



The University of Sydney

Alignment of perceptions about the uses of ICT in Australian and New Zealand schools

Survey Report

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Executive summary

The *aims* of this study were to continue the survey-based evaluation of online curriculum materials produced by The Le@rning Federation; and to examine the nature and extent of the alignment of the perceptions of four sets of respondents who work in different positions in Australia's educational sectors (government, Catholic, independent) concerning the uses and benefits of information and communication technologies (ICT) in classrooms and the factors that encourage its classroom use.

The survey

The survey instrument was based partly on the findings from international research and partly from previously conducted surveys of schools' use of TLF materials. The four sets of participants who were asked to respond to the survey were teachers, school leaders (such as departmental heads), school principals, and 'sector personnel' (consultants and policy developers in regional and head offices).

Survey findings

- 1 Teachers vary considerably in their reported rates of familiarity and professional development experiences with TLF materials, and report low levels of professional development, although higher than reported in earlier surveys.
- 2 A large proportion of teachers have used only a small number of learning objects and have done so only infrequently, although use has increased since the earlier surveys of use of TLF materials.
- 3 While most TLF materials published to date have been developed for use at years K to 10, a substantial number of teachers use TLF materials in years 11 and 12, suggesting a wider applicability of these materials across year levels. It is evident, however, that heaviest use of the materials occurs in years 3 to 7.
- 4 The curriculum areas with the highest use of TLF materials are mathematics, English/literacy and science. Studies of Society and the Environment and cross-curricular integrated studies now have higher reported rates of use than those reported in earlier studies.
- 5 Teachers who use TLF materials continue to report very favourably on their value for students' learning and engagement.

- 6 Most school leaders (such as departmental heads) indicate some regular use of TLF materials by teachers in their schools, while principals report relatively high levels of overall use by teachers. Both principals and school leaders see an increasing awareness and use of TLF materials by teachers in their schools.
- 7 Sector personnel estimate that schools have high levels of familiarity and involvement with the goals of TLF and a positive response to the quality of TLF materials, estimates that are higher than those made by the other three groups of respondents.
- 8 With regard to the levels of classroom use of TLF materials, the benefits, and to the factors that encourage its use, the four groups of respondents (teachers, school leaders, principals and sector personnel) report strikingly similar *relative* ratings. Misalignments, summarised 9 to 12 below, tend to reflect the extent of endorsement of particular options.
- 9 The four groups of educators sampled are not well aligned on the estimated frequency of various purposes to which ICT are put in classrooms.
- 10 With respect to the reported benefits of using ICT in mainstream classrooms, particularly the benefits for learning and curriculum access and for communication purposes, there are substantial differences among the four groups, with teachers showing the least enthusiasm and sector personnel the most.
- 11 Regarding the benefits of using ICT in non-mainstream classrooms, again the ratings from teachers are the lowest of the four groups and sector personnel the highest.
- 12 The estimated benefits nominated by the four groups of respondents for mainstream versus non-mainstream classrooms, indicate that the respondents have relatively finely tuned judgements, accurate or otherwise, about the benefits of ICT in classrooms for diverse groups of learners.
- 13 In estimating the importance of a range of factors that enable teachers to adopt new digital/online technologies in their teaching, teachers place less emphasis on those related to ease of use and support in ICT than do school leaders and sector personnel. Teachers also view pressure from outside sources for them to use ICT to be of less importance than do sector personnel. Policies and syllabuses for ICT are seen as a stronger influencing factor by teachers than by principals and sector personnel.

Introduction

Aims of the study

The study has two main aims:

- To continue the survey-based evaluation of online curriculum materials produced by The Le@rning Federation
- To examine the nature and extent of the alignment of the perceptions of four sets of respondents who work in different positions in Australia's educational sectors (government, Catholic, independent) concerning the uses and benefits of information and communication technologies (ICT) in classrooms and the factors that encourage its classroom use.

