



IMYM

Research Results

ICT Application and Integration by Teachers Beginning to Implement the IMYM Model

2003 – 2004

Prepared by *Distance Learning and Information Technologies Unit, Program Development Branch, Manitoba Education, Citizenship and Youth*

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ICT Application and Integration by Teachers Beginning to Implement the IMYM Model 2003 – 2004

1.0 Introduction

IMYM (Interdisciplinary Middle Years Multimedia) is curriculum-based, interdisciplinary, action research designed to develop and demonstrate promising practices that integrate technology as a foundation skill (TFS) in the middle years classroom. The IMYM model evolved from this action research.

The IMYM model is an effective and flexible instructional model that supports teachers in integrating information and communication technology (ICT) in middle years' classrooms to improve teaching, learning, and assessing.

Five characteristics of the IMYM Model will be discussed: (1) interdisciplinary (2) collaborative (3) authentic assessment (4) constructivist and (5) ICT in the Classroom

1.1 Interdisciplinary

The interdisciplinary component of the IMYM model is designed to meet the needs of the diverse learning styles and multiple intelligences found in each classroom. It offers a variety of opportunities for students to use ICT to achieve outcomes in English language arts, mathematics, science, and social studies in the context of exploring real-world concepts. There are five thematic concept-based interdisciplinary units, each with a duration of 6-8 weeks.

grade 5: *Climate Change*

grade 5: *Prairie Tour*

grade 6: *Inventions, Innovations, and Discoveries*

grade 7: *Balance and Harmony*

grade 8: *Systems Interactions*

1.2 Collaborative

The collaborative component of the IMYM model enables the IMYM teacher to shift roles from disseminator of information to facilitator of active learning. In the collaborative setting, IMYM students work in peer groups at ICT supported learning experience centres around the classroom. IMYM teachers organize students in small collaborative groups in learning centres to make best use of student-to-computer ratios of greater than one-to-one. In the collaborative setting, peers share ideas, solve problems, gather information, create new knowledge, present, actively respond to, and reflect on their collaborative work processes.

1.3 Authentic Assessment

The IMYM model promotes peer feedback on and teacher evaluation of student performance, as well as self-reflection and self-assessment in authentic contexts. Student products, processes, and performances are assessed in both interdisciplinary and collaborative contexts. Students store hypermedia files on digital media such as CD-ROM and Intranet or Internet websites to serve as part of their "electronic portfolio." These portfolios are passed from one IMYM teacher to the next as part of the authentic assessment of a student's accomplishments over the middle years.

1.4 Constructivist

Interdisciplinary IMYM units promote constructivist thinking and development of knowledge. Within these units, core subject areas are blended around a theme or concept focused on the real world. Learning is more meaningful for students in this environment because they are not just acquiring unrelated facts in different subject areas but are drawing connections among subject disciplines and asking and researching essential questions. Developing these connections requires students to build their knowledge using higher level thinking skills such as problem solving and critical analysis in their inquiry process. IMYM learning experiences are designed to activate students' prior knowledge and provide opportunities to generate new knowledge.

1.5 ICT in the Classroom

The placement of ICT within the IMYM classroom enables the use of ICT to teach and learn in context. The use of ICT in the IMYM classroom also facilitates the integration of curriculum while allowing students to acquire and practice ICT skills and competencies (e.g. word processing, file management, multimedia presentation, web page creation, etc.) necessary to function successfully in today's society. The use of ICT allows middle years students to

- develop knowledge, ability, and responsibility in the use of ICT
- acquire, organize, analyze, evaluate, and present information using ICT
- use ICT to expand the range and effectiveness of communication
- solve problems, accomplish tasks, and express creativity, both individually and collaboratively, using ICT
- understand the social role and impact of ICT, and apply ethical, responsible, and legal standards in its use

1.6 Report Summary

This report examines the self-reported entry skills of seventy-six middle years teachers who volunteered to participate in professional learning sessions to prepare them to implement the IMYM model during the 2003-04 school year. These teachers completed two rubrics at the beginning of their training.

(1) The IMYM rubric *Self-Assessment of ICT Literacy*, which allowed teachers to self-assess their skills in using ICT applications.

(2) The IMYM rubric *Self-Assessment of Pedagogical Skills in Integrating ICT with Curriculum and Classroom Practice*, which allowed teachers to self-assess their skills in integrating ICT in the classroom.

The purpose of having IMYM teachers complete these rubrics is to guide providers of professional learning in designing appropriate professional learning opportunities for the teachers. Teachers also use their self-assessments to create their own professional growth plans as they prepare to implement the IMYM model.

The analysis and summary of each of these rubrics will be discussed separately.

2.0 Analysis of IMYM Teachers' Self-reported Skills in Using ICT Applications

The IMYM rubric entitled *The Self-Assessment of Information and Communication Technology (ICT) Literacy* (see Appendix A) provided teachers with the opportunity to self-assess their competency level from beginning to exemplary, in sixteen information and communication technology (ICT) skills

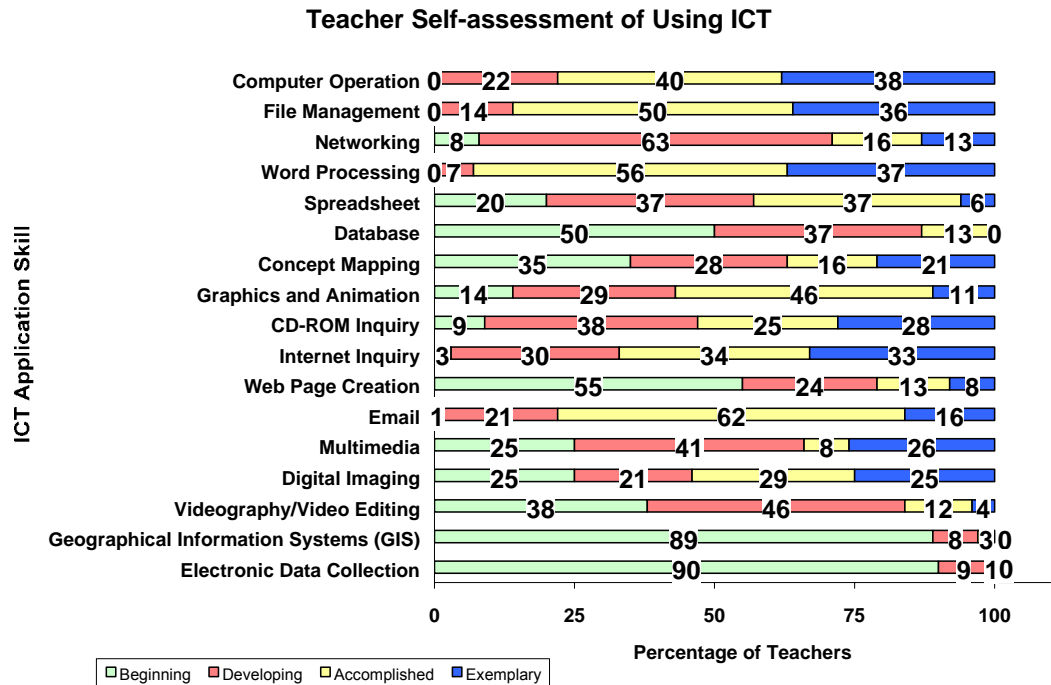
- Computer Operation
- File Management
- Networking
- Word Processing
- Database
- Concept Mapping
- Graphics and Animation
- CD-ROM Inquiry
- Internet Inquiry
- Web Page Creation
- Email
- Multimedia
- Digital Imaging
- Videography/Video Editing
- Geographical Information Systems (GIS)
- Electronic Data Collection

In each of these ICT areas, teachers selected the most appropriate description of their skills, from a rubric of four competency levels

- Beginning
- Developing
- Accomplished
- Exemplary

Figure 1 illustrates the percentage of teachers at each competency level for each of the sixteen ICT application skills.

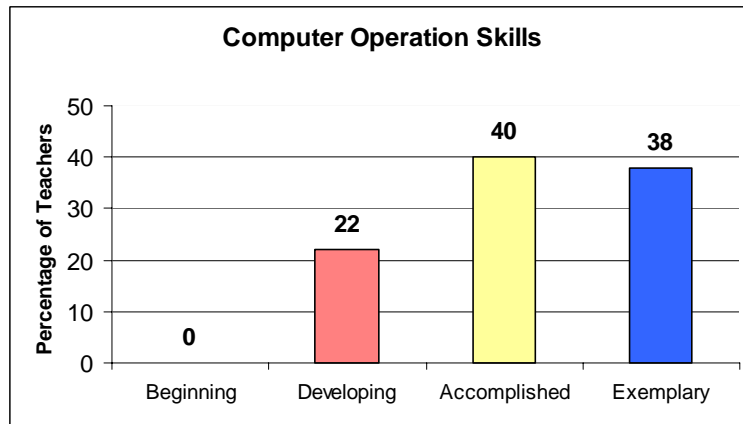
Figure 1. Teacher Self-assessment of Using ICT



2.1 Computer Operation

Before using the IMYM model, all IMYM teachers identified themselves as already possessing skills in basic computer operations, more than three-quarters (78%) of whom ranked themselves at the Accomplished or Exemplary levels. At the Accomplished level, teachers could set up computer and peripheral devices, load software, print, and use some of the operating system tools (e.g. Find command). In addition, they were able to customize the look and sounds of their computer, run two or more programs simultaneously, and switch between several windows. At the Exemplary level, teachers could make preference settings to customize specialized peripherals (e.g. digital camera) and confidently teach students how to use a computer. See Appendix A, Part I.

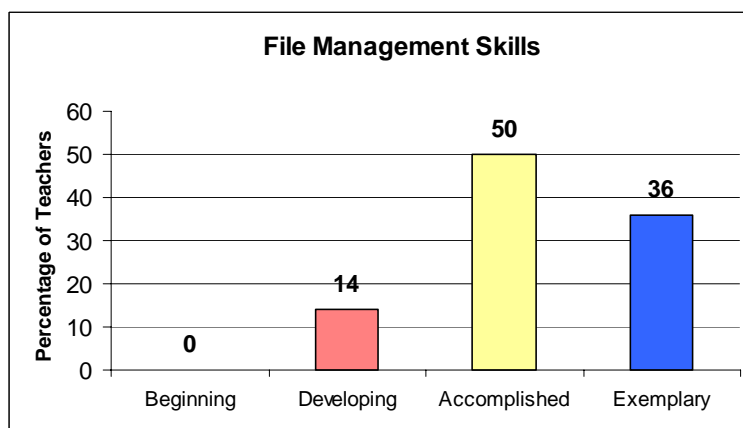
Figure 1. Computer Operation



2.2 File Management

Before using the IMYM model, all teachers identified themselves as already possessing skills in the management of electronic files. Half (50%) the teachers identified themselves as having file management skills at the Accomplished level. These teachers have created filing systems to organize and locate electronic files quickly and reliably, as well as to back up files on a regular basis. An additional third of teachers reported that they had a system for archiving files that they did not need on a regular basis, and could copy files onto a CD-ROM. Moreover, these teachers have taught their students how to manage their own files on classroom computers and the school network (Exemplary level). See Appendix A, Part II.

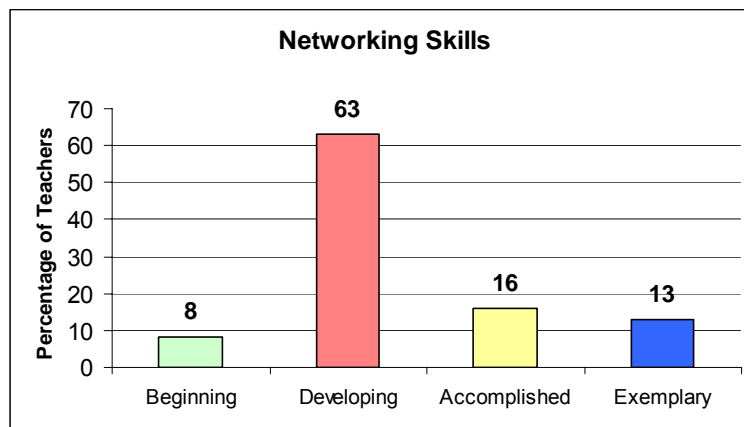
Figure 2. File Management



2.3 Networking

Before using the IMYM model, most IMYM teachers (63%) placed themselves at the Developing level of networking. They indicated that they understood how to use a computer network to store files and to access a printer. Further, only 8% placed themselves at the Beginning level, which signifies no prior knowledge of computer network operation. On the other hand, few teachers (16%) were able to troubleshoot network problems or add or remove computers and other shared devices on a peer-to-peer network (Accomplished level). Even fewer teachers (13%) were able to set up and administer their own peer-to-peer network (Exemplary level). It is not necessary, however, for most teachers to have to develop skills in network management since most schools now have technical support staff to do this work. See Appendix A, Part III.

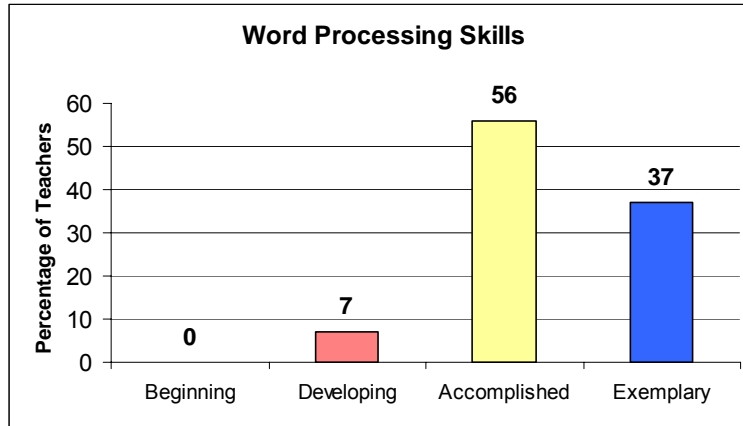
Figure 4. Networking



2.4 Word Processing

Before using the IMYM model, nearly all (93%) IMYM teachers identified themselves at either the Accomplished or Exemplary levels of word processing. At the Accomplished level, more than half (56%) of all participants agreed that they used a word processor for nearly all of their written professional work and home communication and that they could edit, spell-check and format a document. Further, at the Exemplary level, more than one-third (37%) of IMYM teachers could use advanced features (e.g. track changes and hyperlinks) and use a word processor not only individually, but more importantly to teach students to use word processing for all stages of the writing process. See Appendix A, Part IV.

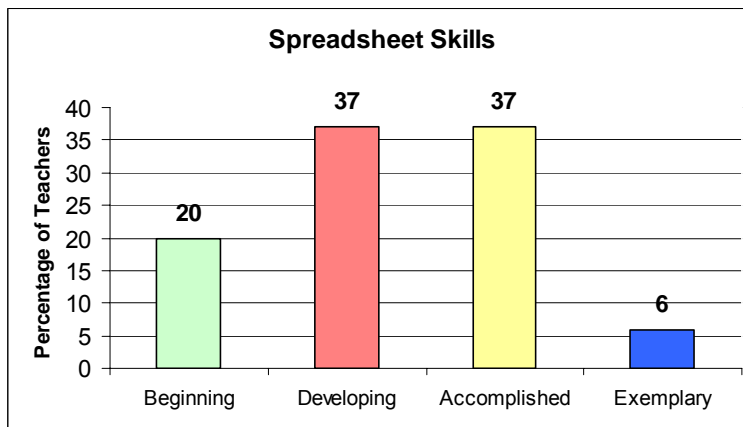
Figure 5. Word Processing



2.5 Spreadsheet

Before using the IMYM model, although 20% of IMYM teachers reported that they did not yet use a spreadsheet, 74% rated themselves at either the Developing or Accomplished levels. At the Developing level, teachers understood how to use and navigate a spreadsheet and to create a simple spreadsheet to add a column of numbers. At the Accomplished level, teachers were able to keep track of student grades using labels, formulas and cell references. In addition, they could create graphs and charts and format spreadsheets by manipulating column widths and text styles. However, only 6% of teachers stated that they worked with multiple worksheets, created macros, used database functions or have taught students to use spreadsheets to improve their data keeping and analytical skills. See Appendix A, Part V.

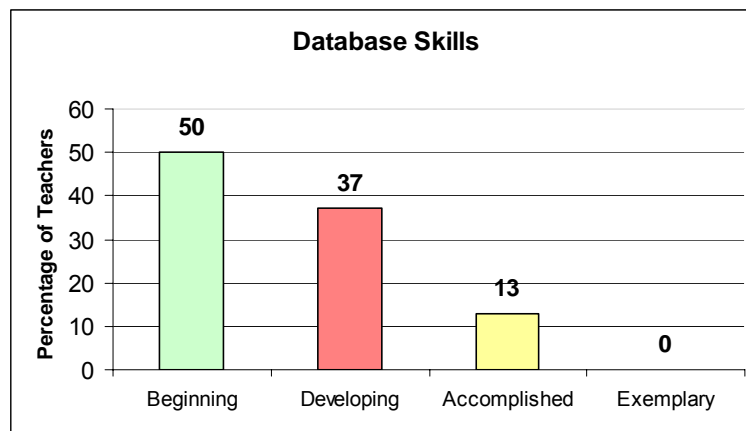
Figure 6. Spreadsheet



2.6 Database

Before using the IMYM model, half the IMYM teachers (50%) did not yet use a database (Beginning level), and the other half (50%) rated themselves at either the Developing or Accomplished levels. At the Developing level, 37% of teachers understood how to use a database, could locate information within a pre-made database, add or delete data, as well as sort and print information with useful layouts. At the Accomplished level, 13% of teachers could define fields and create layouts to support inquiry, as well as perform queries. However, none of the teachers have yet taught their students how to use databases to help them improve their own data-keeping and analysis skills (Exemplary level). See Appendix A, Part VI.

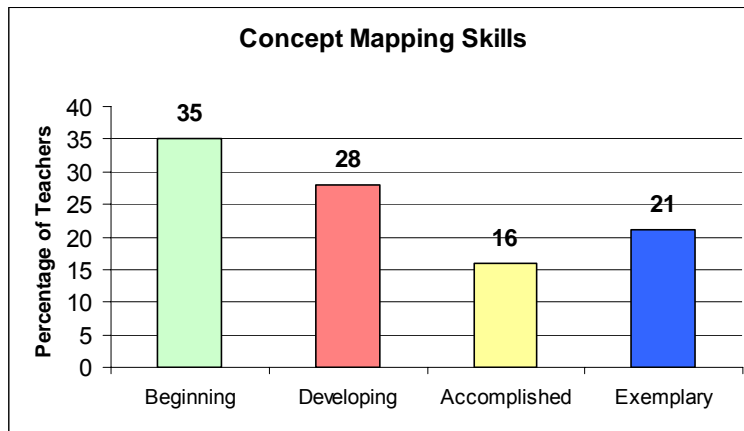
Figure 7. Database



2.7 Concept Mapping

Before using the IMYM model, one third of IMYM teachers (35%) placed themselves at the Beginning level of electronic concept mapping skills. This is likely because these teachers do not yet have access to specialized concept-mapping software (which is not included in a typical "office suite" of software). At the Developing level, 28% did understand how to use concept mapping software to create simple concept maps and outlines. Teachers at the Accomplished level (16%) were also able to use concept mapping software as a note-taking and organizational tool and were able to customize the symbols, links and layout of their concept maps. An additional 21% of teachers could use concept-mapping software as a presentation tool and export their concept maps into multimedia presentations or web pages. Moreover, they have taught their students how to use concept-mapping software (Exemplary level). See Appendix A, Part VII.

