explain what they have done and references and all that. I think they improve as we go along... It is of course possible that someone who knows how to write has taken responsibility for the writing...but they produce a decent result in the end. (teacher interview)

Another teacher signals a similar skills view of writing when stating that 'if they already know their Swedish and if they know how to use references correctly in the text, there is not much I can do as an engineering teacher'. (teacher interview)

The other end of the continuum holds comments which involve the importance of practising the production of reports and oral presentations. For instance, one student explains the reason for integrating communication in an engineering programme as follows: 'So that we practise report writing and the preparation of presentations, which can be used in working life' (student survey, year 2). This type of statement indicates a stronger focus on the learning of a number of strategic products or genres, but the extent to which informants actually have a genre perspective which involves particular conventions, participants and purposes in mind is difficult to know as their expressions are not very elaborate on these issues. There are also some statements that are difficult to place at either of the two ends. For instance, some students say that the purpose of integrating communication is 'to write reports' without elaborating on whether this refers to the format, the activity or both. These types of statements are represented by the shaded area in Figure 3.

Communication as transferring information

Many students and teachers express a perspective on communication which emphasises the function of transferring information to an audience (rather than to interact with or adjust to this audience). The role of writing and communication is to present work that has been completed, and communication is therefore seen as fulfilling a *transferring* function. Many informants highlight the importance of transferring their information in a clear and concise manner so that someone else can understand what they have done or what they mean. For instance, one student states that communication modules should lead to students being able to 'convey their results and conclusions' (student survey, year 2). Another student states that '[...] one does not write in order to make it [the text] beautiful but just to convey what you want to convey [...] as effectively as possible' (student interview, year 2).

What may be lacking in this transferring perspective is the role of communication in negotiating content and knowledge, both as a reciprocal act and as a cognitive act. This means that communication is not perceived as having a knowledge-building function, but instead as an act where facts and information are simply displayed or made available to an audience. So, communication is viewed as something that takes place after the knowledge-building process, rather than something that is an integral part of the creation of knowledge.

Even though the concept of audience is not emphasised in statements belonging to this category, it should be mentioned that some informants acknowledge that there is a receiver. It is worth noting that it is primarily the students who mention audiences, which may be an effect of the fact that they have presented to multiple and mixed audiences, particularly during the second year of the programme where the audience in the ICL module contains students, teachers and industry representatives.

Communication as part of becoming an engineer

Statements from both students and content teachers indicate that communication is perceived as an intrinsic part of the engineering profession. The fact that communication activities, such as report writing and oral presentations, are part of the students' education is perceived as a way into the profession and an engineer's professional duties. The great majority of students also see communication activities, such as writing technical reports and giving oral presentations, as meaningful since these activities meet the expectations on what type of communication they will encounter as engineers after they have graduated.

The content teachers see the ability of communicating within the discipline as something that is important for the students in their careers. Several teachers emphasise that communication is an intrinsic part of the engineering profession today, partly because a great deal of engineering work is project- and team-based. By communication they primarily refer to the ability to write reports and give oral presentations in the workplace. All in all, this means that both teachers and students typically describe the role of communication in 'becoming an engineer' as connected with the ability to produce a number of communication products. Indirectly, their statements are therefore also an acknowledgement of the value and importance of practising the use of apprenticeship genres.

Just as in the first category, communication as product, there is a continuum in this category (Figure 4). The continuum relates to what informants express as being important communication abilities for an engineer.



Figure 4. Illustration of the continuum along which statements about communication as a part of becoming an engineer have been placed.

Some informants mention knowledge about format and correctness as the important qualities. For instance, some students say something like '*you need to know how to write a correct report when you work as an engineer*', and also some teachers take this perspective when highlighting correctness and language as skills necessary for an engineer.

Other informants describe the importance of communication more as a matter of engineering identity. Some students see the ability to communicate with others as the primary goal for writing as an engineer: '*we need to be able to communicate with others*'. Here the concerns are not the surface factors of text production (such as 'correctness' or 'language') but rather discussion and mutual understanding.

Communication as a tool for learning

The final function of communication mentioned by a minority of the students and by a couple of the teachers is that of learning. The student responses show a relationship between content and communication where writing is a means for creating knowledge and understanding: '*writing increases understanding*' and '*it's not until you write things that you*

see what and how much you actually understand'. Overall, however, students do not give detailed accounts of the influence from communication on their learning. It is possible that this is because the questions asked were too general to generate elaborate student accounts on the effects of writing on learning. Carter, Ferzli and Wiebe (2007) were able to collect such accounts when focusing on one particular genre, the lab report. On the other hand, Carter, Ferzli and Wiebe very explicitly asked about how writing influenced their learning (e.g. 'Has writing the lab reports helped your understanding of concepts you had to write about?' (Carter, Ferzli and Wiebe 2007: 300)). It may have been possible to generate accounts of this type also in our study, but what we know from our results is that issues relating to writing- or communicating-to-learn were not what students immediately came to think of when asked about the role of communication in ICL modules.