The report builds on a sequence of earlier studies that have evaluated the perceived and demonstrable efficacy of the online curriculum materials produced by The Le@rning Federation, an initiative instigated by the Australian Government's Ministerial Council on Education, Employment, Training and Youth Affairs. The findings of those earlier reports (see Freebody 2005; Freebody & Muspratt 2007b; Freebody, Muspratt & McRae 2007a, 2007b) were based on data from surveys, site visits, interviews and field experiments. Those findings have informed the content of the survey instruments used in the study reported here.

The earlier studies reported rates of adoption and of use of online curriculum materials in general and of The Le@rning Federation's materials in particular. In continuing the evaluation of The Le@rning Federation's online digital curriculum materials, this study is aimed at exploring the bases for the adoption of information and communication technologies (ICT) in schools, and the views of members of multiple strata within education sectors on the factors involved in such adoption and resistance to adoption. More specifically, the survey was aimed at documenting the views of four groups of educators – teachers, school leaders (such as departmental heads), principals and sector personnel (consultants and policy developers in regional and head offices) – on these main questions:

- To what uses are ICT currently put in classrooms?
- What are the benefits of using ICT, compared to standard classroom approaches for (a) mainstream and (b) non-mainstream students?

- What factors enable or obstruct the adoption of ICT in classrooms?

Informed by a systems view of educational innovation, the participants' responses are analysed and compared, using a framework in which attention is given to a nuanced understanding of the alignment, among the four sets of respondents, of perceptions, values, practices and policies; and to documenting their understandings – implicit and explicit theorisations – of the formation and implementation of ICT-related policy, based on the view that, at different points in the process of adoption and use of ICT in the classroom, alignment of sector policy and classroom practice will vary across a diverse education sector. Points of balance and imbalance in the alignment need to be assessed regularly to regulate the productive tension between creativity and the manageability of practice across highly diverse systems, and to ensure that systems do not become static through over-alignment, or dysfunctionally diverse through under-alignment.

The Le@rning Federation

Purposes

The Le@rning Federation (TLF) was established in 2001 by the Australian Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA). It has been charged with developing:

- a bank of online materials in six priority curriculum areas:
 - Innovation, enterprise and creativity (years 1–10)
 - Languages other than English (specifically Chinese, Japanese and Indonesian across all school year levels)
 - Literacy for students at risk of not achieving national literacy benchmarks (years 5–9)
 - Mathematics and numeracy (years 1–10)
 - Science (years 1–6 and 9–10)
 - Studies of Australia (years 1–10)
- high-quality digital learning items that are online curriculum resources for all Australian and New Zealand schools
- a workable framework, standards and structures for the sharing of online curriculum content among jurisdictions within Australia, New Zealand and other countries

- an interoperability framework to assist sharing and peer-reviewing of teacher-initiated online resources
- productive relationships with ICT-related vendors to support distribution and use of online curriculum content in schools
- support in school sectors for a local education digital content industry.

To support the goals of MCEETYA, during 2006–2008 The Le@rning Federation intends to develop a further 4,000 items of high-quality, globally recognised online content that is related to the Australian Statements of Learning and other MCEETYA priorities, for all Australian and New Zealand schools.

The learning objects component

TLF defines ‘learning objects’ as files or modules of learning material that:

- engage teachers and learners in interactive learning activities;
- may include texts, and/or graphic, audio or animated materials;
- are usable in many different educational settings for multiple purposes;
- are usable in educational settings as elements within larger units of work that may comprise other digital and non-digital materials; and
- are accessible from digital repositories as referenced, located, and accessed by metadata descriptors.

Rather than providing specifications or guidelines for the educational use of its learning objects, TLF’s approach has been based on these principles (Atkins & Jones 2004, pp 2–7):

- The learning object component of the initiative is to have a strong focus on learners, addressing the needs of all students in an inclusive way.
- The content of the learning objects is to have integrity in terms of the particular knowledge domain from which it is drawn, ensuring its accuracy, authenticity and purposefulness.
- The materials are to be readily usable, with accessible interactive design features in meaningful sequences.
- The learning objects are to be accessible to categories of students generally regarded as educationally disadvantaged.