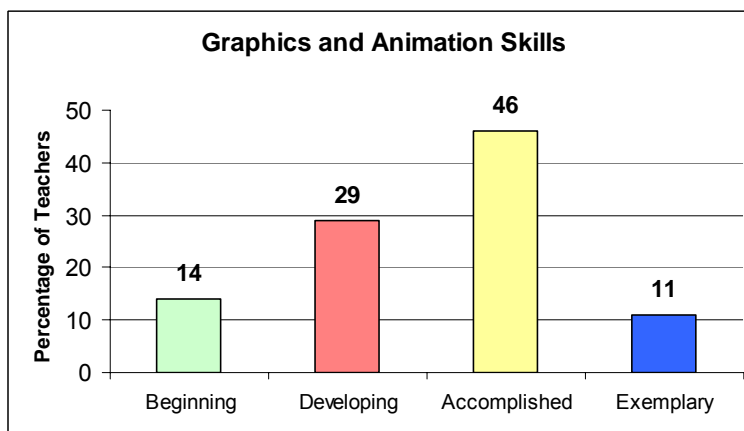
Figure 8. Concept Mapping



2.8 Graphics and Animation

Before using the IMYM model, less than half (43%) of IMYM teachers assessed themselves at either the Beginning or Developing levels of graphics and animation. These teachers either did not yet use graphics in their electronic work (Beginning level) or they understood only how to use paint and draw programs to create simple graphics that they could insert into their electronic work (Developing level). However, almost half (46%) the teachers could edit graphics using most of the drawing tools and could group and ungroup objects as well as apply graphics from one application to another (Accomplished level). Only a modest 11% of teachers created digital animations and have taught students to use graphics to improve their own communications (Exemplary level). See Appendix A, Part VIII.

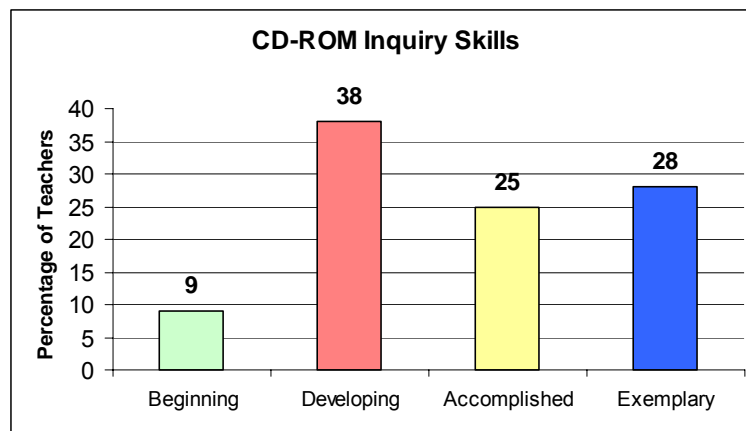
Figure 9. Graphics and Animation



2.9 CD-ROM Inquiry

Before using the IMYM model, over one third of IMYM teachers (38%) identified themselves at the Developing level of CD-ROM inquiry, with the ability to conduct simple searches with electronic databases and encyclopedias and to locate resources using electronic library catalogues. Further, one quarter (25%) of teachers rated themselves at the Accomplished level, with the ability to use a variety of search strategies with numerous electronic information sources and to apply complex functions (e.g. 'and, or') to search efficiently and effectively. Over one quarter (28%) of teachers reported that they teach their students the techniques and power of electronic searching as well as to respect copyright and cite sources (Exemplary level). See Appendix A, Part IX.

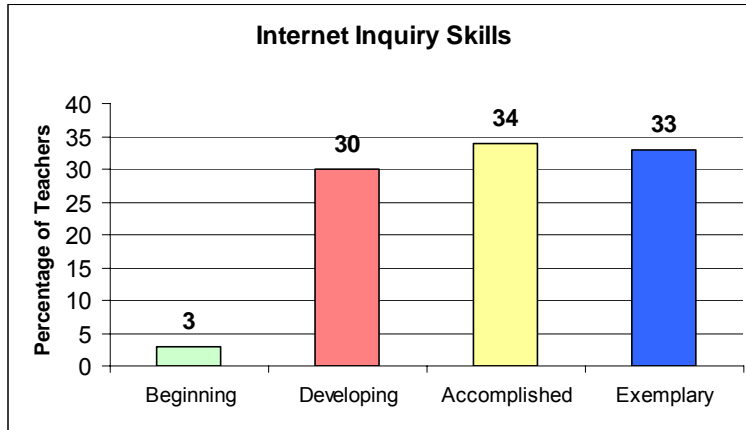
Figure 10. CD-ROM Inquiry



2.10 Internet Inquiry

Before using the IMYM model, very few IMYM teachers (3%) did not already use the Internet (Beginning level). Slightly less than one-third of teachers (30%) could use a web browser to access and navigate the Internet to find a specific website address (Developing level). Approximately one-third (34%) of teachers were also able to make efficient use of a variety of search engines, to use lists of Internet resources to explore educational applications of the Internet, and to evaluate sources of information to assess validity (Accomplished level). At the Exemplary level, one-third (33%) could teach their students to access Internet resources, and to cite and to evaluate sources of information to assess validity. See Appendix A, Part X.

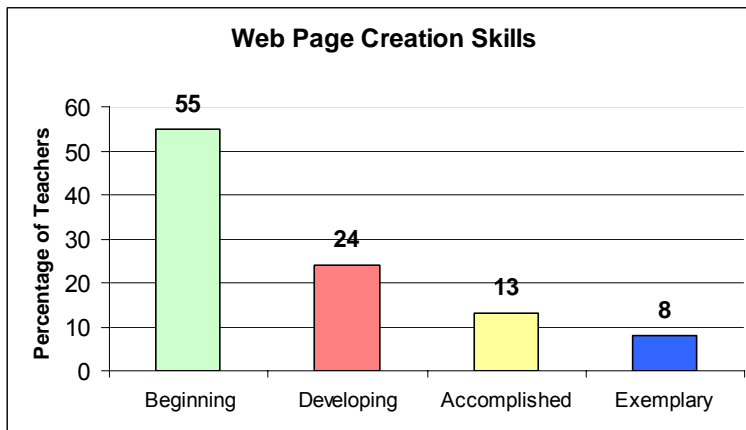
Figure 11. Internet Inquiry



2.11 Web Page Creation

Before using the IMYM model, while over half of IMYM teachers (55%) have not yet created a web page (Beginning level), 24% understood how to create simple web pages with graphics, hyperlinks, and mail-to links (Developing level). A few teachers (13%) have created a multi-page classroom website to communicate with students and parents (Accomplished level). But, only 8% of teachers have created a classroom website that links to student work or have taught their students how to make their own simple websites and electronic collections for Intranet or Internet posting (Exemplary level). This may be due to a lack of access to web page creation software in the classroom, since it is not part of the common "office suite." Or, teachers might not have access to a web server to regularly maintain a website. See Appendix A, Part XI.

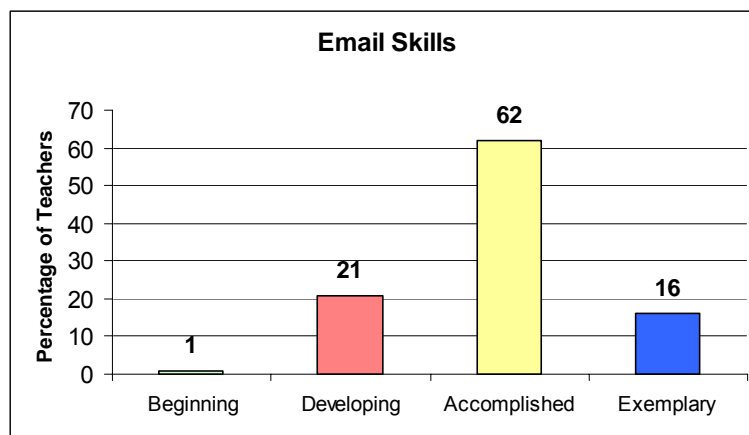
Figure 12. Web Page Creation



2.12 Email

Before using the IMYM model, only 1% of IMYM teachers did not yet use email (Beginning level), while 21% only occasionally sent messages or made requests for information with the understanding of how to communicate with a wide variety of people using electronic mail (Developing level). However, the majority of teachers (62%) checked their email account on a regular basis and used email to access professional information from Listservs (Accomplished level). In addition, a few teachers (16%) encouraged their students to use email to communicate globally with peers and experts and used email to communicate reflectively with students individually and collectively (Exemplary level). See Appendix A, Part XII.

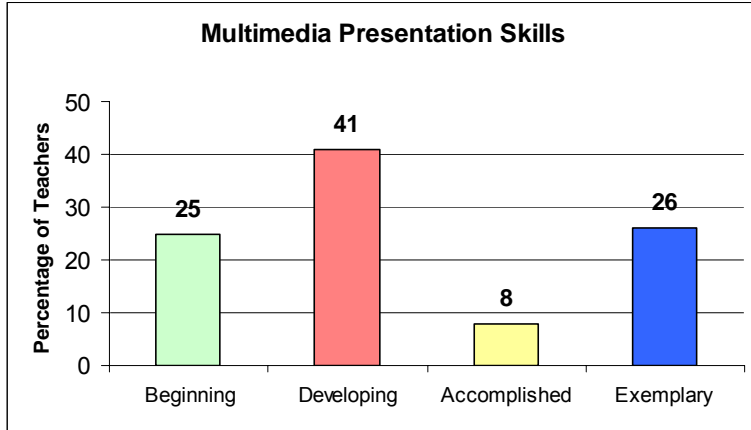
Figure 13. Email



2.13 Multimedia Presentation

Before using the IMYM model, sixty-six percent of IMYM teachers ranked themselves at either the Beginning or Developing levels, which indicates that they have either not yet created their own multimedia presentation (Beginning level) or have understood only how to create simple multimedia presentations integrating text and graphics (Developing level). However, 26% percent of teachers did report that they have taught their students how to create their own multimedia presentations (Exemplary level). See Appendix A, Part XIII.

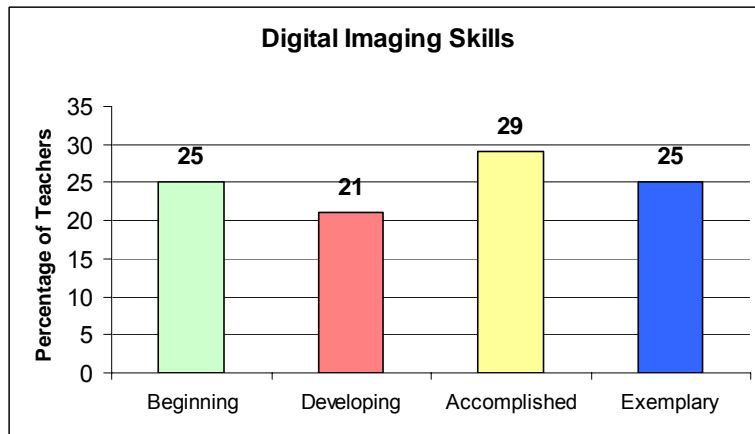
Figure 14. Multimedia Presentation



2.14 Digital Imaging

Before using the IMYM model, one-quarter of the IMYM teachers (25%) did not yet use a digital camera (Beginning level). However, 21% of teachers could already connect a digital camera to a computer to transfer their own digital images. Further, over one-quarter (29%) of teachers could not only alter digital images by cropping, rotating, and resizing them, but could also import their own digital images into word processed documents, concept maps, multimedia presentations and web pages (Accomplished level). Notably, one-quarter of teachers (25%) have also taught their students how to perform these tasks, and could integrate their own digital images into their classroom presentations and websites (Exemplary level). See Appendix A, Part XIV.

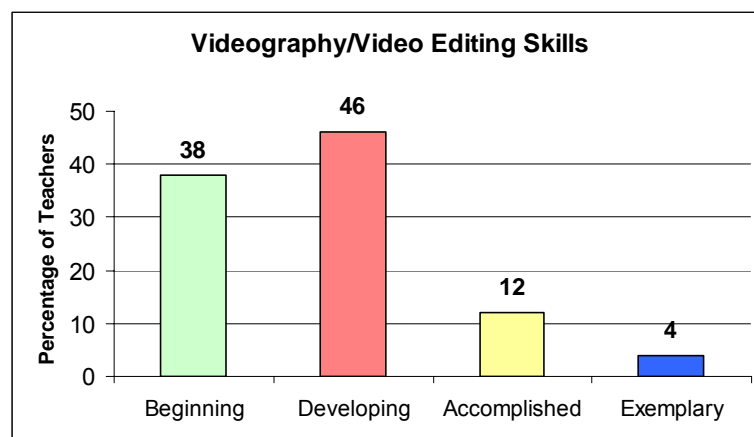
Figure 15. Digital Imaging



2.15 Videography/Video Editing

Before using the IMYM model, thirty-eight percent of IMYM teachers did not yet use a video camera (Beginning level). However, nearly half (46%) the teachers were able to connect a video camera to a VCR or television to simultaneously transfer video and monitor images (Developing level). Although 12% of teachers used video editing software to clip and sequence video and prepared digital video clips for use in other applications (Accomplished level), only 4% have taught their students to videotape and edit their own digital video presentations (Exemplary level). This may be due to a lack of access to digital video cameras and video editing software in classrooms or to a lack of expertise in videography or a lack of time to do video editing. See Appendix A, Part XV.

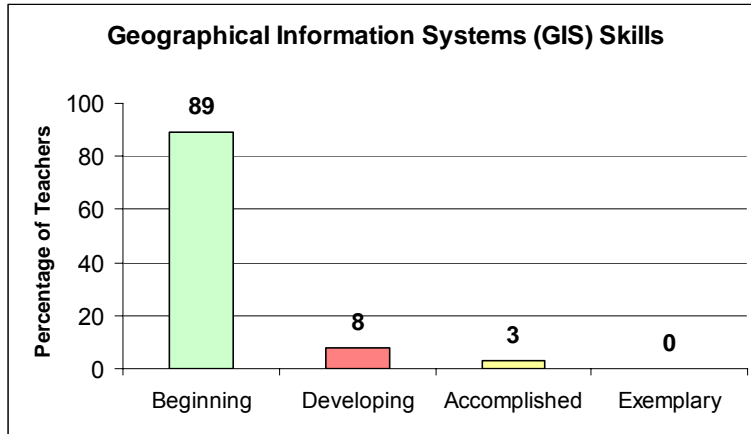
Figure 16. Videography/Video Editing



2.16 Geographical Information Systems (GIS)

Before using the IMYM model, most IMYM teachers (89%) did not yet use GIS software (Beginning level). However, 8% of teachers do understand how to use GIS software to interpret basic data already included with the software (Developing level). This is likely because GIS software has only recently been introduced to Manitoba schools. Not surprisingly, none of the teachers have taught their students how to use GIS software and GPS devices. See Appendix A, Part XVI.

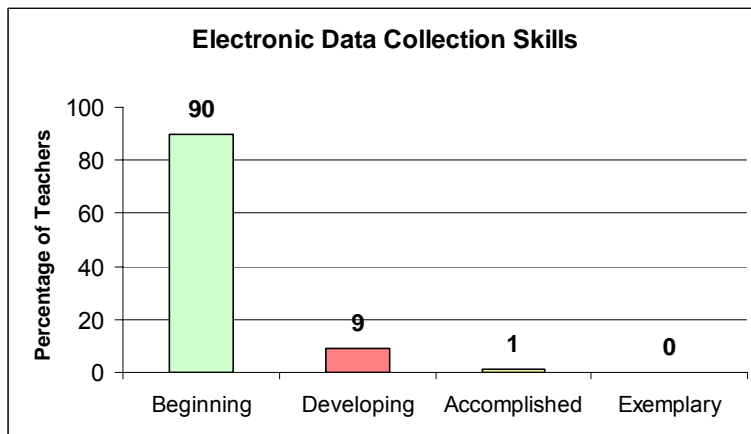
Figure 17. Geographical Information Systems



2.17 Electronic Data Collection

Before using the IMYM model, nearly all (90%) IMYM teachers did not yet use electronic data collection devices (e.g. probeware). This is likely because very few teachers have access to electronic data collection devices in their classrooms. However, 9% did understand how to use at least one type of electronic data collection device to gather experimental data. See Appendix A, Part XVII.

Figure 18. Electronic Data Collection



3.0 Summary of IMYM Teachers' Self-reported Skills in Using ICT

Figures 19-22 depict the range of IMYM teachers for each ICT technical skill level (Beginning, Developing, Accomplished, and Exemplary) and lead to the following conclusions.

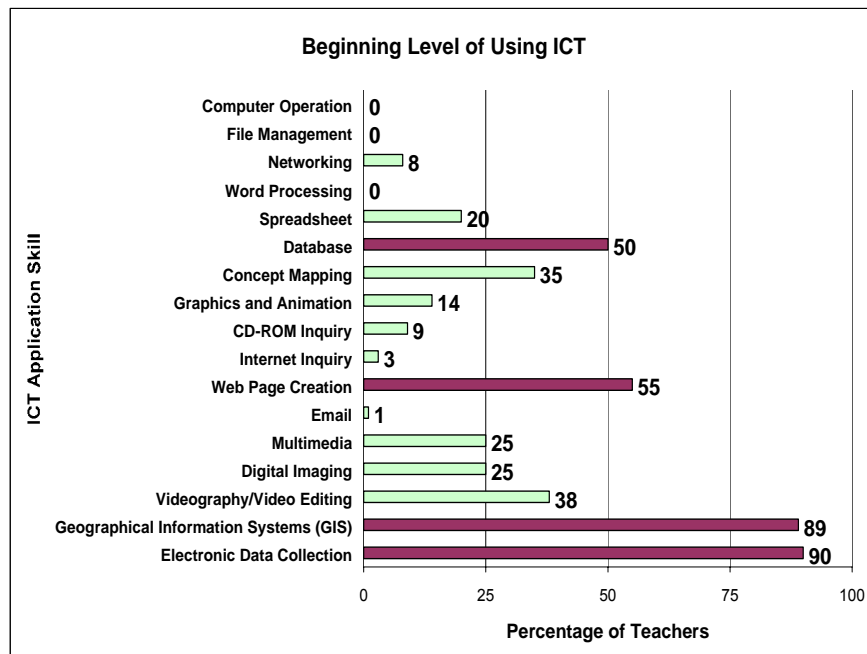
3.1 Beginning level

Before using the IMYM model, half or more of IMYM teachers reported that they were only beginning to acquire the following ICT technical skills

- Electronic data collection – 90%
- Geographical Information Systems (GIS) – 89%
- Web page creation - 55%
- Database – 50%

This may be because of a lack of access in the classroom to the hardware and software needed to learn, support, and master these skills, or to a lack of training opportunities to acquire these skills, or to a lack of time to practice and implement these skills.