Statements about writing-to-learn vary between teachers. Two of the teachers comment on the dual role of writing as a tool for presenting something as well as a tool in the learning process. For instance, one of them argues that report writing:

helps them structure thoughts and ideas [...] it becomes a backbone in their process [...] it becomes a goal for their process [...] when you write it down you can more easily see when it does not make sense [...] when you can see if it is not coherent [...] the medium that you can see whether students have understood or not, if there are pieces missing in their logic [...] and help them identify these themselves [...]. (teacher interview)

There is also one teacher who comments briefly on report writing as a tool that helps students structure and question their own ideas. The two remaining teachers do not discuss communication in relation to learning.

The fact that teachers differ in their statements is not surprising in itself. There are several studies that have recorded differences within a group of teachers (Thaiss and Zawacki 2006: 88–89, Barrie 2006). In the context of the present study, students are clearly involved in writing-to-learn activities (for instance via regular hand-ins during the product development project in the second year), but some teachers do not mention this type of writing when being asked about why students write on the programme. In addition, a couple of the teachers state that they find it difficult to find out what the students know on the basis of the reports they mark:

I think it is very difficult [...] I know how to correct an exam [...] that I have an idea about how to assign credits [...] well, that can also be discussed of course, but how people write is very difficult to assess [...] I have a strong subjective opinion but I find it difficult to relate it with some sort of objective facts. (teacher interview)

Our results thus indicate that faculty would benefit from discussing the concept of 'writing/communicating-to-learn', the assessment of what is broadly termed 'communication', and the role of communication in learning and assessment processes.

All in all, when we summarise our findings presented in the four categories of students' and teachers' perception of communication and communication activities, the picture that emerges is one of consensus. This consensus is primarily grounded in a view in which communication is described as transferring information via a number of apprenticeship genres. The fact that the perceptions highlight a number of communication products is not really surprising as these are genres that the students meet in the integrated content and language interventions in the programme. The results may therefore reflect the fact that there has been an attempt to sequence the learning of particular genres in several courses during the first three years. In addition, the consensus may be influenced by a shared understanding that these are genres that are important in the engineering profession.

Our data do not give us reasons to question the socialising effects of apprenticeship genres found by Carter, Ferzli and Wiebe (2007), primarily because we have not investigated socialisation as such, but also because students and teachers seem to agree that learning to

write a product development report and give an oral presentation about engineering processes are activities that are valuable for students who are in the process of becoming engineers. These genres are perceived as legitimate genres that are both important and to some extent also motivating. It is also suggested that these genres provide opportunities for students to start participating in the scientific and professional community of mechanical engineers, and that it is a way of gradually developing an authority within this discipline (Carter, Ferzli and Wiebe 2007: 295–297). As pointed out above, our data do not give us reason to question these conclusions, but there is a potential risk that too strong a focus on a limited number of key genres happens at the expense of preparing students for addressing new and unknown communicative situations. The ability to address, analyse and act in new and unknown communicative situations is an important ability for modern engineers. This is an ability that we try to practice in our interventions, but our results indicate that more can be done to prepare students for such challenges. In the following section, we therefore problematise the notion of apprenticeship genres from the perspective of how they prepare students for moving between genres and for acting in new communicative situations.

Students' development as communicators

Statements from the survey and the interviews indicate that some students have not developed a genre competence that allows them to act confidently in unknown communicative situations when these situations are not scaffolded. The students manage fairly well as long as they work with apprenticeship genres, but when they have to address other genres or subgenres, some students report that they struggle. For instance, one student describes the difficulties she and her project group had when meeting a genre they were not familiar with: the case study report. This is a report type that the students meet in a course about industrial production and organisation during the second year. The course is given by the department of Technology Management and Economics, and the course does not involve any collaboration between content lecturers and communication lecturers. What the student noticed in this course was that the conventions for and expectations on this report were different than the conventions of the product development report:

It seems as if there is a difference between different departments [...] They [The Department of Technology Management and Economics] structure it differently or have a different perspective or a different structure [...] It feels as if they do not want it to be structured in the same way. (student interview, year 3)

The student also states that it was frustrating to work with this unknown genre as it did not seem to matter how much effort their team put into the text; they could simply not write a text that was good enough: 'we do not know how to write these [case reports] and we always get [...] that they are not very good, as feedback [...] irrespective of how hard we work and how good we feel that the report is'. Statements like this one obviously raise questions about how the writing of case reports is taught in the course, but it also shows that these students were not expecting requirements to be different for this type of report or at least that they were not prepared to deal with these differences. The case seems to be an example of the difficulties of 'course switching', a concept that Lea and Street (1998) introduced to describe difficulties that students experience when having to adjust to different expectations and assumptions of writing as they move between courses and disciplines. Often such switches do not involve simply switching between different surface level requirements, but also switching between how to describe and represent knowledge in those disciplines (Russell and Yañez 2003).