The learning and curriculum framework that has guided the development of TLF's learning objects is based on:

- problem-based learning
- inquiry-based and investigative learning
- authentic, situated contexts for learning
- constructive and tailored feedback.

Elaborations and illustrations of the principles and framework outlined above are provided on TLF's website. At the time of writing (August 2008) TLF had developed 7400 digital learning resources for use in schools. Prior to release, each new learning object has undergone field trials in classrooms and revisions in the light of feedback from teachers and researchers.

Digital resources component

A second component of the TLF initiative is development of a bank of digital resources that is accessible, through searchable repositories, to all schools in Australia and New Zealand. The use of these digital resources within curriculum programs, schemes of work or individual lesson activities is different from the use of learning objects. TLF's digital resources rely on teachers' and/or students' contextualising the material by establishing its purpose and meaning within the conduct of the lesson or unit of work. Compared with the learning object component of the TLF initiative, the digital resources component has received less attention and, in general, less publicity in schools and school systems.

The survey

A survey was designed for each of the four groups of respondents. These are shown in full in Appendix 1. While the core questions remained the same for each group, predictable minor differences reflected each group's location (school, regional office or head office) and functions (teaching, school leadership, curriculum development, professional development or policy formation). Each survey instrument comprised four sections:

- 1 Information about the respondent:

- school or office identification
 - qualifications
 - sense of familiarity with ICT in general, with digital online curriculum, and with learning objects
 - extent of professional development in ICT generally, in use of digital online curriculum, and in use of learning objects
- 2 Information about the school:
- location
 - sector
 - enrolment size
 - grade levels
 - demographics of student body
- 3 Information about the learning objects and digital resources currently in use:
- number
 - names
 - year levels at which they are used
 - curriculum areas in which they are used
 - views on the learning and motivational outcomes for students
- 4 Information about and perception of ICT use in classrooms:
- frequency of use of various forms of ICT
 - benefits of using ICT compared with traditional classroom activities and tools (with reference to both mainstream and non-mainstream educational settings)
 - factors affecting adoption and non-adoption of new digital technologies in classrooms

In sections 3 and 4 spaces were provided for respondents to provide written alternative answers or to expand on their responses.

The respondents

The general features of the respondents are described below, so as to give a sense of the generalisability of the findings. In three of the four groups of respondents, about two-thirds were female, the exception being the school principals group, which had a smaller proportion of women, as shown in Table 1.

Table 1: Gender of members of the four groups of respondents (total n = 1603)

	Group								
	Teachers		School leaders		Principals		Sector personnel		
	Count	%	Count	%	Count	%	Count	%	