Figure 19. Percentage of Teachers at the Beginning Level of Using ICT

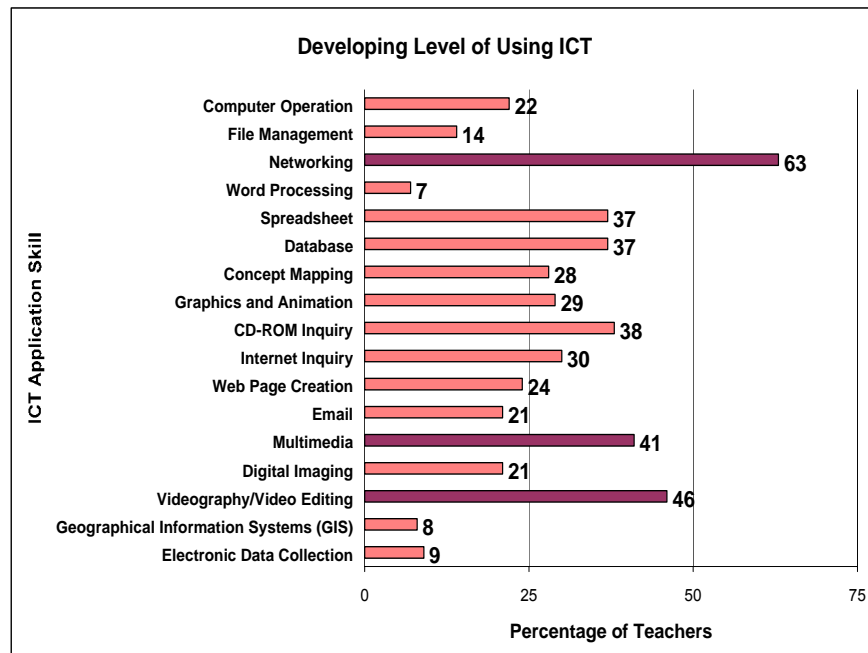


3.2 Developing level

Before using the IMYM model, more than 40% of IMYM teachers identified themselves as actively developing the following ICT technical skills

- Networking – 63%
- Videography/Video Editing – 46%
- Multimedia Presentation – 41%

Figure 20. Percentage of Teachers at the Developing Level of Using ICT

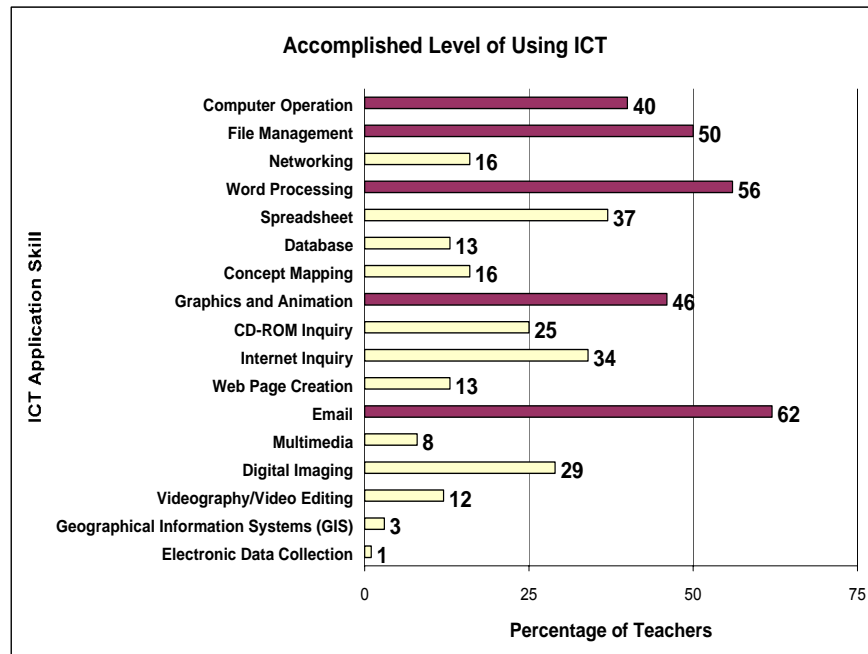


3.3 Accomplished level

Before using the IMYM model, forty percent or more of IMYM teachers assessed themselves as already accomplished in the following ICT technical skills

- Email – 62%
- Word processing - 56%
- File management - 50%
- Graphics and animation – 46%
- Computer operation - 40%

Figure 21. Percentage of Teachers at the Accomplished Level of Using ICT



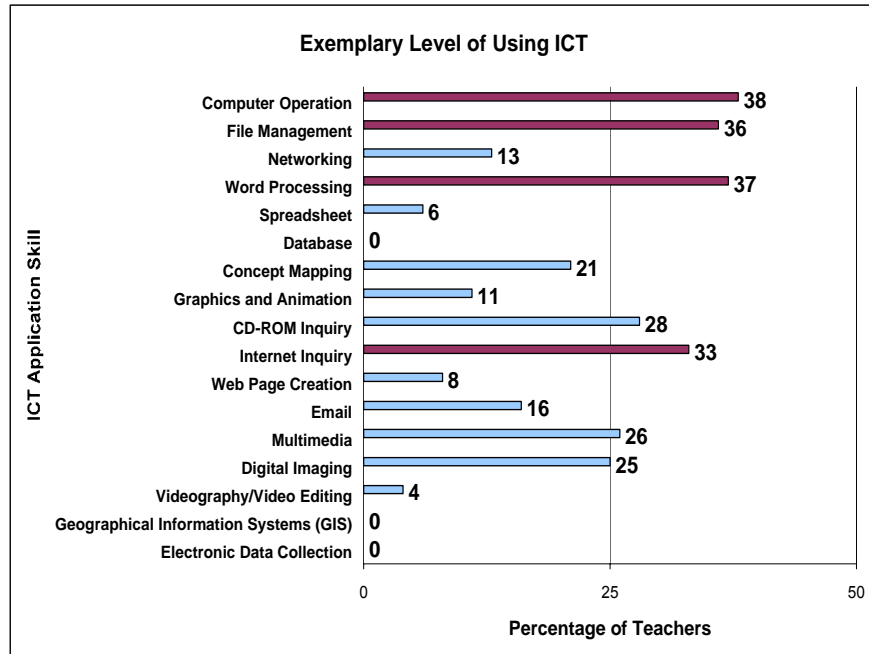
3.4 Exemplary level

Before using the IMYM model, approximately one-third of IMYM teachers have taught their students the following ICT technical skills

- Computer operation - 38%
- Word processing - 37%
- File management – 36%
- Internet Inquiry – 33%

Since these four skills form the core of the student use of ICT in the IMYM classroom, it is not surprising that most IMYM teachers feel they are accomplished in these areas.

Figure 22. Percentage of Teachers at the Exemplary Level of Using ICT



4.0 Analysis of IMYM Teachers' Self-reported Pedagogical Skills in Integrating ICT

The IMYM rubric, entitled *Self-Assessment of Pedagogical Skill in Integrating Information and Communication Technologies (ICT) with Curriculum and Classroom Practice* (see Appendix B) provided teachers with the opportunity to self-assess the competency level of their pedagogical skills from Beginning to Exemplary levels in twelve ICT integration areas

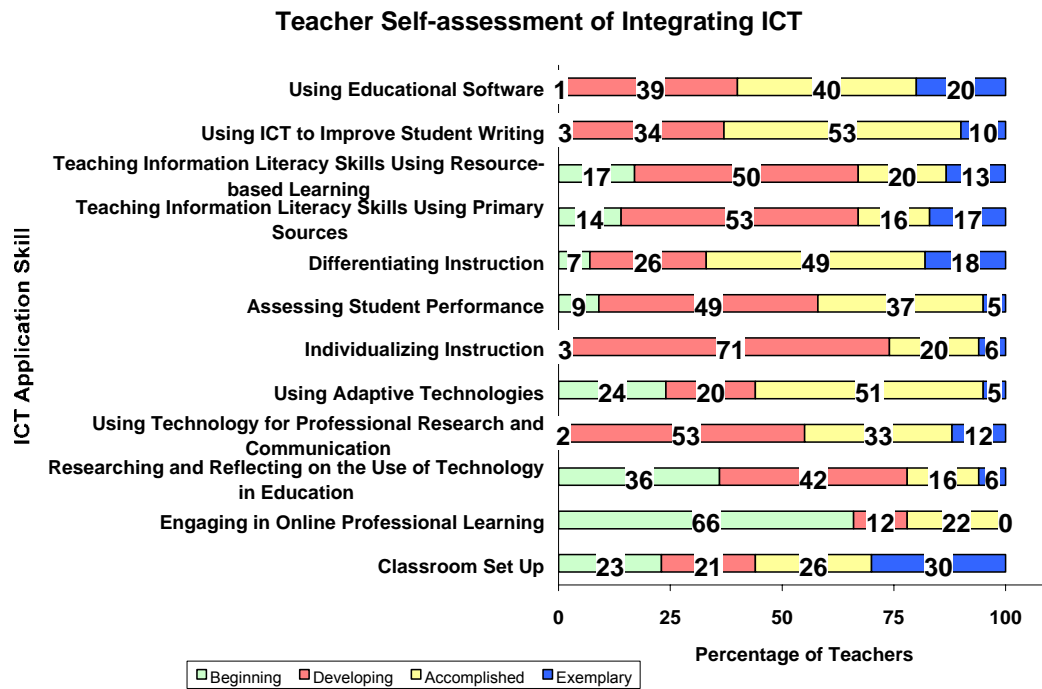
- Using Educational Software
- Using Information and Communication Technology to Improve Student Writing
- Teaching Information Literacy Skills using Resource-based Learning
- Teaching Information Literacy Skills using Primary Sources
- Differentiating Instruction
- Assessing Student Performance
- Individualizing Instruction
- Using Adaptive Technologies
- Using Technology for Professional Research and Communication
- Researching and Reflecting on the Use of Technology in Education
- Engaging in Online Professional Learning
- Classroom Set Up

In each of these ICT areas, teachers selected the most appropriate description from a rubric of four competency levels

- Beginning
- Developing
- Accomplished
- Exemplary

Figure 23 illustrates the percentage of teachers at each competency level for the twelve pedagogical ICT integration skills.

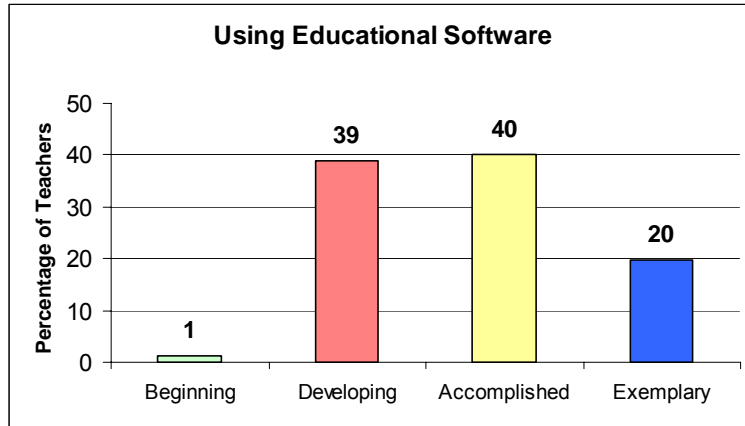
Figure 23. Teacher Self-assessment of Integrating ICT



4.1 Using Educational Software

Before using the IMYM model, most teachers (79%) placed themselves at either the Developing or Accomplished level for using educational software in their classroom. While many teachers used educational software as an instructional supplement or for children with special needs (Developing level), others used software to provide experiences otherwise unavailable to students as well as to address diverse learning styles (Accomplished level). Twenty percent of teachers could access sources of software reviews and remain up-to-date in educational technology developments as well as share their findings with peers (Exemplary level). See Appendix B, Part I.

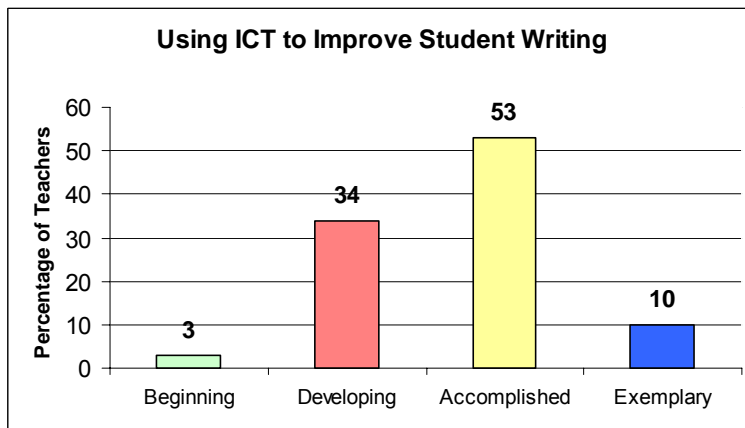
Figure 24. Educational Software



4.2 Using ICT to Improve Student Writing

Before using the IMYM model, over half (53%) of IMYM teachers placed their skills at the Accomplished level, helping their students use technology (e.g. concept mapping software, editing and desktop publishing tools, and portable computers) in all phases of the writing process. Approximately one-third (34%) of teachers rated their pedagogical skill at the Developing level, where they encouraged their students to use concept mapping while writing to stimulate prior knowledge and expected them to compose or edit electronically. Only 3% of teachers reported that they were not familiar with any technologies that would allow them to help students improve their writing skills (Beginning level). See Appendix B, Part II.

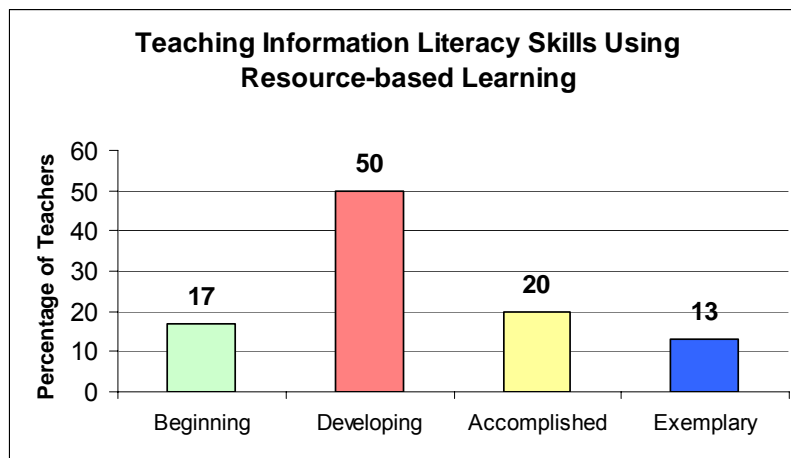
Figure 25. ICT to Improve Student Writing



4.3 Teaching Information Literacy Skills Using Resource-based Learning

Before using the IMYM model, half (50%) the IMYM teachers reported that they were at the Developing level, where they had their students use electronic resources in their resource-based learning projects to develop information literacy skills. Twenty percent of teachers collaborated with their teacher-librarian or other classroom teachers to teach information literacy skills, and designed resource-based learning (RBL) projects that encouraged the use of higher-level thinking skills, electronic information sources, and computer productivity software (Accomplished level). Further, a few teachers (13%) were actively involved in curriculum implementation teams and used interdisciplinary units, web quests, and learning experiences that developed information literacy skills and RBL. These teachers also shared successful units with peers. See Appendix B, Part III.

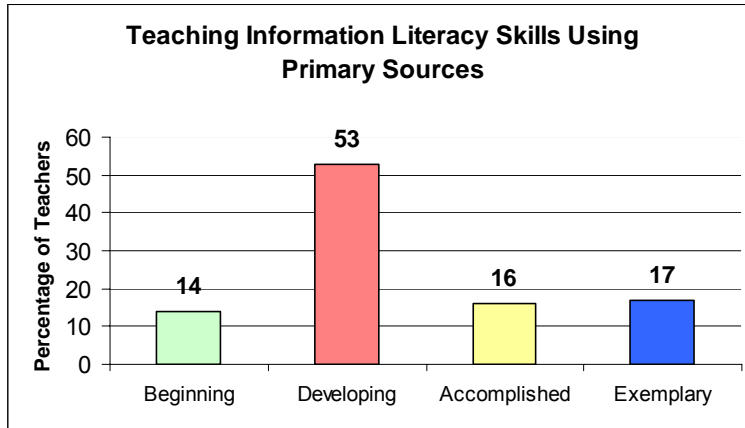
Figure 26. Teaching Information Literacy Skills Using Resource-based Learning



4.4 Teaching Information Literacy Skills using Primary Sources

Before using the IMYM model, over half (53%) the IMYM teachers ranked themselves at the Developing level, in which they designed student projects that required collection and use of original data and could basically predict the outcome of these experiments or surveys. Some teachers (16%) taught their students how to use a variety of tools to gather data (e.g. online surveys, interviews, and digital cameras) and how to use electronic tools (e.g. tables, spreadsheets, and databases) to record, organize, analyze, and communicate the results (Accomplished level). Further, a few teachers (17%) were actively involved in curriculum implementation teams and used interdisciplinary units and learning experiences requiring information literacy skills and the use of primary sources of data. In addition, these teachers shared successful strategies with peers through print, electronic publishing, conference presentations, and workshops (Exemplary level). See Appendix B, Part IV.

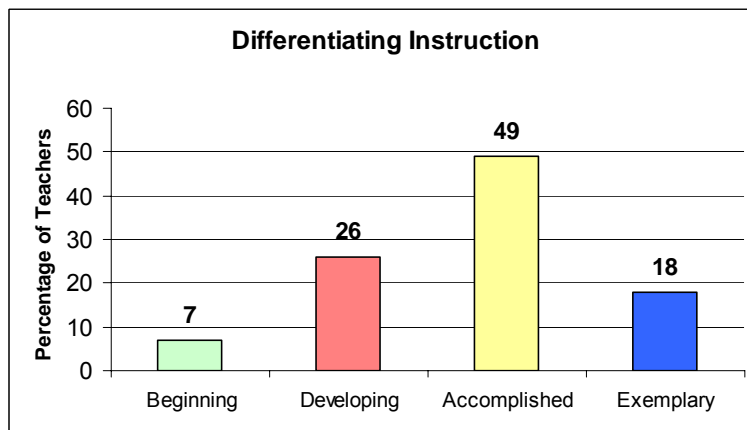
Figure 27. Teaching Information Literacy Skills Using Primary Sources



4.5 Differentiating Instruction

Before using the IMYM model, twenty-six percent of teachers placed themselves at the Developing level of differentiating instruction, where they primarily used teacher-directed, whole group instruction and occasionally gave students a choice of assignments. Further, nearly half (49%) the teachers used a variety of instructional delivery methods and student grouping strategies (e.g. student-to-equipment ratios of greater than one-to-one). Given the technology available to them, these teachers designed learning experiences that best fit curricular learning outcomes, learning styles and needs (Accomplished level). A few teachers (18%) attempted to discover the most effective means of using technology to engage their students and meet curricular outcomes, as well as to work with a team of like-minded teachers to create, modify, and improve their practices in instructional delivery. See Appendix B, Part V.

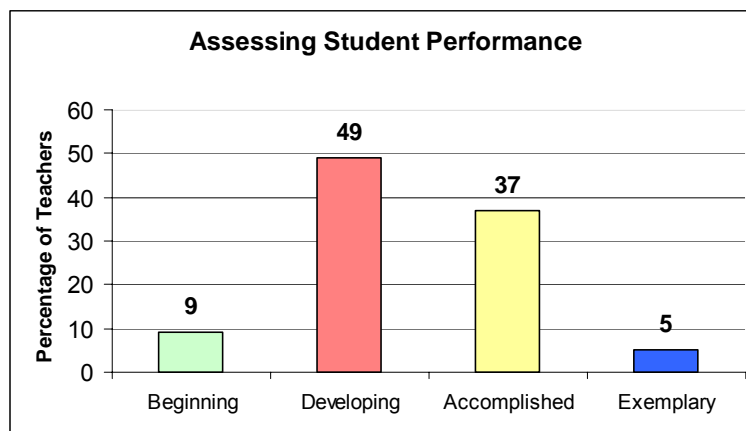
Figure 28. Differentiating Instruction



4.6 Assessing Student Performance

Before using the IMYM model, nearly half (49%) of the IMYM teachers placed themselves at the Developing level for authentic assessment of student performance. These teachers gathered evidence of student learning and collected print copies of electronic work (e.g. word-processed documents, graphics and presentations) that demonstrate student achievement in student portfolios and during parent conferences. At the Accomplished level, 37% of teachers evaluated student products and performances by using assessment tools (e.g. checklist, rubrics, and benchmarks) that allowed them to objectively determine the quality of student performance and assisted in student self and peer assessment. In addition, these teachers had a computerized means of aggregating performance data that they then used to modify their instructional strategies. Very few (5%) of teachers have developed strategies to assess both interdisciplinary and collaboration work (Exemplary level). See Appendix B, Part VI.

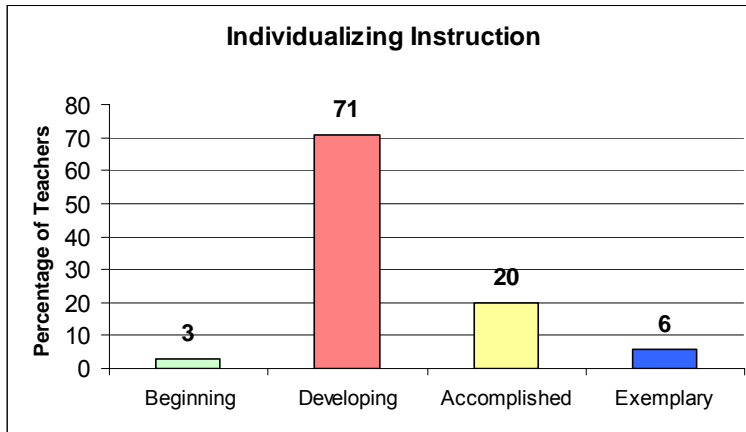
Figure 29. Assessing Student Performance



4.7 Individualizing Instruction

Before using the IMYM model, almost three-quarters of IMYM teachers (71%) identified themselves at the Developing level for individualizing instruction, where they occasionally gave students a choice of assignments, yet expected students to achieve the same learning outcomes within the same time frame (unless in a modified program). Also, these teachers encouraged skill remediation with students during or after school. Further, 20% of teachers could create a learning plan for each of their students and track the accomplishment of their learning outcomes in each plan using a computerized tool (Accomplished level). However, only 6% of teachers could customize the content and design of the computerized planning and reporting tools that they used, as well as sharing their strategies of using technology to individualize instruction with peers (Exemplary level). See Appendix B, Part VII.