From the students' point of view, there is a conflict between the writing they have learnt and the new and, to them, arbitrary requirements of the new writing assignment. For these students, it looks as if frustration becomes a hurdle that prevents them from approaching the situation as a useful learning opportunity. Another student also expresses her frustration about the differences between product development reports and case reports. Her view of the problem was, however, not that the genres are different and that she needed to know how to use both of them, but rather that there is a lack of a clear template that covers all writing assignments:

I would like to have something at the beginning of our education that tells us about the parts of a report so that you know [...] sort of like a template that you could have throughout your education. (student interview, year 2)

What is particularly interesting in these two accounts is that the students talk about a genre, the case report, which shares many surface characteristics that can be found in the product development report as well (introduction, method, conclusion, etc.). Students may obviously benefit from having written reports within the apprenticeship genre, but our data suggest that for some students the experience they have is not sufficient to make them write a new genre in a neighbouring discipline.

The students' frustrations indicate something about their development as writers in the discipline. Thaiss and Zawacki (2006) identified three stages in students' development as writers within a discipline at university. In the first stage, students tried to find common requirements that seemed to apply to all assignments that they needed. In the next stage, students developed a relativistic view where all teachers seemed to be requesting different things in their writing assignments. In the third stage, students had learnt to handle the uncertainty and different requirements (real and perceived). Students had learnt to navigate within the discipline, for instance by knowing how to channel their interest in a topic into a piece of text. Thaiss and Zawacki (2006: 140) argue that it is possible to envisage more advanced stages, but they also claim that not all students reach the third level. The frustrated students in our study have obviously not reached the third stage. However, in order to find out more about to what extent students are able to move into the third or higher stages of development on their own (Thaiss and Zawacki 2006: 140) and how such development can be supported, it would be necessary to involve students from all five years of the programme.

We have also come across teacher comments that suggest that students have problems when working with genres that differ from the product-development report. When presenting our results from the present study to a group of teachers on the programme investigated, one teacher from a master programme anecdotally told us how students struggle when dealing with problems that are not of the problem-solution type. For instance, in material science, the work process that the students face is often reversed in the sense that their task is to find out why a problem occurred rather than to find *one* solution to a problem, and often there is not a single cause to the problem but a combination of causes. The students, who have primarily been trained to write problem-solution oriented texts and think in a problem-solution oriented way, face several challenges here as these ways of writing and thinking are not necessarily the most effective ones in the context of material science.

We may only speculate here, but we believe that it would be useful for students to be made aware of the differences between writing these types of seemingly similar reports as well as the different ways of knowing involved in solving these tasks. We also believe that there may be both a socialising and motivational value in seeing these differences as they happen in the discipline rather than in a general writing course. It is therefore important to find ways of scaffolding the awareness of such differences - differences which are not simply manifested in texts but which influence students understanding in and of the discipline. Working with more genres and explicating genres would therefore implicate moving towards an academic literacies approach to student writing and communication, as it would involve looking more closely at dynamism and differences between genres as well as what counts as knowledge in a particular discipline.

Our findings indicate that a role that could be valuable on a programme of the type that we have described here is a role in which a communication teacher works as a facilitator and negotiator of what different assignments and disciplines require. In our context, the main concern for communication teachers has so far been to be active in course design, course delivery and the development of criteria, but it may also be beneficial for programmes to consider other roles. One such role could involve the negotiation of assignments and expectations from different departments, and this negotiation could involve teachers as well as students in different steps of a process. One of the crucial goals of such a process would be to demystify some of the requirements of a particular assignment in order to understand

how these requirements are connected with disciplinary requirements and ways of understanding and not only the expectations of individual teachers.

Instead of suggesting entirely new communication modules or interventions, the approach would primarily involve making better use of what is actually done in the programme by: 1) making explicit differences and similarities between genres and ensembles of genres, and 2) trying to raise students' meta-knowledge of discourse practices to enable them 'to communicate successfully in different contexts' (Paretti 2011). Students who have had the experience of meeting, analysing and discussing communicative situations which are different from the genres that they are familiar with may develop their awareness of strategies that can be used in such situations. Working with and determining what may be effective in one context but not necessarily in another context strengthens students' capacity to make 'informed judgements' about their own and other peoples' communication (Boud and Molly 2012: 7–8).