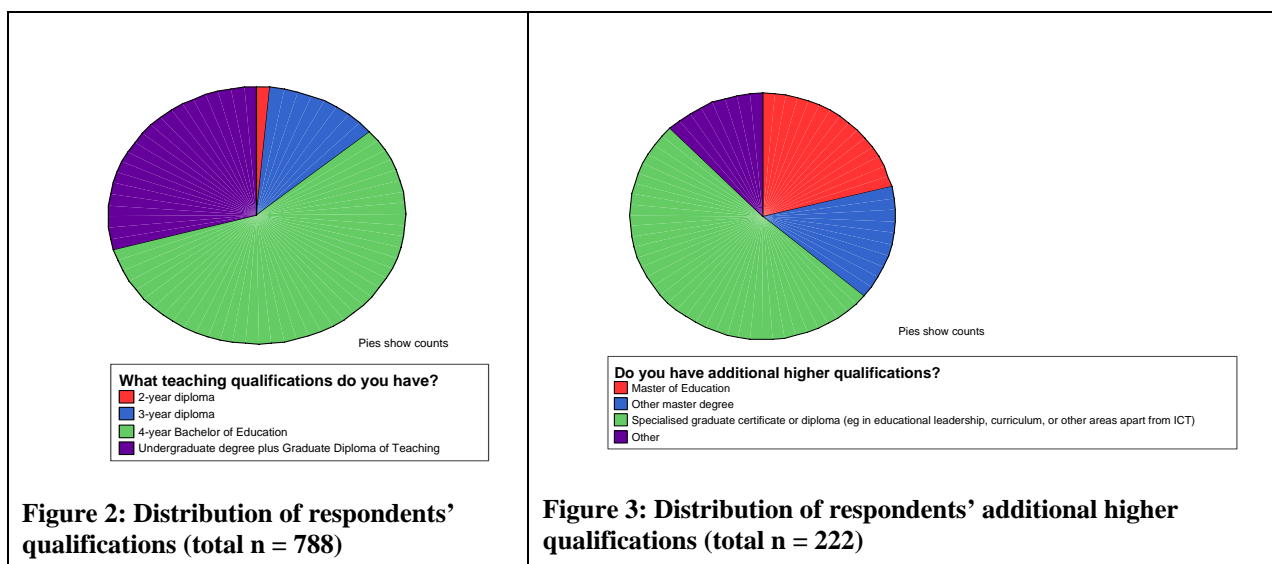
Male	210	26.40	169	37.90	92	54.10	51	26.70
Female	586	73.60	277	62.10	78	45.90	140	73.30
Total	796	100.00	446	100.00	170	100.00	191	100.00

In the teachers group, respondents varied in the number of years they had been in their current positions, while most of those in the other groups had been in their current positions for less than five years, as shown in Table 2.

Table 2: Distribution of respondents' years of experience in current roles (total n = 1595)

	Group							
	Teachers		School leaders		Principals		Sector personnel	
	Count	%	Count	%	Count	%	Count	%
1st year	20	2.5	100	22.4	31	18.3	43	22.4
2–5 years	159	20.2	340	76.1	57	33.7	144	75.0
6 –10 years	124	15.8	7	1.6	35	20.7	5	2.6
11–15 years	94	11.9			19	11.2		
16–20 years	75	9.5			14	8.3		
More than 20 years	315	40.0			13	7.7		
Total	787	100.0	447	100.0	169	100.0	192	100.0

The teachers' professional qualifications were varied, as shown in Figure 2. More than half of them had attained a four-year Bachelor of Education degree (reflecting their position as primary teachers, as shown later). About one teacher in four reported that they had completed higher qualifications, the distribution of which is shown in Figure 3.



Respondents' schools and districts

Respondents were located in a variety of schools across Australia and New Zealand.

Table 3 presents the country, state or territory in which the respondents worked.

Table 3: Distribution of location of the sample of respondents (total n = 1602)

	Group							
	Teachers		School leaders		Principals		Sector personnel	
	Count	%	Count	%	Count	%	Count	%
ACT	33	4.2	11	2.4	1	0.6	10	5.2
NSW	209	26.4	90	20.0	33	19.4	27	14.1
NT	36	4.5	34	7.6	8	4.7	26	13.6
NZ	29	3.7	44	9.8	29	17.1	28	14.7
Qld	66	8.3	42	9.4	20	11.8	22	11.5
SA	15	1.9	20	4.5	3	1.8	12	6.3
Tas	172	21.7	51	11.4	17	10.0	20	10.5
Vic	127	16.0	84	18.7	37	21.8	23	12.0
WA	105	13.3	73	16.3	22	12.9	23	12.0
Total	792	100.0	449	100.0	170	100.0	191	100.0

Broadly, and in rough proportion to the populations and school sizes of these locations, response rates from the ACT, Northern Territory, Tasmania and Western Australia were higher than expected, whereas response rates from New South Wales, New Zealand and Queensland were lower than expected.

Table 4 shows the distribution of respondents according to the educational sector in which they worked.