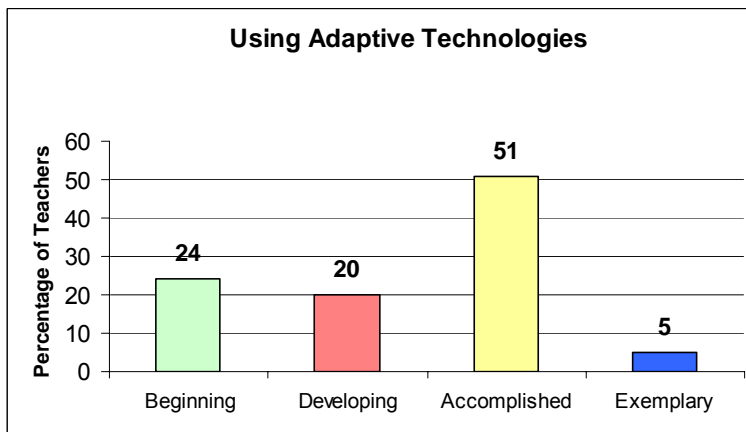
Figure 30. Individualizing Instruction



4.8 Using Adaptive Technologies

Before using the IMYM model, over half (51%) of the IMYM teachers could use technology when appropriate to help students with special learning needs (Accomplished level). Twenty-four percent of teachers indicated that they were not aware of how technology could help students with physical or mental challenges (Beginning level), while 20% of teachers were able to work with students who might bring special devices to work and communicate in the classroom (Developing level). This may be because once a student with special needs arrives in a teacher's classroom, the teacher learns to use the adaptive technologies in order to support the student or, they work directly with an educational assistant who knows both the student and the technology. See Appendix B, Part VIII.

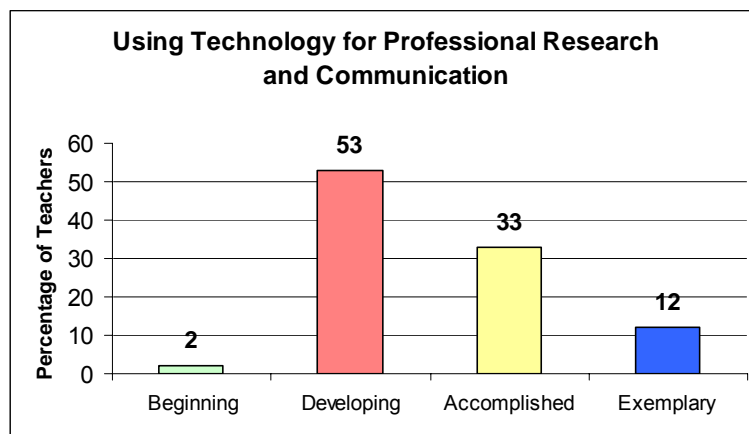
Figure 31. Using Adaptive Technologies



4.9 Using Technology for Professional Research and Communication

Before using the IMYM model, over half the teachers (53%) placed their skills at the Developing level, for using technology for professional research and communication. These teachers could use online tools to find learning experiences, resources and promising practices, as well as to correspond electronically with peers. Further, one third (33%) of teachers used specialized databases (e.g. ERIC and CBCA) to research educational topics and read electronic newsletters and journals (Accomplished level). However, only 12% of teachers participated in electronic discussion groups, used electronic tools to conduct workshops or conferences, and organized professional learning opportunities for peer teachers to teach them how to use technology to enhance instruction. See Appendix B, Part IX.

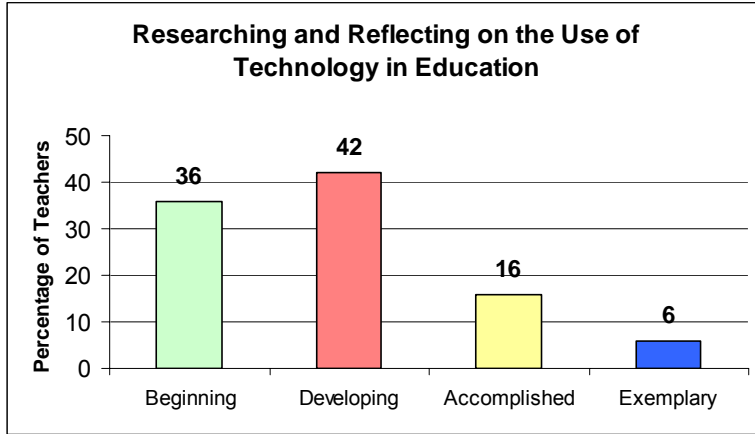
Figure 32. Using Technology for Professional Research and Communication



4.10 Researching and Reflecting on the Use of Technology in Education

Before using the IMYM model, over one-third (36%) of IMYM teachers assessed themselves at the Beginning level for researching and reflecting on the use of technology in education. These teachers were uncertain whether the use of ICT would make a difference in their students' learning or in classroom climate. However, 42% of teachers indicated that they did collect and share anecdotal information as well as student observations of ICT use in the classroom (Developing level). In addition, some teachers (16%) analyzed and self-reflected on how the technology and methodology affected their students' learning and classroom climate. Also, they could use the results of peers' research on ICT integration to inform their own classroom practice (Accomplished level). See Appendix B, Part X.

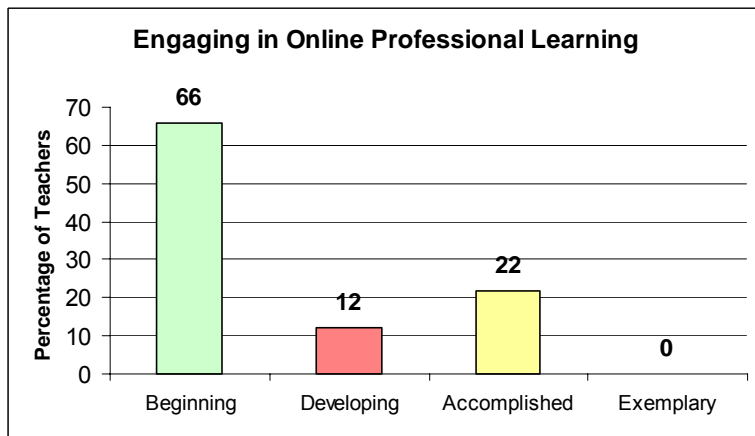
Figure 33. Researching and Reflecting on the Use of Technology in Education



4.11 Engaging in Online Professional Learning

Before using the IMYM model, two-thirds (66%) of teachers assessed themselves at the Beginning level for engaging in online professional learning. These teachers were not aware that professional learning was available online. This may be because professional learning has only lately become available online in Manitoba and teachers may not have access to relevant online professional development (PD). At the Accomplished level, 22% of teachers have taken at least one online professional learning course in which they engaged in online discussions and shared online samples or digital photos with peer teachers in their online learning communities. See Appendix B, Part XI.

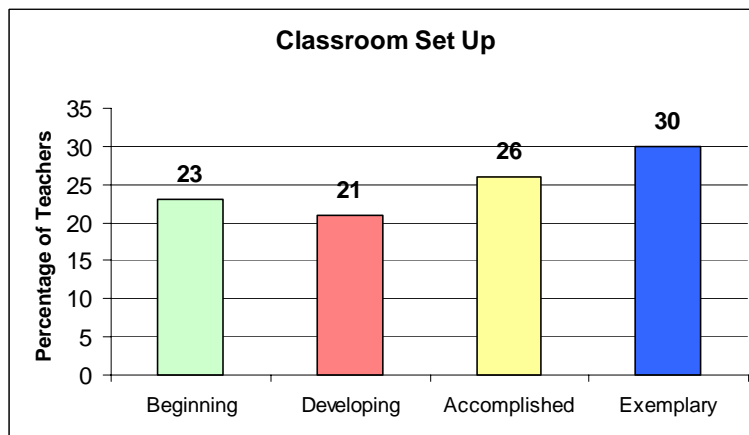
Figure 34. Engaging in Online Professional Learning



4.12 Classroom Set Up

Before using the IMYM model, forty-four percent of IMYM teachers either set up their classroom primarily for independent learning with access to a computer lab (Beginning level) or set up their classroom to accommodate occasional collaborative learning with at least one computer without Internet access (Developing). On the other hand, over half (56%) of teachers either set up their classroom to accommodate collaborative learning and created learning centres with limited Internet access (Accomplished level) or used learning centres for collaborative and independent learning, where students performed Internet research or created an electronic product (Exemplary level). The even spread in the pedagogy of classroom set-up indicates the wide variety of classroom management, strategies, and availability of technology to support learning in Manitoba classrooms. See Appendix B, Part XII.

Figure 1. Classroom Set Up



5.0 Summary of IMYM Teachers' Self-reported Pedagogical Skills in Integrating ICT

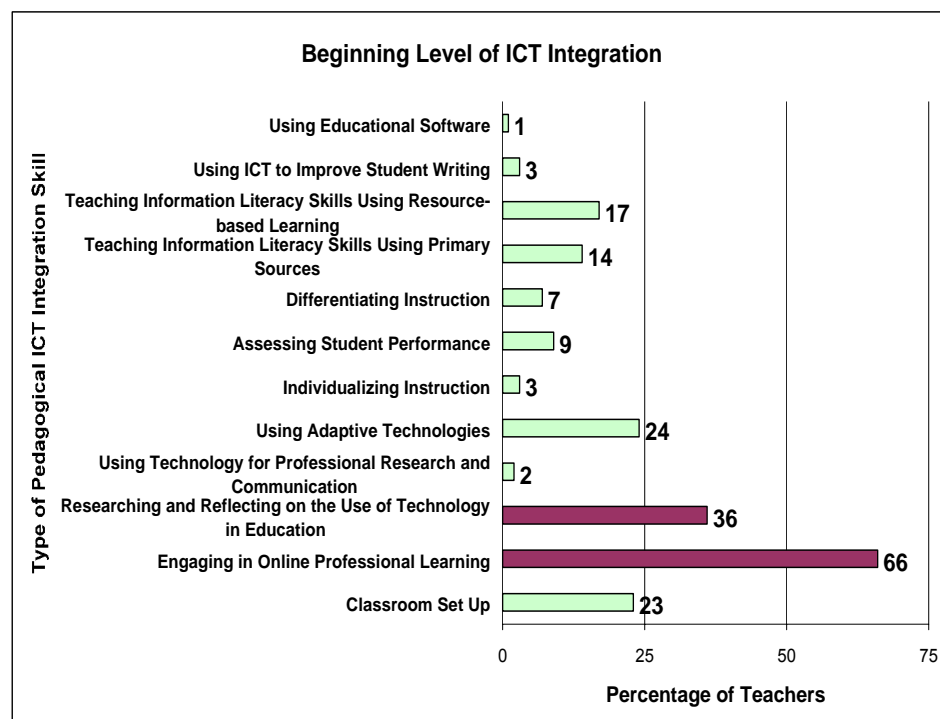
Figures 36-39 depict the range of IMYM teachers for each ICT pedagogical skill level (Beginning, Developing, Accomplished, and Exemplary) and lead to the following conclusions.

5.1 Beginning level

Before using the IMYM model, IMYM teachers reported that they were only beginning to acquire the following two pedagogical skills

- Engaging in Online Professional Learning – 66%
- Researching and Evaluating the Use of Technology in Education – 36%

Figure 36. Percentage of Teachers at the Beginning Level of Integrating ICT

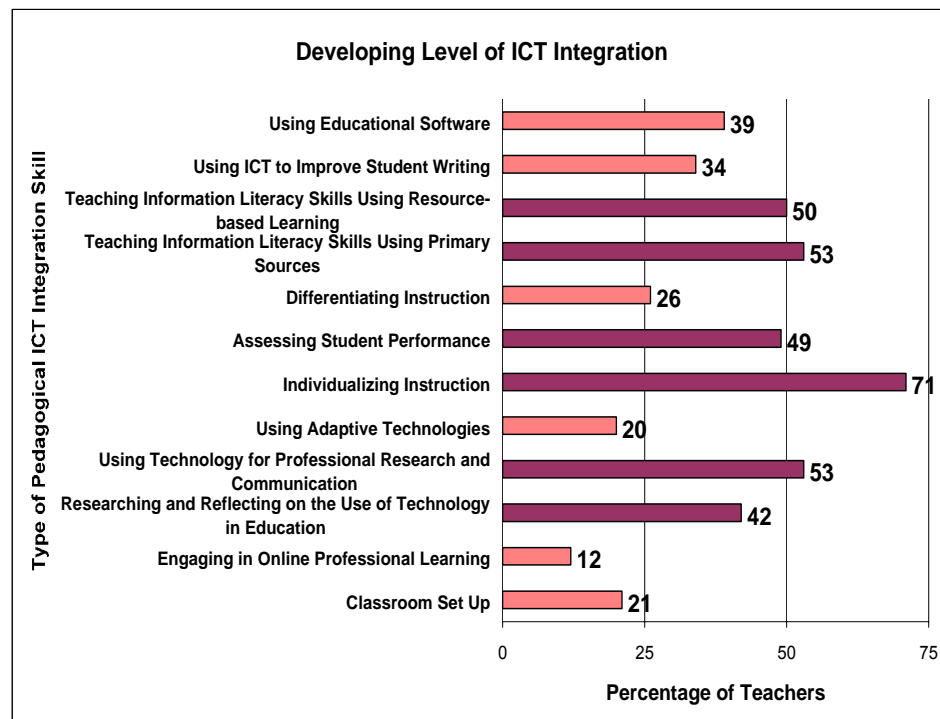


5.2 Developing level

Before using the IMYM model, more than 40% of IMYM teachers identified themselves as actively developing the following pedagogical skills

- Individualizing Instruction – 71%
- Teaching Information Literacy Skills using Primary Sources – 53%
- Using Technology for Professional Research and Communication – 53%
- Teaching Information Literacy Skills using Resource-based Learning – 50%
- Assessing Student Performance – 49%
- Researching and Evaluating the Use of Technology in Education – 42%

Figure 37. Percentage of Teachers at the Developing Level of Integrating ICT

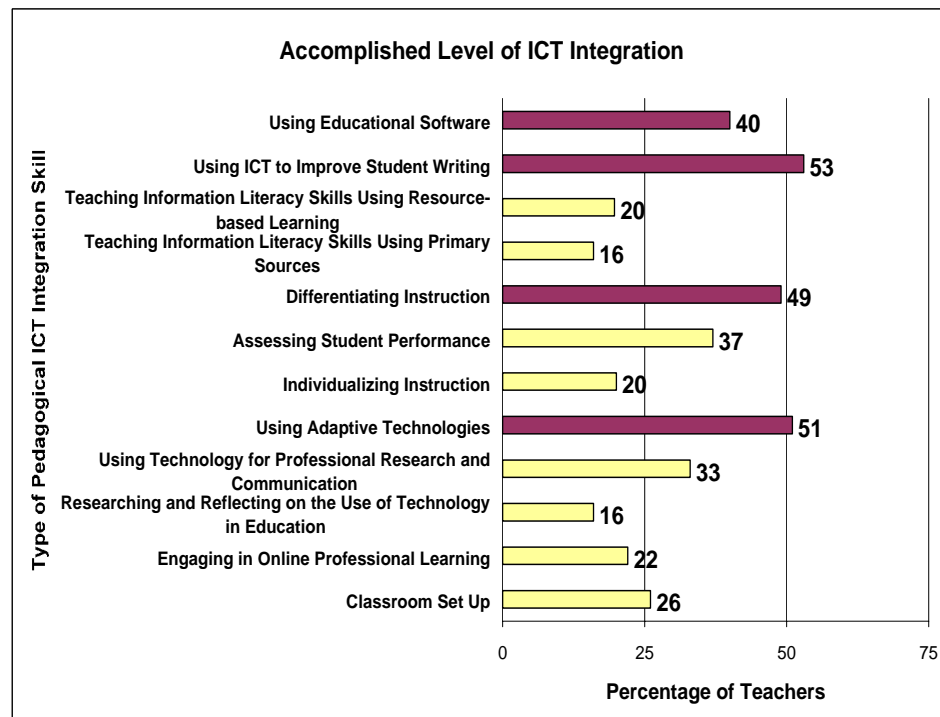


5.3 Accomplished level

Before using the IMYM model, 40% or more of IMYM teachers assessed themselves as already accomplished in the following pedagogical skills

- Using ICT to Improve Student Writing – 53%
- Using Adaptive Technologies – 51%
- Differentiating Instruction – 49%
- Using Educational Software – 40%

Figure 1. Percentage of Teachers at the Accomplished Level of Integrating ICT

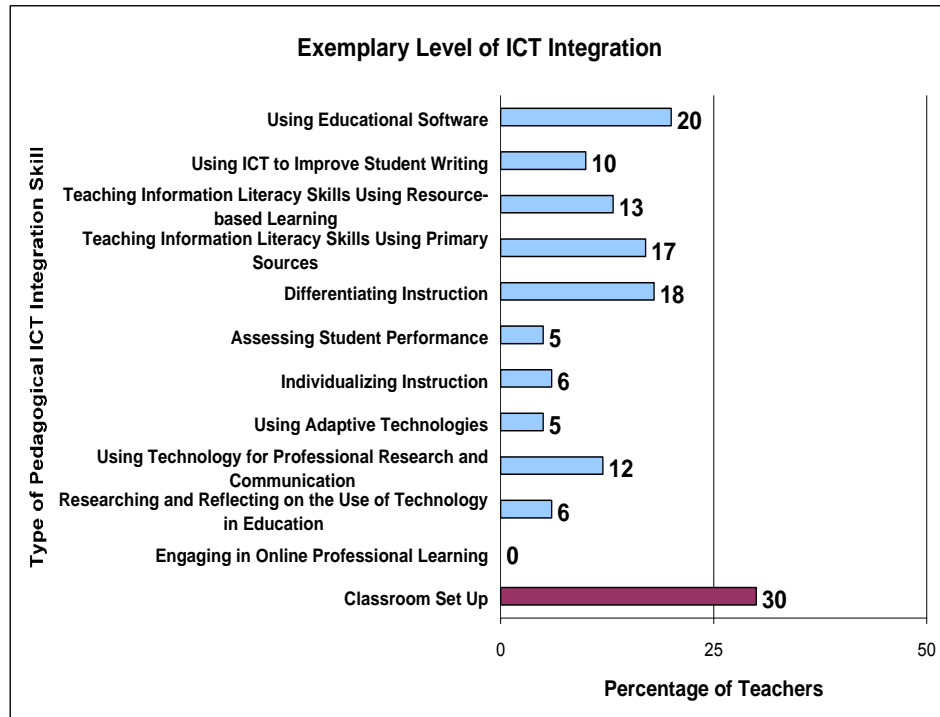


5.4 Exemplary level

Before using the IMYM model, only one-third of IMYM teachers have set up their classrooms with learning centres for both collaborative and independent learning so that their students use classroom computers throughout the school day whenever they need to conduct Internet research or to create an electronic product to demonstrate their learning.

- Classroom Set Up – 30%

Figure 39. Percentage of Teachers at the Exemplary Level of Integrating ICT



5.5 Conclusion

In general, the results indicate that IMYM teachers' technical skills in using ICT applications is at a higher level than their pedagogical skill in integrating those same ICT applications. IMYM teachers tend to first acquire their ICT skills before they feel comfortable applying them to their professional practice.