Conclusion

In the present study we have investigated students' and teachers' perceptions of communication and communication activities at a mechanical engineering programme. The approach to the integration of content and language has been referred to as an apprenticeship genre approach. We have seen both strengths and weaknesses of this approach. Among the strengths we see that apprenticeship genres are considered to be relevant because being able to use the apprenticeship genres is part of becoming an engineer. At the same time, however, we can see that some students seem to have a fairly narrow perspective on what communication within their discipline is and that genres which differ from the apprenticeship genres cause problems for some students. We have therefore tried to problematise some of the effects of an apprenticeship genre approach and discussed ways in which some of the potential drawbacks of an apprenticeship genre approach can be mitigated. One of the aspects discussed in connection with compensating for potential drawbacks is a different role for communication teachers in which they take a wider perspective on communication on the programme and also try to involve genres that differ from the apprenticeship genres.

Our results are obviously preliminary and in order to be able to say something more about students and their ability to communicate within and outside the apprenticeship genres, we would have to observe such situations and the communication products produced under different circumstances. In this context, it would be interesting to study what it entails to develop what Russell and Harms refer to as 'the communicative dispositions necessary' (Russell and Harms 2010: 244). Russell and Harms base their discussion of dispositions on Berieter's (1995) distinction between transfer of principles and transfer of dispositions (see also Brent 2011 and Toumi-Gröhn and Engeström 2003). Russell and Harms (2010) do not elaborate on what the development of dispositions could entail, but in our context we envision that one aspect that would be particularly interesting to investigate in more detail is whether or not it can be claimed that students are disposed to address unknown communicative situations, to what extent such dispositioning can be practised, and what the training of such dispositioning would entail.

In a broader perspective, an approach that aims at moving beyond an apprenticeship genre approach, for instance by increasing students' awareness of different genres, would entail moving from an academic socialisation model towards an academic literacies model (Lea and Street 1998, 2006). There are different frameworks which are useful for programmes that want to work actively towards specific levels of writing, literacy or conceptions of generic attributes, for example Lea and Street (1998, 2006), Ivanič (2004) and Barrie (2006, 2007). Another very interesting approach is described by Patton (2008), who takes a curriculum-wide perspective on writing and includes portfolio and portfolio assessment (see also Paretti 2013, this issue). We acknowledge the strengths of portfolio assessment, but also realise the administrative challenges that would arise if it was implemented for 450 students (150

students per year in years 1-3) at the bachelor thesis level on the mechanical engineering programme investigated here.

One reason for programmes to be concerned about students' ability to develop an understanding of communication within the discipline, at the same time as they develop their ability to handle new and unfamiliar contexts, is the educational design of the Bologna system, where students may choose a two-year Master's programme after their three Bachelor years. This system gives, for instance, mechanical engineering students the opportunity to give a management profile to their degree. The concept of the mechanical engineering student has thus widened in comparison with the old system where all students used to follow the same basic set-up in a full-fledged five-year programme.

In an educational system and on a global market that emphasise inter-, multi- and/or trans-disciplinarity (Paretti 2011), it seems increasingly important to practise and discuss communication in various settings. Consequently, a potentially important task for communication teachers is to identify a variety of genres that students meet in the programme and use these to make students aware of and practise addressing a wide range of communicative situations.

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Appendix 1: Student Survey Questions

- Has your way of writing changed since you started at Chalmers?
- Have you become better at writing?
- If you feel/think that you have become a better writer, what is it that you have improved?
- What does it mean to become a better writer? What can one become better at when it comes to writing?
- What is the aim of having communication modules in some of your engineering courses?
- What do you think communication modules at an engineering programme should lead to?
- Have the modules you have attended so far affected your view on communication?
- Do students become better engineers by writing reports in their education?

Appendix 2: Interview Questions – Students

- In what way have you practised communication on your programme during the years you have been studying at this programme?
- What have you done, and what was the purpose?
- What is your previous experience of writing (at school or at university)? Are there similarities and/or differences between that writing and the writing you do here?
- What does it mean to you to become a better writer, i.e. what can one become better at?
- Have you become a better writer? What are you better at?
- What is the purpose of having communication modules in some of your courses?
- Has your view of why there are communication modules on your programme changed while you have studied here at Chalmers?
- If you were given the opportunity to design a communication module – what would that module contain?
- Is there anything you would like to know more about or practise more in terms of communication?
- Do you receive support about language and communication from content teachers?
- Do you feel that content and communication teachers say roughly the same thing about communication?
- What is it like to write in a project group in comparison with writing individually?

Appendix 3: Interview Questions – Teachers

General questions

- Why do students write reports?
- What do students learn from writing reports?
- Is that what you would like them to learn?

Assessment

- Is the technical report sufficient as a tool for grading and assessment?
- Can you assess what you want to assess? What do you want to assess?
- Do students become better engineers by writing reports?

Supervision

- Do you discuss communication in your tutorials?
- What do you discuss?
- What do the students ask about?

On being and becoming an engineer

- What do you need to be able to communicate about as an engineer within this discipline?
- Is there anything that the students would need to practise more when it comes to communication in your discipline?