Table 4: Distribution of the sample of respondents by educational sector (total n = 1599)

	Group							
	Teachers		School leaders		Principals		Sector personnel	
	Count	%	Count	%	Count	%	Count	%
Government	636	80.4	339	75.8	120	71.0	168	87.5
Independent	53	6.7	78	17.4	30	17.8	4	2.1
Catholic	102	12.9	30	6.7	19	11.2	20	10.4
Total	791	100.0	447	100.0	169	100.0	192	100.0

It can be seen that the representation of government schools is somewhat higher than would be expected on the basis of national distribution. The lower representation of sector personnel in the Independent sector is to be expected, given the more devolved nature of that sector.

Table 5 indicates the distribution of respondents according to the level of schooling in which they worked. Note that this question was not put to sector personnel.

Table 5: Distribution of schooling level of the sample of respondents (total n = 1405)

	Group					
	Teachers		School leaders		Principals	
	Count	%	Count	%	Count	%
Primary	414	52.5	196	43.8	103	61.3
Secondary	214	27.1	111	24.8	25	14.9
P-10/12	100	12.7	77	17.2	24	14.3
Other	61	7.7	64	14.3	16	9.5
Total	789	100.0	448	100.0	168	100.0

About half of the respondents worked in primary schools, while significant numbers of school leaders and principals were based in special schools (generally, 'special needs' schools, however variously labelled by their systems).

Respondents were asked to estimate the current total enrolment of the school in which they worked. Responses are summarised in Table 6. Note that this question was not put to sector personnel.

Table 6: Distribution of schools of various sizes among the sample of respondents (total n = 1378)

	Group					
	Teachers		School leaders		Principals	
	Count	%	Count	%	Count	%
26–100	33	4.2	16	3.6	20	12.7
101–200	65	8.3	36	8.2	27	17.1
20 –300	136	17.4	48	10.9	26	16.5
301–400	145	18.6	55	12.5	19	12.0
401–500	50	6.4	31	7.0	17	10.8
501–700	284	36.4	112	25.5	22	13.9
701–1000	67	8.6	70	15.9	16	10.1
More than 1000			72	16.4	11	7.0
Total	780	100.0	440	100.0	158	100.0

The enrolment sizes of schools supervised by the principals in this sample are moderately well distributed from small to very large. For teachers and school leaders, however, note the comparative drop in the proportion of schools with enrolments of 401 to 500.

Table 7 shows the gender composition of the student enrolments. Note that the single-sex schools are almost all independent schools, and that this question was not put to sector personnel.

Table 7: Distribution of coeducational and single-sex schools among the sample of respondents (total n = 1400)

	Group					
	Teachers		School leaders		Principals	
	Count	%	Count	%	Count	%
Coeducational	754	95.6%	414	92.8%	158	95.8%
Single sex – female	20	2.5%	20	4.5%	5	3.0%
Single sex – male	15	1.9%	12	2.7%	2	1.2%
Total	789	100.0%	446	100.0%	165	100.0%

Of considerable interest from previous studies, including some international research studies into these issues, is the lack of any substantial correlation between measures and estimates of adoption and use, and the demographic context of the school setting. In the present study, respondents were asked to estimate the number of students in their schools who fell into the following categories: those whose language background is other than English; Indigenous / Aboriginal Australian / Torres Strait Islanders; those from low socio-economic communities; and those with special

educational needs. The findings for these estimates by the teachers, school leaders and principals are shown in figures 4–7 respectively.

It should be noted that, of the four groups of respondents, more of those in the teachers group will represent the smaller (and, in the Australian setting, thereby more remote) schools than will those in the school leaders group or the principals group. Thus, for purely statistical reasons, we would expect the teachers group to estimate higher proportions of students in these four categories. The differing estimates among the four groups of respondents for each demographic feature do not represent different estimates for the same schools or the same types of schools in comparable locations.