6.0 Comparison of Teacher Skills in Using and Integrating ICT Over Three School Years

This section will compare the results of three groups of teachers as they begin to implement the IMYM model. It will examine IMYM teachers' self-reported skills in using ICT applications with skills in integrating ICT, over three school years

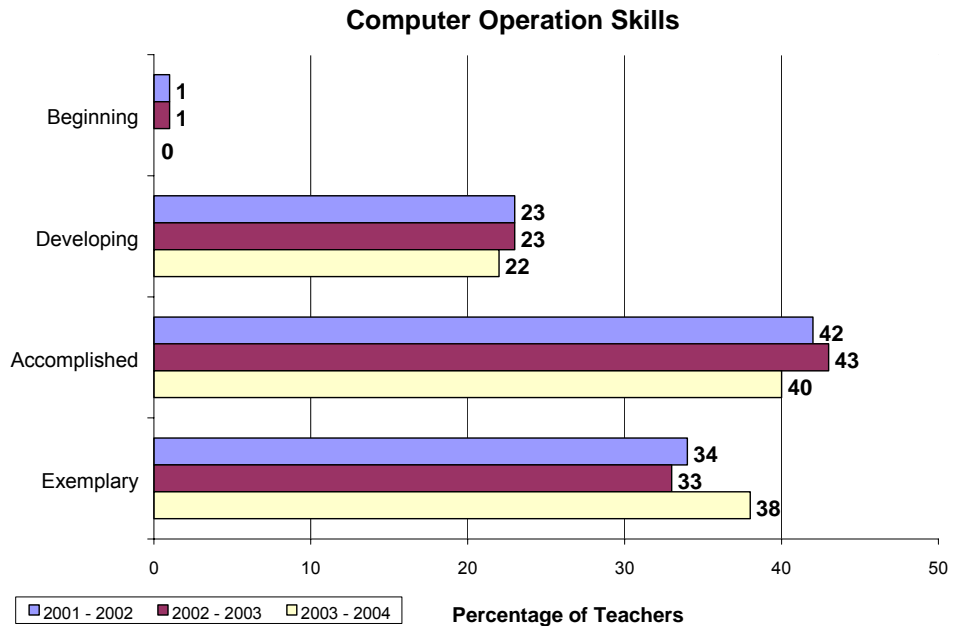
- 2001-2002 (125 teachers)
- 2002-2003 (199 teachers)
- 2003-2004 (76 teachers)

The placement of the skill levels (Beginning, Developing, Accomplished, and Exemplary) for these three year segments will be discussed.

6.1 Computer Operation

The IMYM teachers' self-reported skills in computer operation for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was very little change in the Beginning (1% and 0%), Developing (23% and 22%), and Accomplished (42%, 43%, and 40%) levels. However, there was a slight increase in the amount of teachers placing themselves at the Exemplary level (38% vs. 34% and 33%). This indicates that in 2003-04, slightly more IMYM teachers felt comfortable to set preferences to customize applications and to confidently teach students how to use a computer than in 2001-02 and 2002-03.

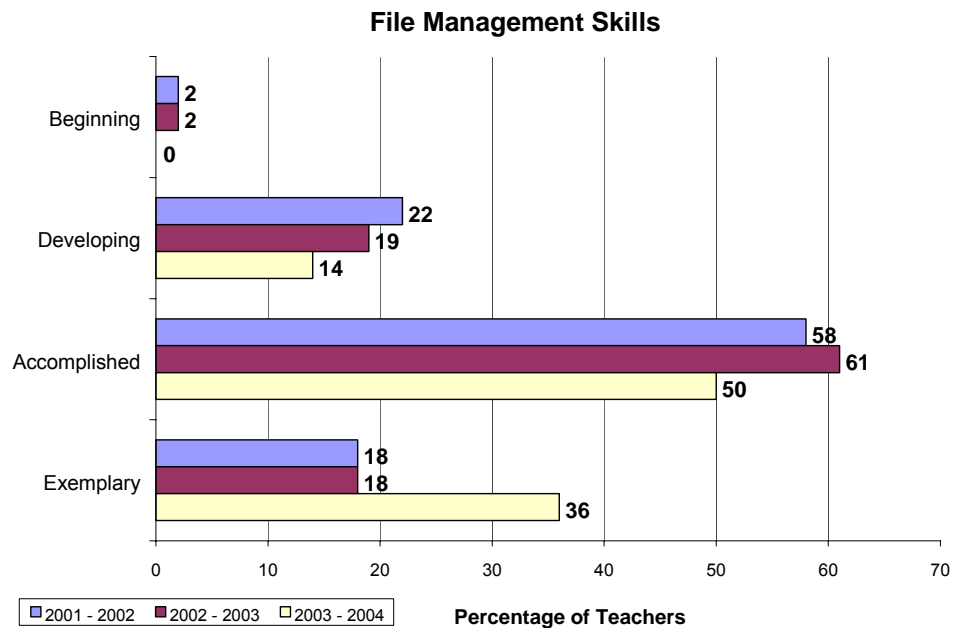
Figure 40. Computer Operation (2001-2004)



6.2 File Management

The IMYM teachers' self-reported skills in file management for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was very little change in the Beginning level (2% and 0%). However, a shift from the Developing level (14% vs. 22% and 19%) and Accomplished level (50% vs. 58% and 61%) to the Exemplary level (36% vs. 18%) was apparent. This indicates that in 2003-04, more IMYM teachers have taught their students how to manage their own files on classroom computers and the school network than in 2001-02 and 2002-03.

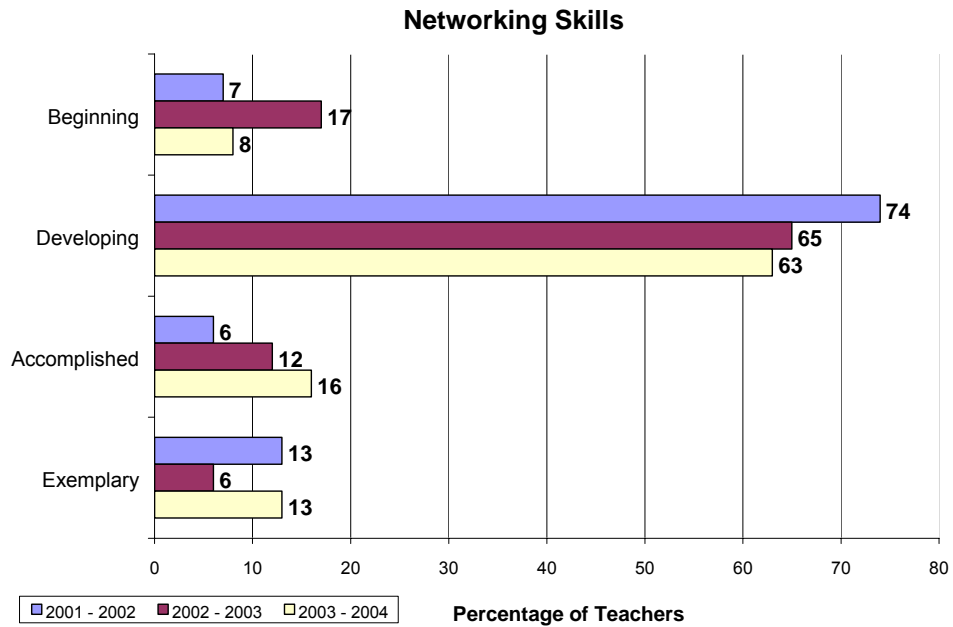
Figure 41. File Management (2001-2004)



6.3 Networking

The IMYM teachers' self-reported skills in networking for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (7%, 17% and 8%) and Exemplary (13% and 6%) levels. However, a slight shift from the Developing level (74%, 65%, and 63%) to the Accomplished level (6%, 12%, and 16%) was evident. This indicates that in 2003-04, more IMYM teachers were able to set up and administer their own peer-to-peer network than in 2001-02 and 2002-03 even though this is a very technical skill that most teachers will not need to develop.

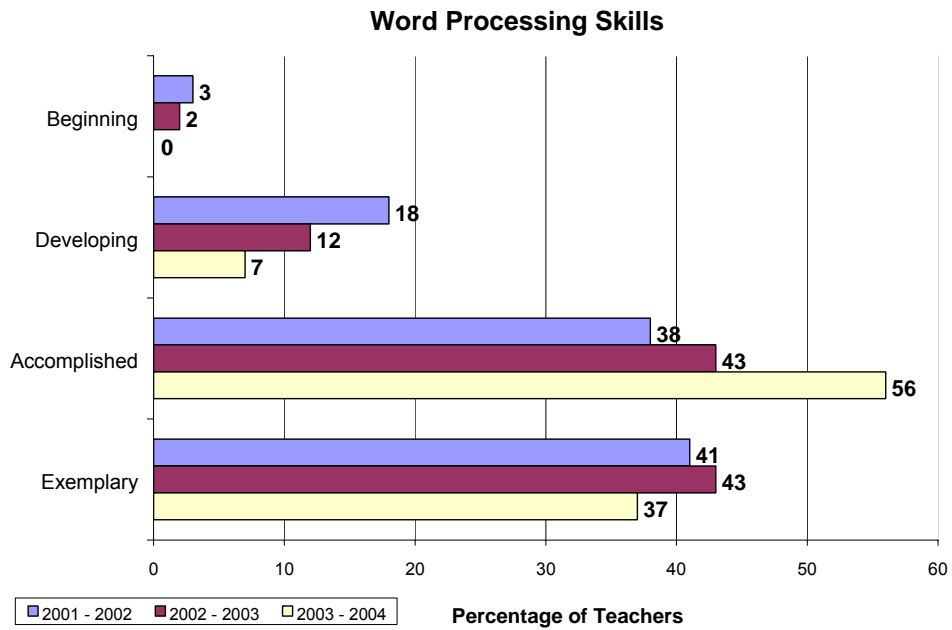
Figure 42. Networking (2001-2004)



6.4 Word Processing

The IMYM teachers' self-reported skills in word processing for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (3%, 2%, and 0%) and Exemplary (41%, 43%, and 37%) levels. However, an essential shift from the Developing level (18%, 12% and 7%) to the Accomplished level (38%, 43%, and 56%) was apparent. This indicates that in 2003-04, more IMYM teachers used a word processor for nearly all of their written professional work and home communication than in 2001-02 and 2002-03.

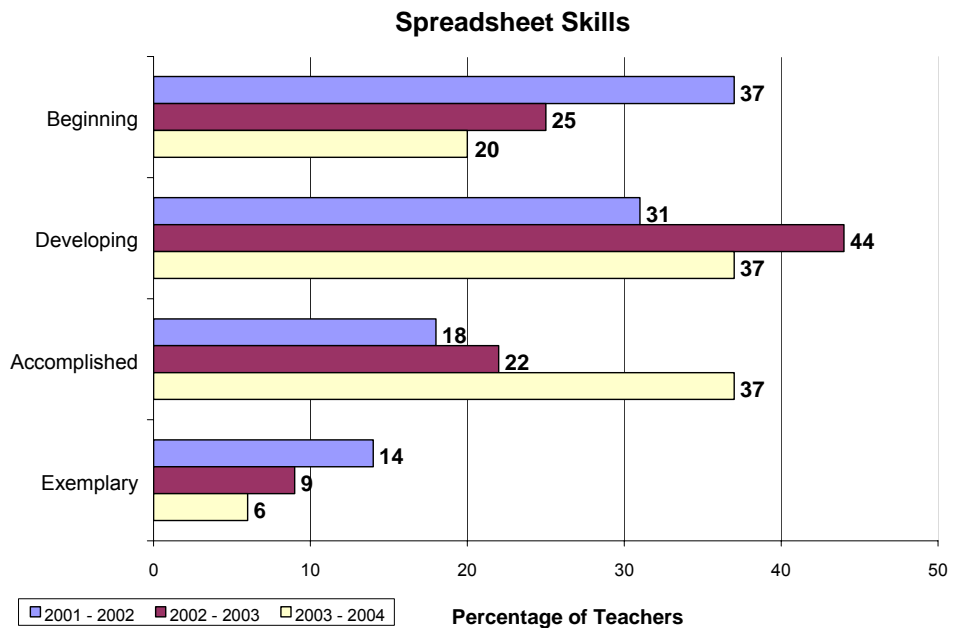
Figure 43. Word Processing (2001-2004)



6.5 Spreadsheet Use

The IMYM teachers' self-reported skills in spreadsheet use for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was a considerable decrease in the Beginning level (37%, 25%, and 20%) and Exemplary level (14%, 9%, and 6%). On the other hand, there was a notable increase in the number of teachers placing themselves at the Accomplished level (18%, 22%, and 37%). This indicates that in 2003-04, more IMYM teachers were able to keep track of student grades using labels, formulas and cell references, as well as create graphs and charts and format spreadsheets by manipulating column widths and text styles than in 2001-02 and 2002-03.

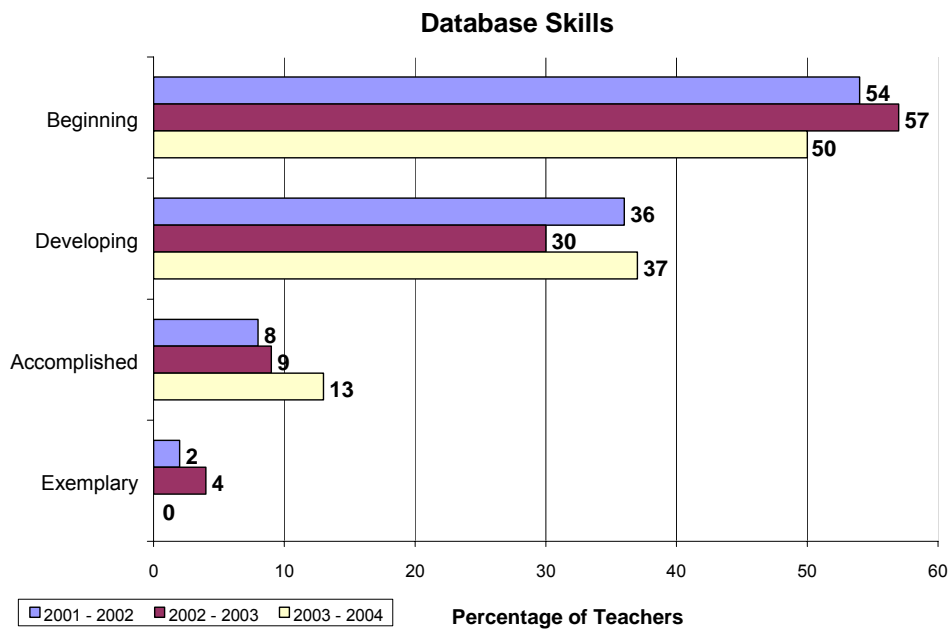
Figure 44. Spreadsheet (2001-2004)



6.6 Database Use

The IMYM teachers' self-reported skills in database use for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (54%, 57%, and 50%), Developing (36, 30% and 37%) and Exemplary (2%, 4%, and 0%) levels. Further, in 2003-04, there was only a slight increase in the Accomplished level (13% vs. 8% and 9%). This indicates that in 2003-04, slightly more IMYM teachers could define fields and create layouts to support inquiry, as well as perform queries than in 2001-02 and 2002-03.

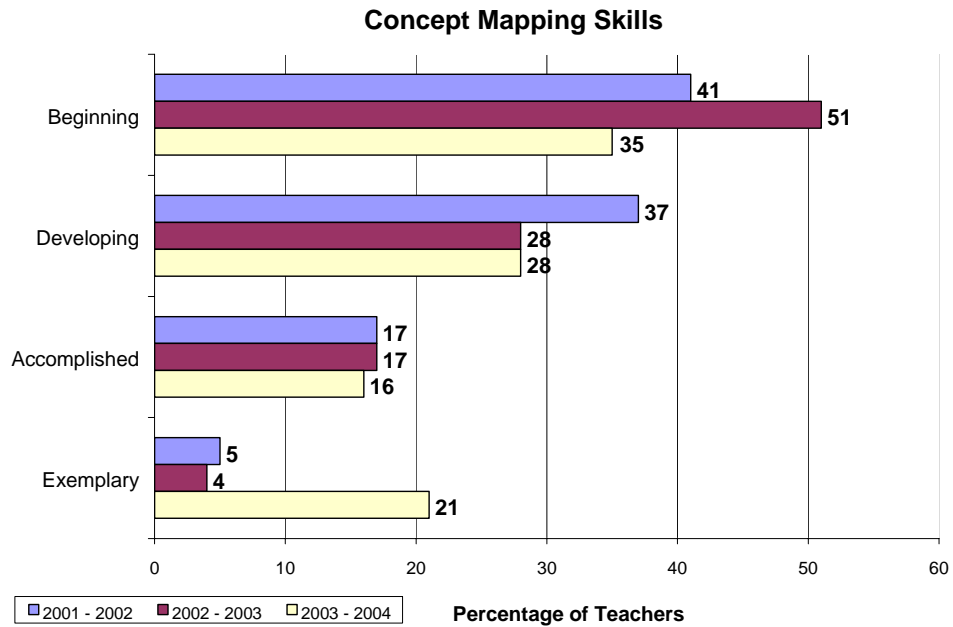
Figure 45. Database (2001-2004)



6.7 Concept Mapping

The IMYM teachers' self-reported skills in concept mapping for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was little change in the Developing (37% and 28%) and Accomplished (17% and 16%) levels. Clearly, however, there was a decrease in the Beginning level (35% vs. 41% and 51%) and a significant increase in the Exemplary level (21% vs. 5% and 4%). This indicates that in 2003-04, more IMYM teachers could use concept mapping software as a presentation tool and export their concept maps into multimedia presentations and have taught their students how to use concept mapping software than in 2001-02 and 2002-03. This may be due to an increase in the availability of, and familiarity with, concept mapping software in the classroom.

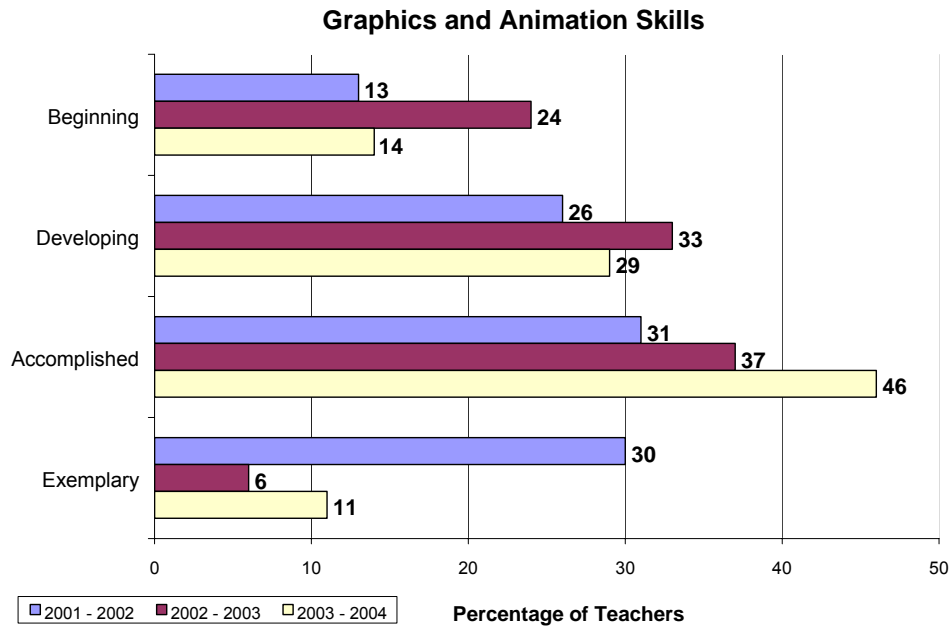
Figure 1. Concept Mapping (2001-2004)



6.8 Graphics and Animation

The IMYM teachers' self-reported skills in graphics and animation for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (13%, 24% and 14%) and Developing (26%, 33%, and 29%) levels. However, there was a steady increase in the Accomplished level (31%, 37%, and 46%) and a visible decrease in the Exemplary level (30%, 6%, and 11%). This indicates that in 2003-04, more IMYM teachers could edit graphics using most of the drawing tools and could group and ungroup objects as well as apply graphics from one application to another. On the other hand, in 2002-03 and 2003-04, fewer teachers have created digital animations and have taught students to use graphics to improve their own communications, than in 2001-02.

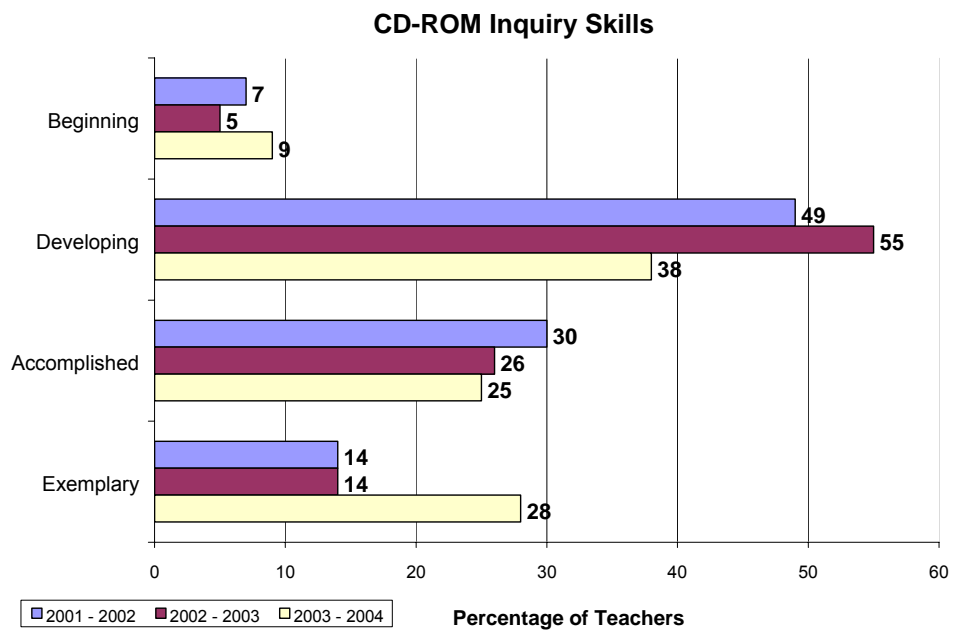
Figure 47. Graphics and Animation (2001-2004)



6.9 CD-ROM Inquiry

The IMYM teachers' self-reported skills in CD-ROM inquiry for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was very little change in the Beginning level (7%, 5%, and 9%). However, a shift from the Developing (38% vs. 49% and 55%) and Accomplished (30%, 26%, and 25%) to Exemplary (28% vs. 14%) was apparent. This indicates that in 2003-04, more IMYM teachers could teach their students the techniques and power of electronic searching than in 2001-02 and 2002-03.

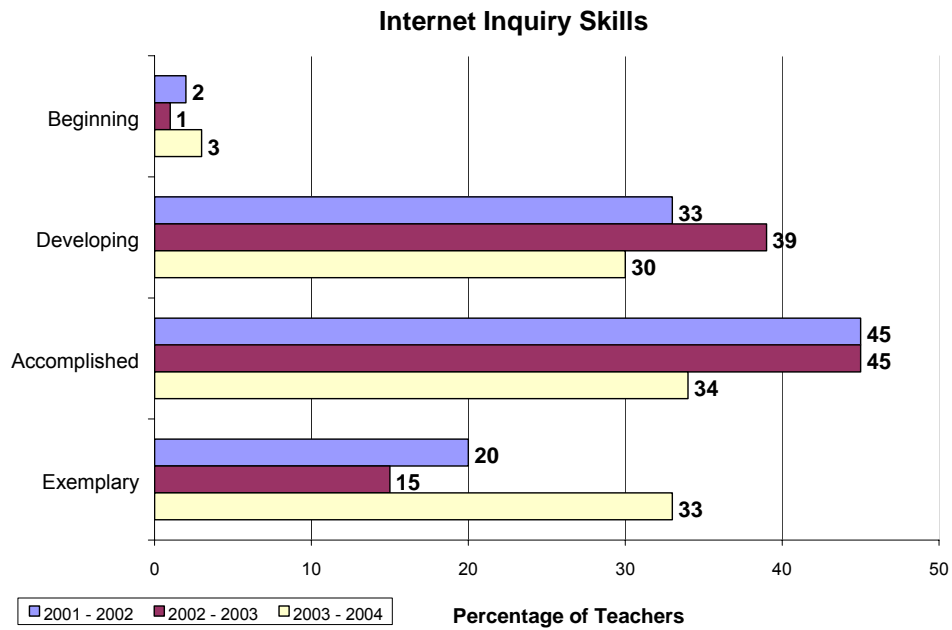
Figure 48. CD-ROM Inquiry (2001-2004)



6.10 Internet Inquiry

The IMYM teachers' self-reported skills in Internet inquiry for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (2%, 1%, and 3%) and Developing (33%, 39%, and 30%) levels. However, a shift from the Accomplished level (34% vs. 45%) to the Exemplary level (33% vs. 20% and 15%) was apparent. This indicates that in 2003-04, more IMYM teachers could teach their students to access Internet resources, and to cite and to evaluate sources of information to assess validity than in 2001-02 and 2002-03. This may be due to an increase in Internet access in the homes and classrooms of IMYM teachers.

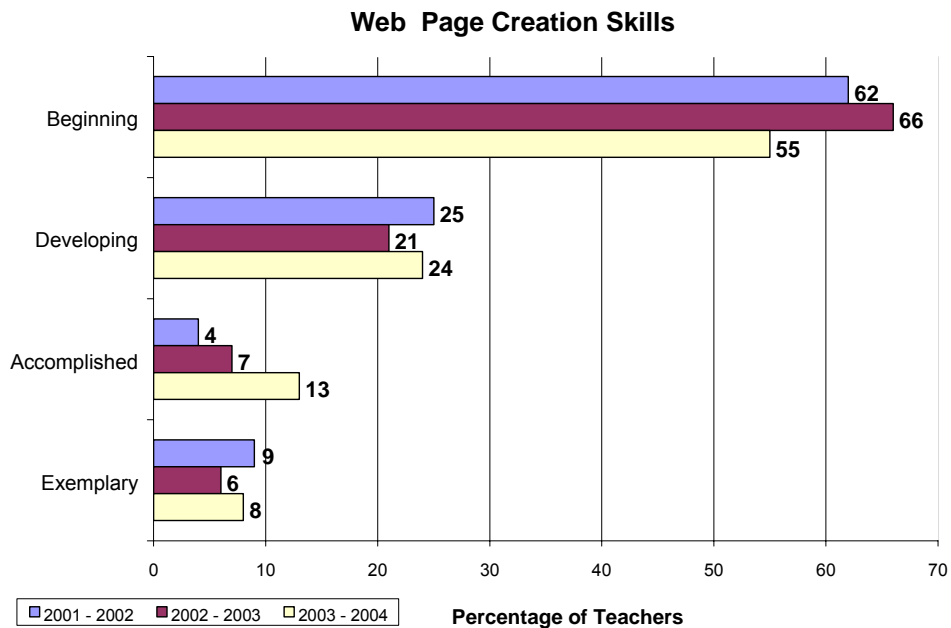
Figure 49. Internet Inquiry (2001-2004)



6.11 Web Page Creation

The IMYM teachers' self-reported skills in web page creation for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (62%, 66%, and 55%), Developing (25%, 21% and 24%) and Exemplary (9%, 6%, and 8%) levels. Further, in 2003-04, there was only a slight increase in the Accomplished level (13% vs. 4% and 7%). This indicates that in 2003-04, more IMYM teacher have created a multi-page classroom website to communicate with students and parents than in 2001-02 and 2002-03. This may be due to an increase in access to web page creation software in the classroom, and to an increase in the professional learning opportunities on classroom website creation available to teachers.

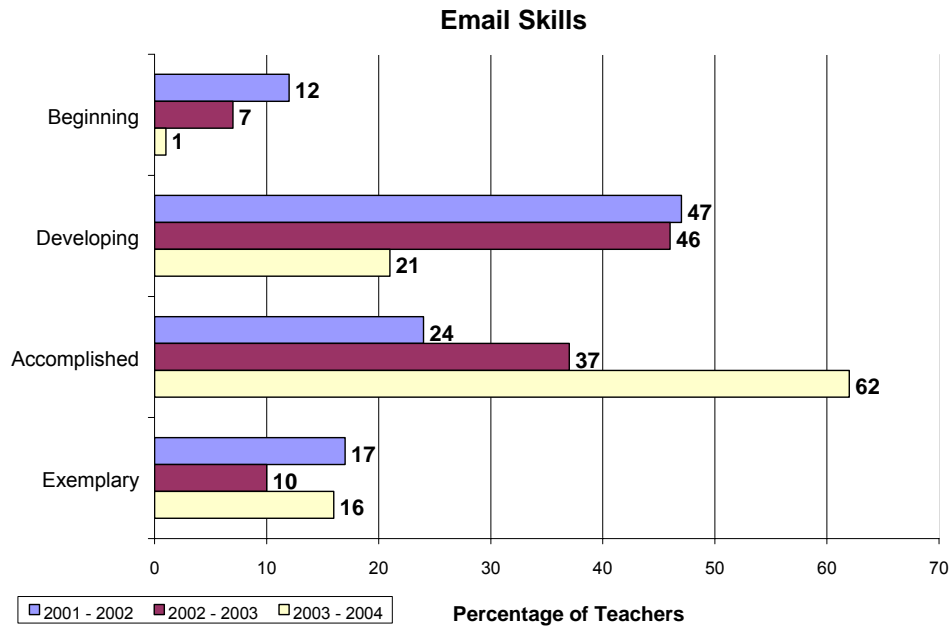
Figure 50. Web Page Creation (2001-2004)



6.12 Email Use

The IMYM teachers' self-reported skills in email for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was a decrease in the Beginning level (12%, 7%, and 1%) and a variable change in the Exemplary level (17%, 10%, and 16%). Clearly, however, there was a decisive shift from the Developing level (21% vs. 47% and 46%) to the Accomplished level (62% vs. 24% and 37%). This indicates that in 2003-04, more IMYM teachers checked their email account on a regular basis and used email to access professional information from Listservs than in 2001-02 and 2002-03. This may be due to an increase in Internet access and email services in both the homes and classrooms of IMYM teachers.

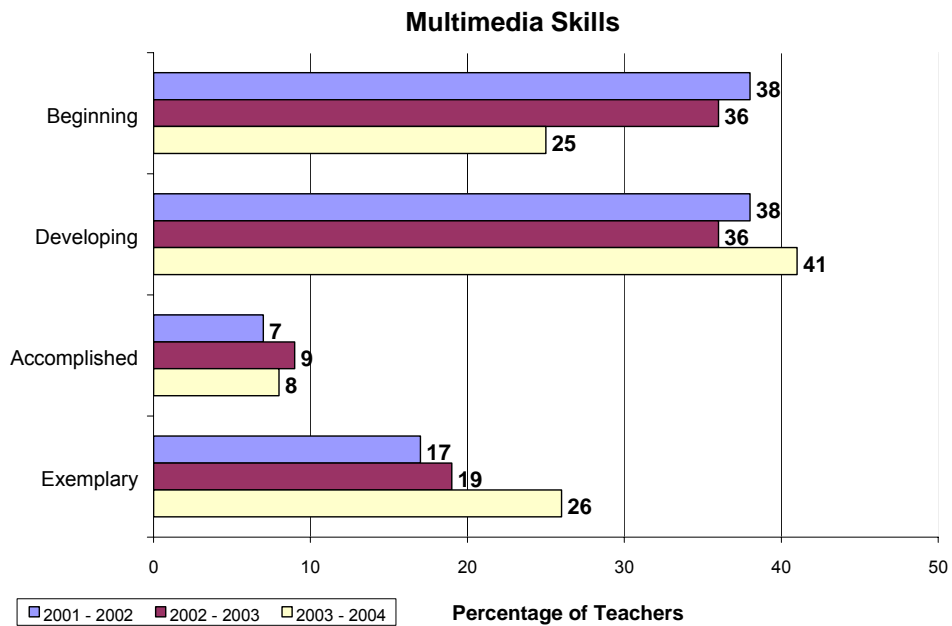
Figure 51. Email (2001-2004)



6.13 Multimedia

The IMYM teachers' self-reported skills in multimedia for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was little change in the Developing (38%, 36%, and 41%) and Accomplished (7%, 9%, and 8%) levels. However, a considerable decrease in the Beginning level (38%, 36%, and 25%) and increase in the Exemplary level (17%, 19%, and 26%) was evident. This indicates that in 2003-04, more IMYM teachers reported that they have taught their students how to create their own multimedia presentations than in 2001-02 and 2002-03. This may be due to an increase in the professional learning opportunities on the use of multimedia software available to IMYM teachers.

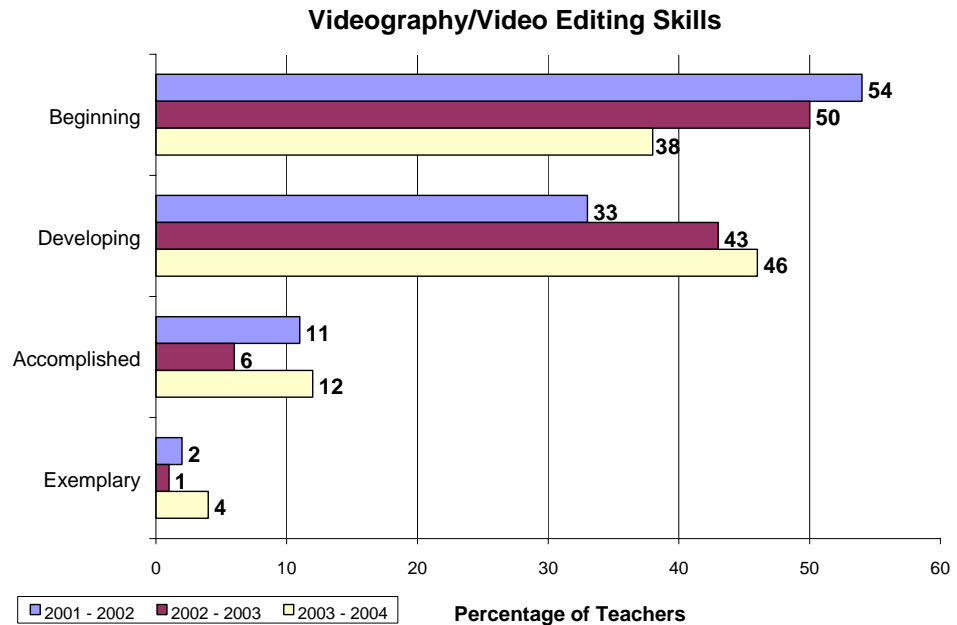
Figure 52. Multimedia (2001-2004)



6.14 Videography/Video Editing

The IMYM teachers' self-reported skills in videography/video editing for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Accomplished (11%, 6%, and 12%) and Exemplary (2%, 1%, and 4%) levels. However, a distinctive shift from the Beginning level (38% vs. 54% and 50%) to the Developing level (46% vs. 33% and 43%) was apparent. This indicates that in 2003-04, more IMYM teachers were able to connect video devices in order to simultaneously transfer video and monitor images than 2001-02 and 2002-03. This may be due to an increase in access to digital video cameras in classrooms and to the professional learning opportunities on video editing available to teachers.

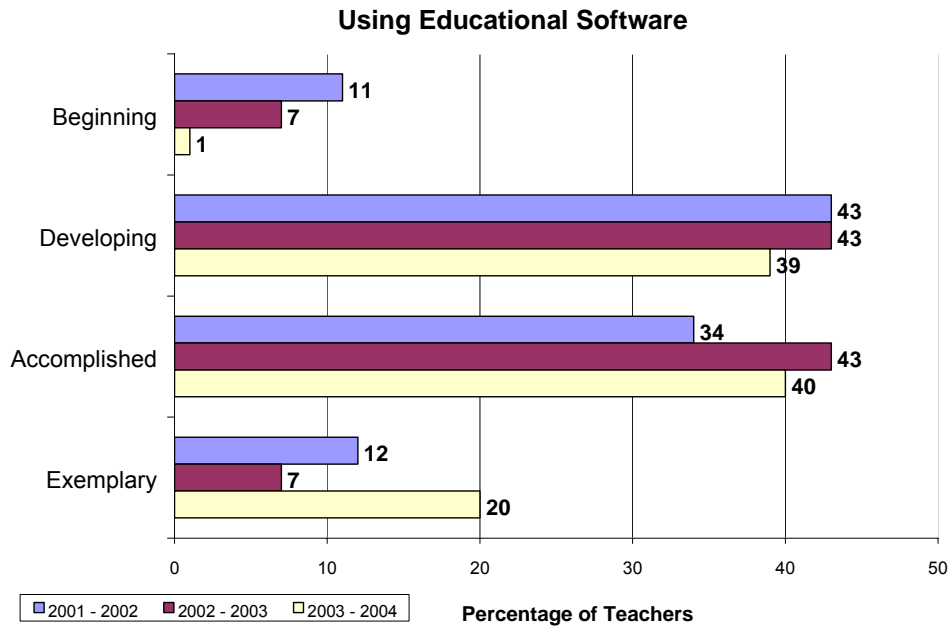
Figure 1. Videography/Video Editing (2001-2004)



6.15 Using Educational Software

The IMYM teachers' self-reported skills in using educational software for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was a decrease in the Beginning level (11%, 7%, and 1%) and variable change in the Developing (43% and 39%) and Accomplished (34%, 43%, and 40%) levels. However, a notable increase occurred in the Exemplary level (20% vs. 12% and 7%). This indicates that in 2003-04, more IMYM teachers could access sources of software reviews and remain up-to-date in educational technology developments as well as share their findings with peers than in 2001-02 and 2002-03. This may be due to an increase in the availability of educational software in IMYM classrooms.

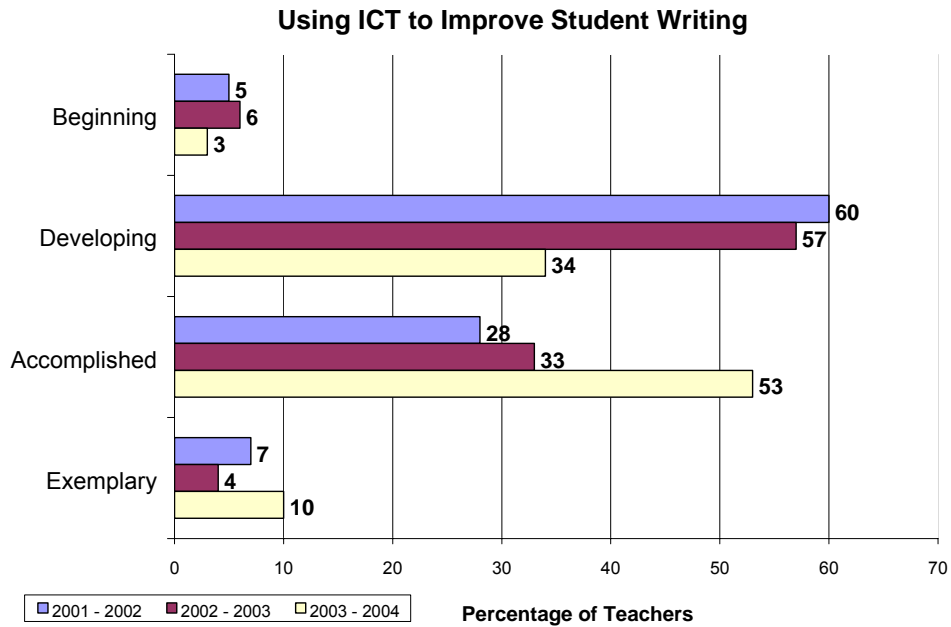
Figure 54. Using Educational Software (2001-2004)



6.16 Using Information and Communication Technology to Improve Student Writing

The IMYM teachers' self-reported skills in using ICT to improve student writing for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (5%, 6%, and 3%) and Exemplary (7%, 4%, and 10%) levels. However, clearly, there was a significant shift from the Developing level (34% vs. 60% and 57%) to the Accomplished level (53% vs. 28% and 33%). This indicates that in 2003-04, more IMYM teachers helped their students use technology (e.g. concept mapping software, editing, and desktop publishing tools) in all phases of the writing process than in 2001-02 and 2002-03. This may be due to an increase in professional learning opportunities for teachers on using ICT to improve student writing and to increased access to word processors in the classroom.