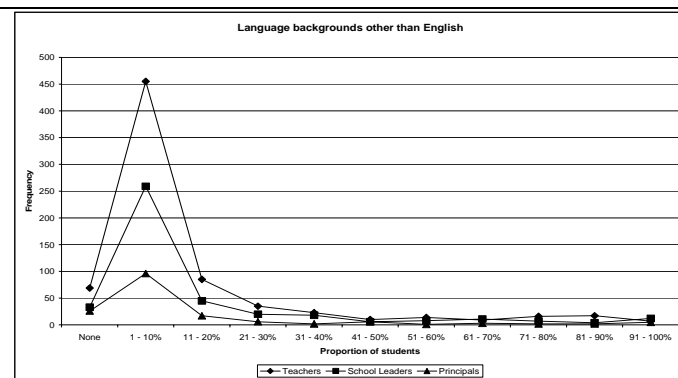


Figure 4: Distribution of respondents' estimates of the number of students in their schools who come from language backgrounds other than English
 (n teachers = 738; n school leaders = 419;
 n principals = 163)

The fact that most respondents indicate between 1 and 10 enrolled students has come from a language background other than English reflects adequately estimates by the Australian Bureau of Statistics (2006 census) that about 20% of Australian residents speak a language other than English at home.

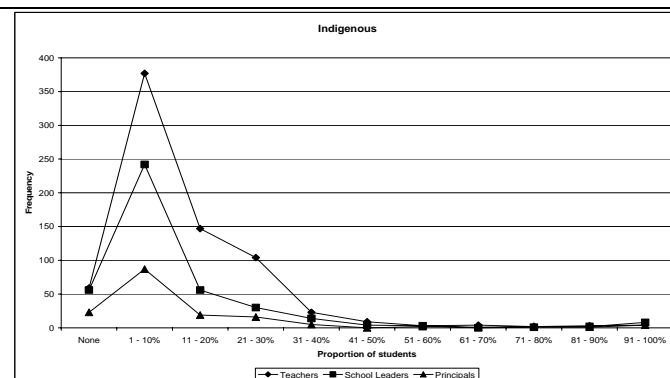


Figure 5: Distribution of respondents' estimates of the number of students in their schools who come from Indigenous backgrounds
 (n teachers = 738; n school leaders = 419;
 n principals = 163)

Australian Bureau of Statistics (2006 census) indicates that about 2.3% of Australian residents self-identify as Aboriginal or Torres Strait Islanders.

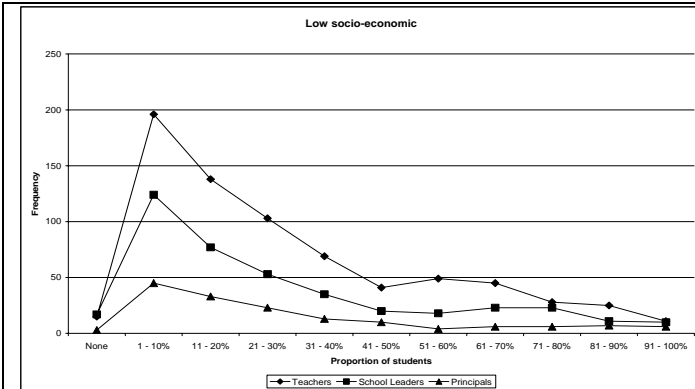


Figure 6: Distribution of respondents' estimates of the number of students in their schools who come from low socio-economic backgrounds

(n teachers = 738; n school leaders = 419; n principals = 163)

These more broadly distributed estimates indicate that many schools have substantially higher levels of low SES enrolment than they have for the other three variables.