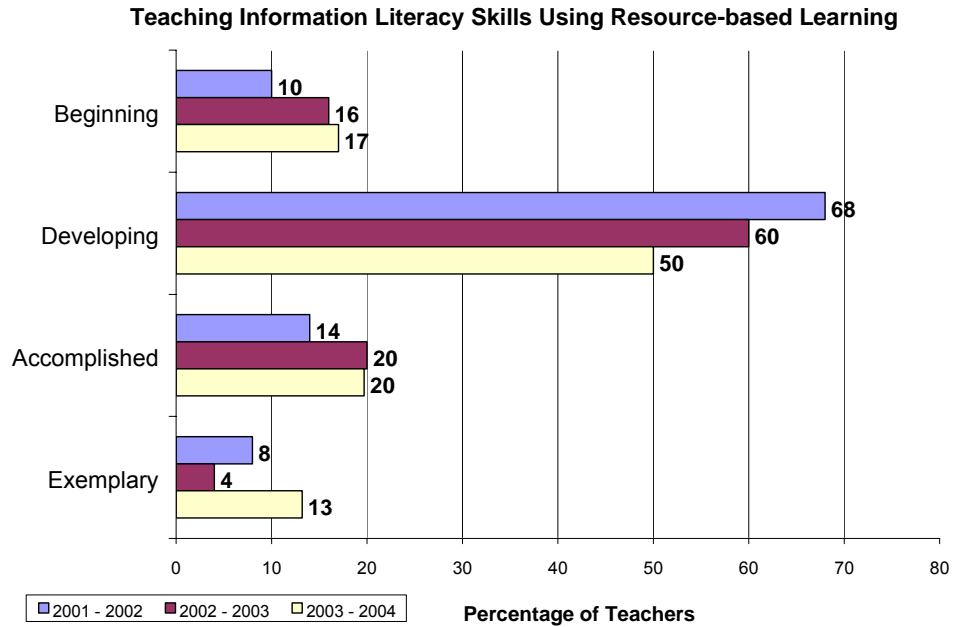
Figure 55. Using ICT to Improve Student Writing (2001-2004)



6.17 Teaching Information Literacy Skills using Resource-based Learning

The IMYM teachers' self-reported skills in teaching information literacy skills using resource-based learning (RBL) for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was a slight increase in the Beginning (10%, 16%, and 17%), Accomplished (20% vs. 14%) and Exemplary (13% vs. 8% and 4%) levels. On the other hand, there was a continuous decrease in the number of teachers placing themselves at the Developing level (68%, 60%, and 50%). This indicates that in 2002-03 and 2003-04, slightly more IMYM teachers were actively involved in curriculum implementation teams, used interdisciplinary units and learning experiences that developed information literacy skills and RBL, and shared successful units with peers than in 2001-02 and 2002-03.

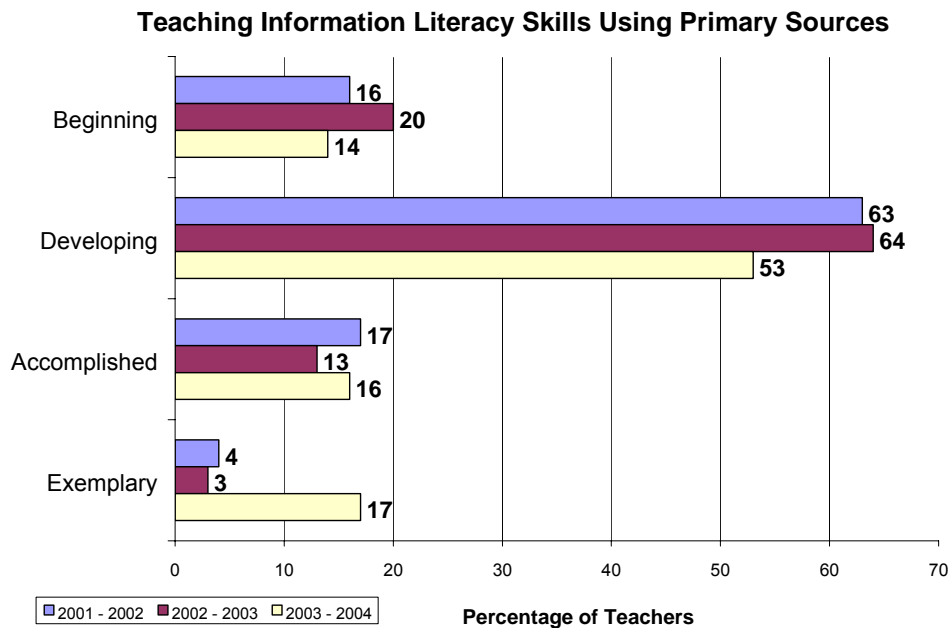
Figure 56. Information Literacy Skills Using RBL (2001-2004)



6.18 Teaching Information Literacy Skills using Primary Sources

The IMYM teachers' self-reported skills in teaching information literacy skills using primary sources for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (16%, 20%, and 14%) and Accomplished (17%, 13%, and 16%) levels. Although there was a decrease in the Developing level (53% vs. 63% and 64%), there was a notable increase in the Exemplary level (17% vs. 4%). This indicates that in 2003-04, more IMYM teachers were actively involved in curriculum implementation teams and used interdisciplinary units and learning experiences requiring information literacy skills and the use of primary sources of data than in 2001-02 and 2002-03.

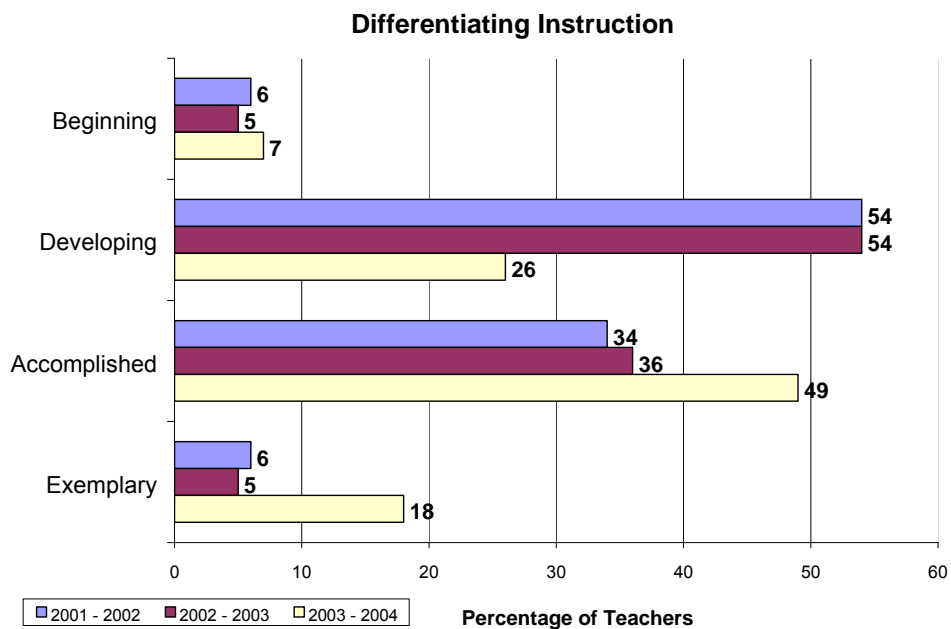
Figure 57. Information Literacy Skills - Primary Sources (2001-2004)



6.19 Differentiating Instruction

The IMYM teachers' self-reported skills in differentiating instruction for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning level (6%, 5%, and 7%). However, a unique shift from the Developing (26% vs. 54%) to the Accomplished (34%, 36%, and 49%) and Exemplary (18 vs. 6% and 5%) levels is evident. This indicates that in 2003-04, more IMYM teachers used a variety of instructional delivery methods and student grouping strategies (e.g. student-to-equipment ratios of greater than one-to-one) and designed learning experiences that best fit curricular learning outcomes, learning styles and needs than in 2001-02 and 2002-03. In addition, more IMYM teachers in 2003-04 attempted to discover the most effective means of using technology to engage their students and meet curricular outcomes as well as to work with a team of like-minded teachers to create, modify, and improve their practices in instructional delivery than in 2001-02 and 2002-03. This may be due to continued professional learning on differentiated instruction through implementation of the Manitoba Education, Citizenship and Youth document (*Success for All Learners*) or to other differentiated instruction initiatives in Manitoba schools.

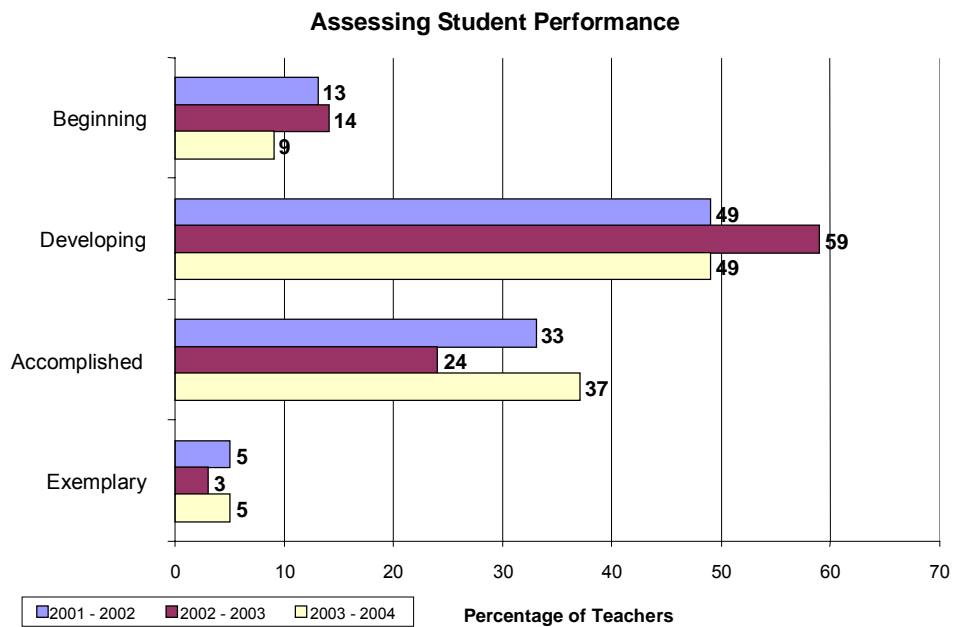
Figure 58. Differentiating Instruction (2001-2004)



6.20 Assessing Student Performance

The IMYM teachers' self-reported skills in authentic assessment of student performance for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was little or variable change in all four skill levels: Beginning (13%, 14%, and 9%), Developing (49% and 59%), Accomplished (33%, 24%, and 37%), and Exemplary (5% and 3%) levels in all three segments (2001-2002, 2002-2003, and 2003-2004). This may be due to a lack of professional development opportunities for IMYM teachers on authentic assessment.

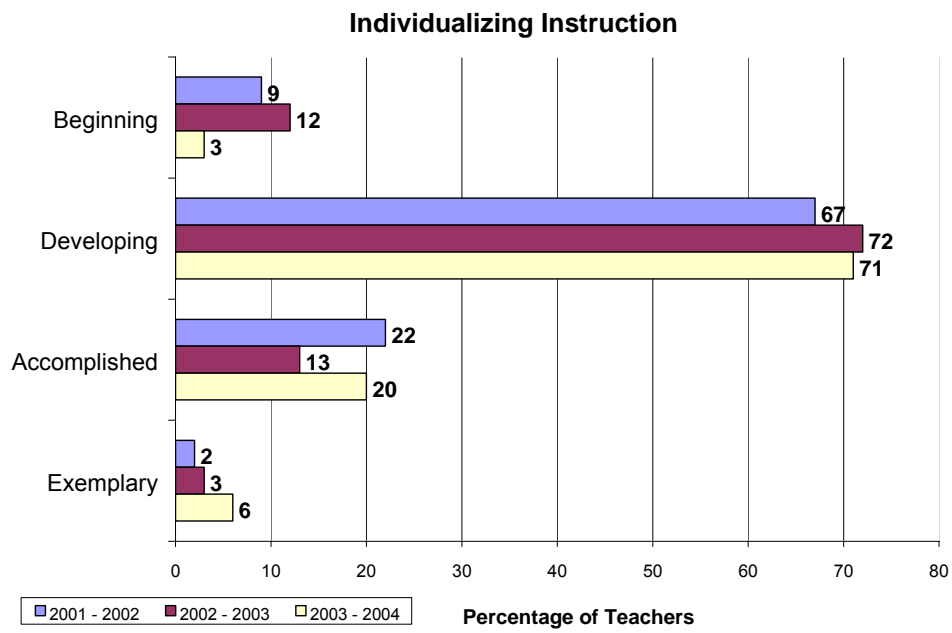
Figure 59. Assessing Student Performance (2001-2004)



6.21 Individualizing Instruction

The IMYM teachers' self-reported skills in individualizing instruction for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was little or variable change in all four skill levels: Beginning (9%, 12%, and 3%), Developing (67%, 72%, and 71%), Accomplished (22%, 13%, and 20%), and Exemplary (2%, 3%, and 6%) levels. This indicates that IMYM teachers have been consistent in their reports of their placements at each level for individualizing instruction in all three segments (2001-2002, 2002-2003, and 2003-2004).

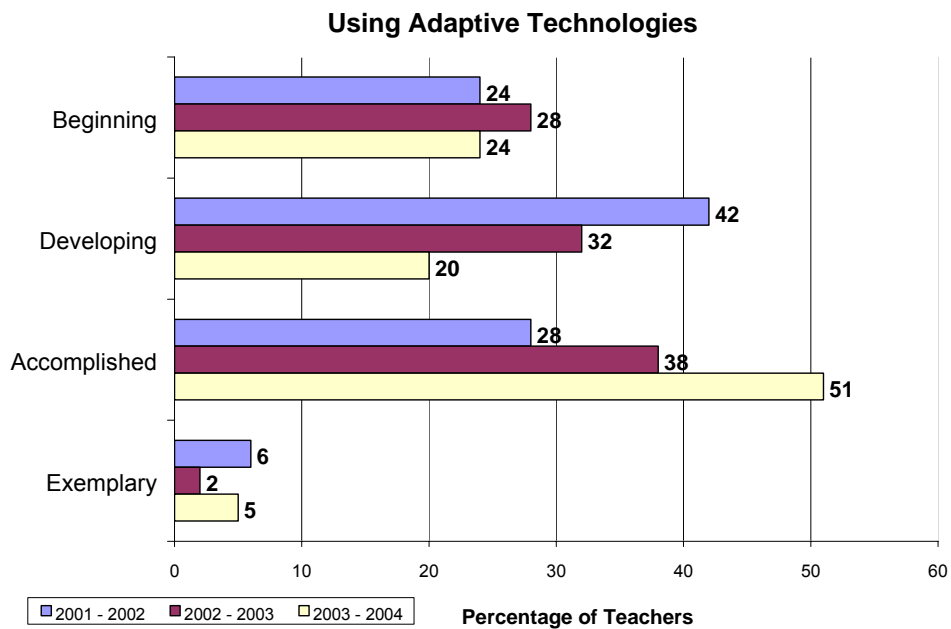
Figure 60. Individualizing Instruction (2001-2004)



6.22 Using Adaptive Technologies

The IMYM teachers' self-reported skills in using adaptive technologies for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (24% and 28%) and Exemplary (6%, 2%, and 5%) levels. However, a notable shift from the Developing level (42%, 32%, and 20%) to the Accomplished (28%, 38% and 51%) level was apparent. This indicates that in 2003-04, more IMYM teachers could use technology when appropriate to help students with special learning needs than in 2001-02 and 2002-03.

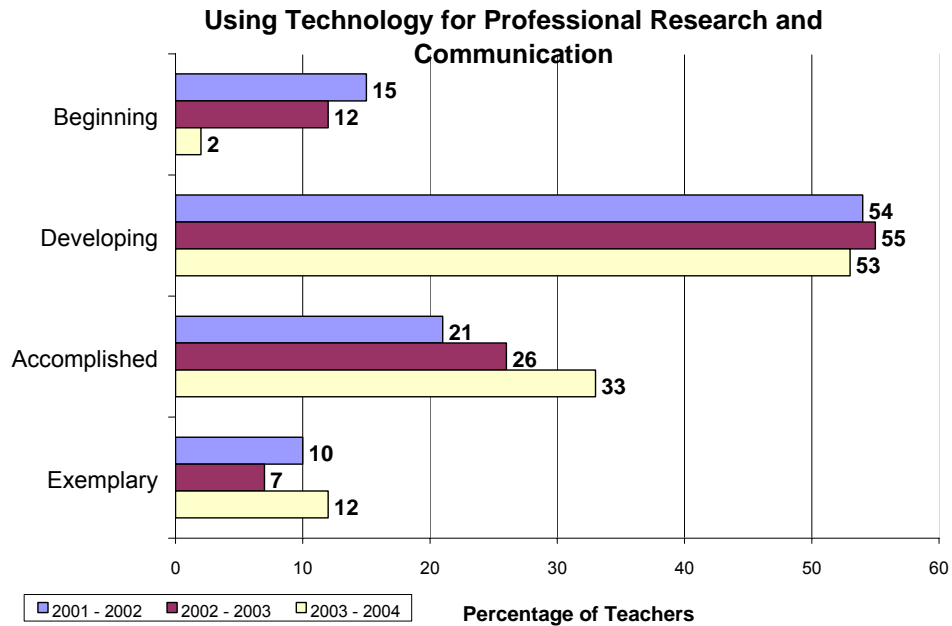
Figure 61. Using Adaptive Technologies (2001-2004)



6.23 Using Technology for Professional Research and Communication

The IMYM teachers' self-reported skills in using technology for professional research and communication for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Developing (54%, 55%, and 53%) and at the Exemplary (10%, 7%, and 12%) levels. On the other hand, there was a steady decrease in the Beginning level (15%, 12%, and 2%) and a continuous increase in the Accomplished level (21%, 26%, and 33%). This indicates that in 2003-04, more IMYM teachers used online databases to research educational topics and read electronic newsletters and journals than in 2001-02 and 2002-03. This may be due to an increase in the number of computers with Internet access in both the homes and classrooms of IMYM teachers.

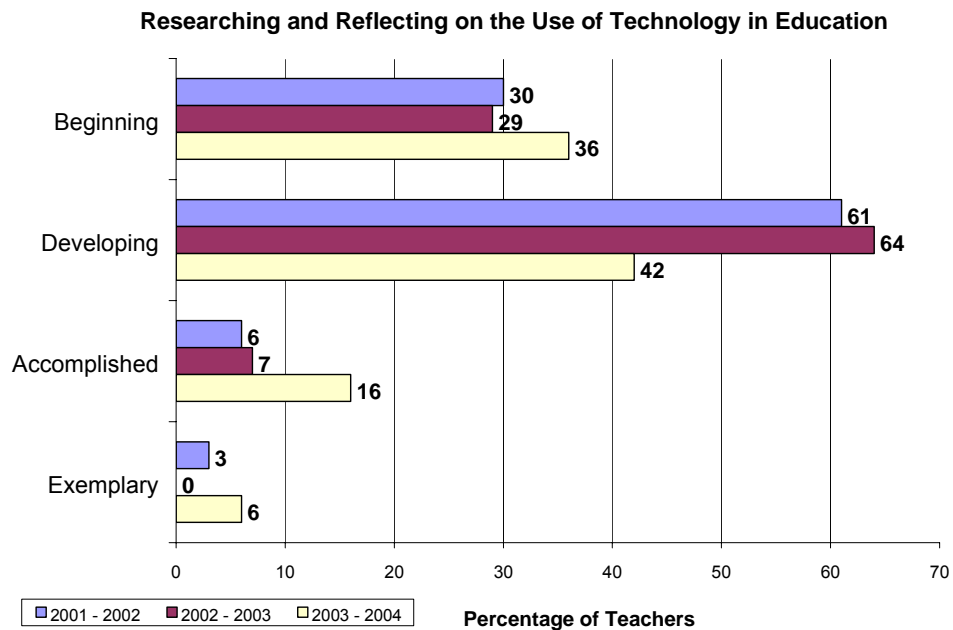
Figure 62. Professional Research and Communication (2001-2004)



6.24 Researching and Reflecting on the Use of Technology in Education

The IMYM teachers' self-reported skills in researching and reflecting on the use of technology in education for the years 2001-02, 2002-03 and 2003-04 were compared. It was found that there was variable change in the Beginning (30%, 29%, and 36%) and Exemplary (3%, 0%, and 6%) levels. However, a shift from the Developing level (42% vs. 61% and 64%) to the Accomplished level (16% vs. 6% and 7%) was apparent. This indicates that in 2003-04, more IMYM teachers analyzed and self-reflected on how the technology and methodology affected their students' learning and classroom climate and could use the results of peers' research on ICT integration to inform their own classroom practice than in 2001-02 and 2002-03.

Figure 63. Research and Reflection (2001-2004)



7.0 Conclusion

Before using the IMYM model, teachers varied considerably in their levels of technical skill in using ICT (Appendix A). Despite the newly introduced skills of electronic data collection and geographical information systems, in which teachers lacked skill, overall, the Accomplished level prevailed in the technical skills of using ICT applications. Interestingly, the skills of email, the Internet, computer operation, word processing, and file management were at a high percentage both at the Accomplished and Exemplary levels indicating not only individual skill but more importantly, the ability to transfer these skills to their teaching practice.

On the other hand, the Developing level was dominant for the pedagogical skills in integrating ICT in the classrooms (Appendix B). While the pedagogical skills of using ICT to improve student writing, adaptive technologies and educational software as well as differentiating instruction were the highest percentages at the Developing and Accomplished levels, the skill of engaging in online and professional learning was the highest Beginning level of all pedagogical skills.