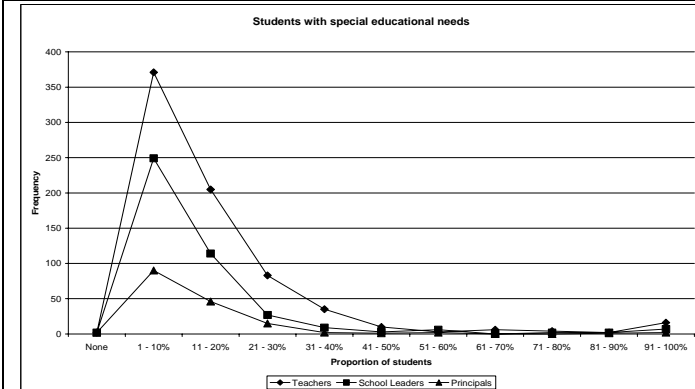


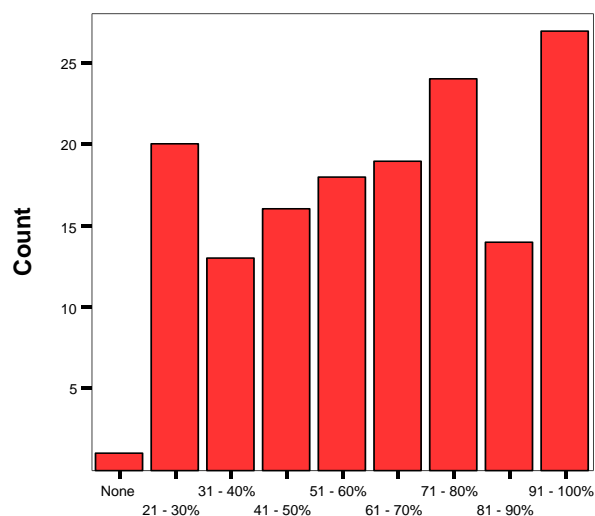
Figure 7: Distribution of respondents' estimates of the number of students in their schools who have special educational needs

(n teachers = 738; n school leaders = 419; n principals = 163)

All schools in this sample reported having some students with special educational needs. Few reported having more than 20% of enrolled students with such special needs.

These demographic estimates indicate that the school settings of the survey sample can be considered broadly representative of Australian and New Zealand schools, even though, as indicated in Table 3, the sample is not a particularly accurate representation of these populations in terms of country, state and territory locations.

For some time there have been calls for schools to produce and implement whole-school ICT plans. Among the 168 principals in this sample who responded to the item, 17% indicated that their school did not have such a plan, and 33% indicated that the jurisdiction in which they worked did not require such a plan. Further, the 152 school sector personnel who responded to the item produced a wide range of estimates of how many schools in their country, state or territory had an operational whole-school ICT plan, as shown in Figure 8.



What would you estimate to be the % of schools who have an ICT plan?

Figure 8: Estimates by 152 sector personnel of the proportion of schools in their jurisdiction that have an operational whole-school ICT policy

It is clear that, sector-wide, there are significant variations in the establishment and use of a whole-school ICT plan. This may not necessarily indicate lower usage rates or any other within-classroom variations, but it does indicate varying approaches to coordination. It also place differing degrees of pressure on systems to provide specific kinds of professional development to teachers and school leaders. The variation would have implications for the ways in which teachers could and did engage in curricular exchange and share more locally with colleagues.

Finally, a series of questions were asked of teachers concerning their familiarity with different aspects of using ICT in their teaching and concerning the extent of professional development (PD) they had engaged in with regard to each of those aspects. Results are summarised in Table 8.

Table 8: How familiar are you, and how much professional development have you had in the following aspects of ICT use (7-point scale)?

Variable	N	Mean	SD
Familiar with standard ICT applications?	796	5.49 (+)	1.44
PD on standard ICT applications?	796	4.55	1.80
Familiar with digital online curriculum?	784	5.04 (+)	1.56
PD on digital online curriculum?	774	4.26	1.81
Familiar with digital learning objects?	785	3.85	1.99
PD on digital learning objects?	789	3.22 (-)	1.90
Familiar with digital resources?	789	3.53	1.87
PD on digital resources?	793	3.08 (-)	1.84

Reported familiarity with, and professional development in, aspects of ICT use was highest for standard ICT applications and then declined progressively for digital online curriculum materials, learning objects and finally digital resources. Reported levels of professional development are lower than reported levels of familiarity, in all cases. Nevertheless, it is notable that teachers report high levels of familiarity with standard ICT applications and digital online curriculum materials.