Some of these results may be due to the following factors

- access to hardware in homes/classrooms
- access to software in homes/classrooms
- access to professional learning
- access to technical support
- access to bandwidth
- level of computing power
- reliability of ICT

It may be concluded that professional development needs to be targeted at the pedagogy needed to integrate ICT in the curriculum and in the classroom.



Appendix A

Interdisciplinary Middle Years Multimedia (IMYM) Model Self-Assessment of Information & Communication Technology (ICT) Literacy

This self-assessment will help you and your ICT trainer to develop an individual plan to meet your ICT training needs, and will also help you to determine areas in which you might continue to learn and practice in a self-directed manner. Please judge your competency level in each of the following ICT skill areas by checking the box that best describes your current skill level. (Be honest, but be kind!)

Level	Beginning	Developing	Accomplished	Exemplary
ICT Skill				
I. Computer operation	<input type="checkbox"/> I do not yet use a computer.	<input type="checkbox"/> I understand how to use a computer to run specific, pre-loaded software.	<input type="checkbox"/> I can set-up my computer and peripheral devices, load software, print, and use some of the operating system tools such as the Find command. I customize the look and sounds of my computer. I run two or more programs simultaneously, and can switch among several windows as required.	<input type="checkbox"/> I make preference settings to customize software applications. I configure specialized peripherals such as a digital camera. I feel confident enough to teach students how to use a computer.
II. File management	<input type="checkbox"/> I do not yet save any files I create using the computer.	<input type="checkbox"/> I understand how to save files I've created but I do not know how to choose where they are saved. I do not know how to copy files between disks.	<input type="checkbox"/> I have a filing system for organizing my computer files, and can locate files quickly and reliably. I back-up my files on a regular basis.	<input type="checkbox"/> I have a system for archiving files that I do not need on a regular basis. I can burn files onto a CD-ROM. I have taught my students how to manage their files on my classroom computers and on the school network.
III. Networking	<input type="checkbox"/> I do not yet have any knowledge of computer network operation.	<input type="checkbox"/> I understand how to use a computer network to store files and to access a printer.	<input type="checkbox"/> I am able to troubleshoot and correct problems such as a shared printer dropping off a peer-to-peer network. I can add or remove computers and shared devices on a peer-to-peer network.	<input type="checkbox"/> I am able to set up a peer-to-peer network in my classroom, complete with a shared printer. I am able to administer the network including passwords and permissions for students on the network.

Level	Beginning	Developing	Accomplished	Exemplary
ICT Skill				
IV. Word processing	<input type="checkbox"/> I do not yet use a word processor.	<input type="checkbox"/> I understand how to use a word processor to create simple documents that I know I will modify and use again, however I generally find it easier to hand write most of my written work.	<input type="checkbox"/> I use a word processor for nearly all my written professional work: memos, tests, worksheets, and home communication. I can edit, spell check, and change the format of a document.	<input type="checkbox"/> I use advanced features of word processing such as track changes and hyperlinks. I use a word processor not only for my own work, but have taught students to use it for all stages of the writing process.
V. Spreadsheet	<input type="checkbox"/> I do not yet use a spreadsheet.	<input type="checkbox"/> I understand how to use a spreadsheet and can navigate within one. I can create a simple spreadsheet that adds a column of numbers.	<input type="checkbox"/> I use spreadsheets for several purposes such as keeping track of student grades. These spreadsheets have labels, formulas, and cell references. I can change the format of my spreadsheets by changing column width and text style. I use my spreadsheets to make graphs and charts.	<input type="checkbox"/> I create spreadsheets with multiple worksheets and link them together. I create macros to use in my spreadsheets. I use the database functions of my spreadsheet. I use a spreadsheet not only for my work, but have taught students to use spreadsheets to help them improve their own data-keeping and analysis skills.
VI. Database	<input type="checkbox"/> I do not yet use a database.	<input type="checkbox"/> I understand how to use a database and can locate information within one that has been pre-made. I can add or delete data in a database. I can sort and print the information in layouts that are useful to me.	<input type="checkbox"/> I use databases for several purposes. I can create a database from scratch - defining fields and creating layouts in order to support inquiry. I can use database information to perform queries.	<input type="checkbox"/> I use formulas with my databases to create summations of numerical data. I use databases not only for my work, but have taught students to use databases to help them improve their own data-keeping and analysis skills.
VII. Concept Mapping	<input type="checkbox"/> I do not yet use concept mapping software.	<input type="checkbox"/> I understand how to use concept mapping software for creating simple concept maps and outlines.	<input type="checkbox"/> I use concept mapping software as a note-taking and organizational tool. I customize the symbols, links, and layout of my concept maps. I create concept maps for my students to use.	<input type="checkbox"/> I use concept mapping software as a presentation tool, complete with Internet links. I also export my concept maps into multimedia presentations or web pages. I have taught my students how to use concept mapping software.

Level	Beginning	Developing	Accomplished	Exemplary
ICT Skill				
VIII. Graphics and Animation	<input type="checkbox"/> I do not yet use graphics in my electronic work.	<input type="checkbox"/> I understand how to use paint and draw software to create simple graphics. I insert both pre-made clipart and simple original graphics into my electronic work.	<input type="checkbox"/> I edit graphics using most of the drawing tools, and can group and ungroup objects. I copy and paste graphics from one application for use in another. I create simple animations.	<input type="checkbox"/> I create digital animations to help my students visualize changes in a process over time. I use graphics and animation not only for my own demonstrations, but have taught students to use graphics to improve their own communications.
IX. CD-ROM inquiry	<input type="checkbox"/> I do not yet seek information from pre-made electronic sources (e.g. CD-ROM encyclopedias).	<input type="checkbox"/> I understand how to use electronic library catalogues to find resources and can conduct simple searches with electronic databases and encyclopedias.	<input type="checkbox"/> I use a variety of search strategies with a number of electronic information sources. I use advanced search functions such as "and" and "or" to help target the search and find just the right information in the most efficient manner.	<input type="checkbox"/> I incorporate logical search strategies into my work with students, showing them the power of such searches with electronic sources. I insist my students respect copyright and cite their sources.
X. Internet inquiry	<input type="checkbox"/> I do not yet use the Internet.	<input type="checkbox"/> I understand how to use a web browser to access and navigate the Internet to find a specific URL. I bookmark my favourite websites.	<input type="checkbox"/> I make efficient use of a variety of search engines, as well as lists of Internet resources, to explore educational applications of the Internet. I evaluate the source of information and its URL to assess its authority, accuracy, objectivity, currency, and coverage.	<input type="checkbox"/> I make effective use of a variety of search engines to create my own hot-lists of Internet resources for student use. I show my students how to access Internet resources and how to evaluate the source of information and its URL to assess its validity. I insist my students respect copyright and cite their sources.
XI. Web page Creation	<input type="checkbox"/> I do not yet create web pages.	<input type="checkbox"/> I understand how to create simple single web pages with graphics, Internet links, and mail-to links.	<input type="checkbox"/> I have created a multipage classroom website with a simple navigation scheme. I use my classroom website to communicate with students and/or parents.	<input type="checkbox"/> I have created a multipage classroom website that links to student work. I have taught my students how to make their own simple websites and electronic collections of their work on our Intranet or the Internet.

Level	Beginning	Developing	Accomplished	Exemplary
ICT Skill				
XII. Email	<input type="checkbox"/> I do not yet use electronic mail.	<input type="checkbox"/> I understand how to communicate with a wide variety of people using electronic mail. I send occasional messages and requests for information using email.	<input type="checkbox"/> I check my email account on a regular basis. I use email to access professional information from listservs.	<input type="checkbox"/> I involve my students in using email to communicate globally with other students and various kinds of experts. I use email to communicate reflectively with individual students and to distribute/collect assignments.
XIII. Multimedia Presentations	<input type="checkbox"/> I do not yet create my own multimedia presentations.	<input type="checkbox"/> I understand how to create simple linear multimedia presentations integrating text and graphics.	<input type="checkbox"/> I create non-linear multimedia presentations that include features such as action buttons, animations, Internet links, audio, and video.	<input type="checkbox"/> I create multimedia presentations, not only for my own classroom presentations, but have taught my students to create their own multimedia presentations.
XIV. Digital Imaging	<input type="checkbox"/> I do not yet use a digital camera.	<input type="checkbox"/> I understand how to take photos with a digital camera. I can connect a digital camera to a computer to transfer my own digital images.	<input type="checkbox"/> I can alter digital images by cropping, rotating, and resizing. I import my own original digital images into word processed documents, concept maps, multimedia presentations, and/or webpages.	<input type="checkbox"/> I integrate my own digital images into my classroom presentations and/or on my classroom website. I have taught my students how to take digital images and use them in their own word processed documents, concept maps, multimedia presentations and/or webpages.
XV. Videography/ video editing	<input type="checkbox"/> I do not yet use a video camera.	<input type="checkbox"/> I understand how to take video with a video camera. I can connect a video camera to a VCR and/or television in such a way that I can transfer video and monitor the image at the same time.	<input type="checkbox"/> I use video-editing software to clip and sequence video. I prepare digital video clips for use in other applications.	<input type="checkbox"/> I create digital video clips, not only for classroom presentations, but have taught my students to film and edit their own digital video presentations.
XVI. Geographic Information Systems (GIS)	<input type="checkbox"/> I do not yet use GIS software.	<input type="checkbox"/> I understand how to use GIS software to interpret basic data already included with the software.	<input type="checkbox"/> I interpret and analyze data included with the GIS software, as well as data from external sources such as e-stat.	<input type="checkbox"/> I use GIS software to interpret and analyze customized data, including imported data from GPS devices. I have taught my students how to use GIS software and GPS devices.

Level	Beginning	Developing	Accomplished	Exemplary
ICT Skill				
XVII. Electronic Data Collection	<input type="checkbox"/> I do not yet use electronic data collection devices such as probeware or GPS.	<input type="checkbox"/> I understand how to use at least one type of electronic data collection device to gather experimental data.	<input type="checkbox"/> I use several different electronic data collection devices. I connect these devices to my computer to gather and analyze experimental data.	<input type="checkbox"/> I design experiments that use electronic data collection devices to gather and analyze data. I have taught my students how to use these devices in classroom and field conditions.

Name: _____

Grade level(s): _____

School: _____

Subject area(s): _____

Division: _____

classroom computers: _____

Phone: _____

Email: _____



Appendix B

Interdisciplinary Middle Years Multimedia (IMYM) Model Self-Assessment of Pedagogical Skill in Integrating Information and Communication Technology (ICT) with Curriculum and Classroom Practice*

This self-assessment will help you and your technology mentor to develop an individual professional growth plan to increase your pedagogical skill in integrating ICT with your classroom practice. It will also help you to determine areas in which you might continue to learn and practice in a self-directed manner. Please judge your competency level in each of the following areas by checking the box that best describes your current skill level. (Be honest, but be kind!)

Level	Beginning	Developing	Accomplished	Exemplary
I. Using Educational Software	<input type="checkbox"/> I do not use educational software, such as drill and practice, simulations, and tutorials as part of my instruction. However, I am aware of some titles that may help my students meet their learning goals.	<input type="checkbox"/> I use some educational software as an instructional supplement, or for children with special needs.	<input type="checkbox"/> I use educational software that has been evaluated as a learning resource to match outcomes in Manitoba Foundation for Implementation documents. I use these resources to provide experiences otherwise unavailable to my students and to address diverse learning styles.	<input type="checkbox"/> I seek out new educational software for evaluation and adoption. I access sources of software reviews and keep current on developments in educational technologies through professional reading and conference attendance. I share my findings with my colleagues.
II. Using information and communication technology to improve student writing	<input type="checkbox"/> I do not use any technologies that would allow me to help my students improve their writing skills. However, I ask that the final draft of some student writing assignments be word processed.	<input type="checkbox"/> I encourage my students to use concept mapping to activate their prior knowledge as they write. I expect my students to compose or edit using the computer. I ask that the final draft of most student writing assignments be word processed.	<input type="checkbox"/> I help my students use technology in all phases of the writing process from brainstorming and outlining to writing and editing. This may include concept mapping software, spelling and grammar checkers, electronic dictionary and thesaurus, desktop publishing tools, and the use of hand held devices and portable computers.	<input type="checkbox"/> I store collections of my students' writing electronically. I use technology to help students share their writing with a wide reading audience. I look for specific technology tools to help my students improve their writing skills. I share successful strategies with colleagues through print and electronic publishing and through conference presentations and workshops.

Level	Beginning	Developing	Accomplished	Exemplary
Pedagogy Skill				
III. Teaching information literacy skills using resource-based learning	<ul style="list-style-type: none"> □ I am not familiar with the term information literacy, and I am not sure why such skills are important. 	<ul style="list-style-type: none"> □ As a part of my instructional strategies, I have students engage in resource-based learning projects where information literacy skills are developed. My students use and cite electronic resources in the resource-based learning process. 	<ul style="list-style-type: none"> □ I collaborate with a teacher-librarian or with other classroom teachers to teach information literacy skills. I design resource-based learning projects so that students ask essential questions, use higher-level thinking skills, use and cite electronic information sources, use computer productivity software, and are authentically assessed. 	<ul style="list-style-type: none"> □ I am actively involved in curriculum implementation teams in my school or division and advocate for and use interdisciplinary units, web quests, and learning experiences that develop information literacy skills and resource-based learning. I share successful units with colleagues through print and electronic publishing and through conference presentations and workshops.
IV. Teaching information literacy skills using primary sources	<ul style="list-style-type: none"> □ When asking students to do research, I expect them to only use secondary resources such as books, magazines, or reference materials. 	<ul style="list-style-type: none"> □ As part of my instructional strategies I include student projects that require the collection and use of original data and information. I generally can predict the outcome of such experiments or surveys. 	<ul style="list-style-type: none"> □ I expect my students to participate in information literacy projects that require the collection of original data to answer a real-world question. They use a variety of tools to gather data, such as online surveys, interviews, digital cameras, digitized sources of historical records, computerized probes and sensors, or GPS devices. I teach my students to use electronic tools such as tables, spreadsheets, or databases to record, organize, analyze and communicate the results. 	<ul style="list-style-type: none"> □ I am actively involved in curriculum implementation teams in my school or division and advocate for and use interdisciplinary units and learning experiences that require information literacy skills and the use of primary sources of data. I share successful strategies with other teachers through print, electronic publishing, conference presentations, and workshops.

Level	Beginning	Developing	Accomplished	Exemplary
Pedagogy Skill				
V. Differentiated Instruction	<p><input type="checkbox"/> I rely on a few effective methods of delivering content to my students. I do not use technology that requires that I change my instructional methodology.</p>	<p><input type="checkbox"/> I have tried learning experiences that have a technology component, however, I primarily use teacher-directed, whole group instruction. I occasionally give my students a choice of assignments.</p>	<p><input type="checkbox"/> I use a variety of instructional delivery methods and student grouping strategies routinely throughout the year. I design learning experiences and approaches that best fit curricular learning outcomes, student learning styles and needs, and the technology available to me. I use small groups working collaboratively in learning centres to take advantage of student-to-equipment ratios of greater than one-to-one.</p>	<p><input type="checkbox"/> I continually try new approaches suggested by research or observation to discover the most effective means of using technology to engage my students and meet curricular outcomes. I work with a team of like-minded teachers either face-to-face or online to create, modify, and improve my practices in instructional delivery.</p>
VI. Assessing student performance	<p><input type="checkbox"/> I assess my students using primarily summative and objective written tests. I assess some student performances or products using formative and subjective criteria. I am aware that ICT can be used to assess student achievement.</p>	<p><input type="checkbox"/> I gather evidence of student learning and collect print copies of electronic work (such as word-processed documents, graphics, and presentations) to demonstrate student achievement in student portfolios and parent conferences.</p>	<p><input type="checkbox"/> I use a wide range of assessment strategies to evaluate student products and performances. I create assessment tools such as checklists and rubrics that help students assess themselves and their peers and allow me to objectively determine the quality of student work. I ask students to keep both a physical and electronic portfolio of their achievements. I have a computerized means of aggregating performance data for my class that I use to modify my instructional strategies.</p>	<p><input type="checkbox"/> I have developed strategies to assess both interdisciplinary work and collaborative work. I continuously try new strategies suggested by research or observation to discover the most effective means of using technology to help assess student learning. I work with a team of like-minded teachers, in person or virtually, to create, modify, and improve my assessment practices.</p>

Level	Beginning	Developing	Accomplished	Exemplary
Pedagogy Skill				
VII. Individualizing instruction	<input type="checkbox"/> I modify my instructional strategies only for students with identified special needs.	<input type="checkbox"/> I occasionally give my students a choice of assignments, but all students in my class (unless they are in a modified program) must achieve the same learning outcomes within the same time frame. I do skill remediation with students during or after school.	<input type="checkbox"/> With the assistance of the student, parents, and specialists, if required, I create a learning plan for each of my students. I track the accomplishment of their learning outcomes in each plan using a computerized tool. I use this tool during parent conferences and for school reporting.	<input type="checkbox"/> I can customize the content and design of the computerized planning and reporting tools that I use. I share my strategies, for using technology to individualize instruction, with my colleagues.
VIII. Adaptive Technologies	<input type="checkbox"/> I am not aware of how technology can help students with physical or mental challenges.	<input type="checkbox"/> I work with students who may bring with them special devices that allow them to work and communicate in the classroom.	<input type="checkbox"/> I use technology when appropriate to help students with special learning needs. This includes detailed IEPs and specialized communications devices.	<input type="checkbox"/> I provide professional learning opportunities for other teachers in the use of adaptive technologies.
IX. Using technology for professional research and communication	<input type="checkbox"/> I do not use information and communication technologies for professional research or communication.	<input type="checkbox"/> I use online tools to find learning experiences, learning resources, and promising practices for my classroom. I correspond electronically with other educators.	<input type="checkbox"/> I access specialized databases such as ERIC, CBCA, and EBSCO to research educational topics. I read electronic newsletters and journals.	<input type="checkbox"/> I participate in electronic discussion groups or chat rooms related to my area of expertise. I use electronic tools when giving workshops or speaking at conferences. I organize professional learning opportunities for other teachers and feel comfortable teaching colleagues how to use technology to enhance instruction.
X. Researching and reflecting on the use of technology in education	<input type="checkbox"/> I am uncertain whether the use of information and communication technology would make a difference in my students' learning or in classroom climate.	<input type="checkbox"/> I gather, and share with colleagues, anecdotal information and observations about how students use technology to learn in my classroom.	<input type="checkbox"/> I analyze and self-reflect on how the technology and methodology I use affects my students' learning and the climate of my classroom. I use the results of others' research on ICT integration to inform my own classroom practice.	<input type="checkbox"/> I have designed action research as part of my own professional learning. I report electronically, in person, and in print, the findings of my research, to other professionals.

Level	Beginning	Developing	Accomplished	Exemplary
Pedagogy Skill				
XI. Engaging in online professional learning	<input type="checkbox"/> I am aware that professional learning is available online.	<input type="checkbox"/> I have participated in online professional learning but it did not involve online discussions and posting of student samples.	<input type="checkbox"/> I have taken at least one online professional learning course in which I engaged in online discussions. I shared online samples of my work and/or digital photos of my classroom with the other teachers in my online learning community.	<input type="checkbox"/> I engage in a variety of online professional learning experiences in addition to online courses, including web casts, online conferences, and web logs.
XII. Setting up my classroom	<input type="checkbox"/> My classroom is set up primarily for independent learning. There are no computers in my classroom. Most of my use of technology with students is scheduled in a computer lab.	<input type="checkbox"/> My classroom is set up to accommodate occasional collaborative learning. I have at least one computer in my classroom but it is not connected to the Internet.	<input type="checkbox"/> My classroom is often set up to accommodate collaborative learning. I create learning centres that often have computers or other technology in them. At least one classroom computer is connected to the Internet.	<input type="checkbox"/> My classroom is set up with learning centres for both collaborative and independent learning. My students use classroom computers throughout the day whenever they need to do Internet research or create an electronic product.

*Adapted from Rubrics to Guide Professional Technology Development by Doug Johnson, Learning and Leading with Technology, Volume 28 Number 4, December/January 2000-2001

Name: _____

School: _____

Division: _____

Phone: _____

Grade level(s): _____

Subject area(s): _____

classroom computers: _____

Email: _____

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