Respondents' views of TLF materials

Respondents were asked a number of questions specifically about the TLF materials. These concerned their sense of familiarity with the materials, the professional development they had engaged in that was focused on the materials, the curriculum areas and grade levels at which they were used, and estimates of frequency of use. Responses are summarised below. Note that participants' responses to items relating to the value of ICT and the factors that enable ICT adoption are summarised in later sections of this report.

Teachers' uses of TLF materials

A number of questions called for teachers to indicate their familiarity with TLF material and the extent of their use of these materials. These are summarised in figures 9–12 (approximate number over all four questions = 660).

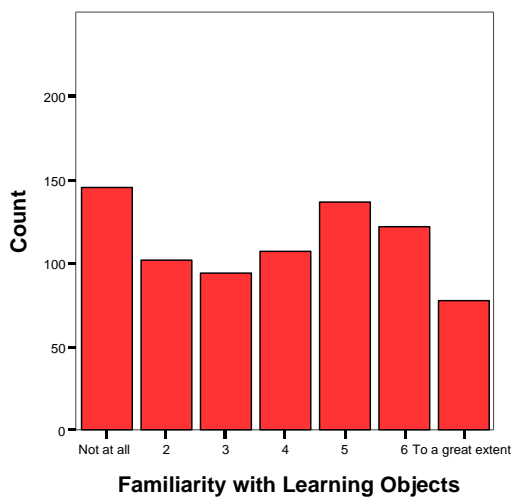


Figure 9: Teachers’ responses to the question: ‘To what extent are you familiar with the use of learning objects, such as those produced by The Le@rning Federation, in the classroom?’

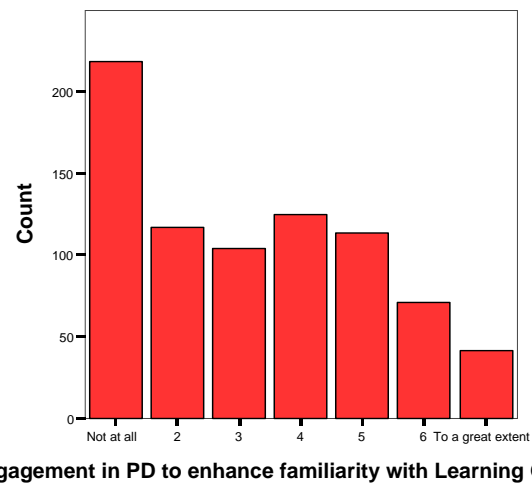


Figure 10: Teachers’ responses to the question: ‘To what extent have you engaged in professional development activities to enhance your familiarity with the use of learning objects in the classroom?’

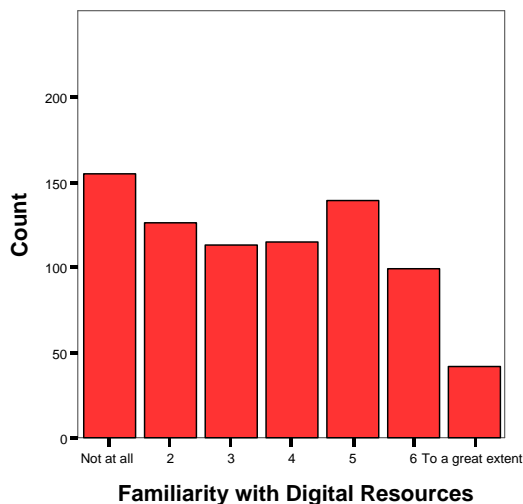


Figure 11: Teachers’ responses to the question: ‘To what extent are you familiar with the use of digital resources, such as those produced by TLF, in the classroom?’

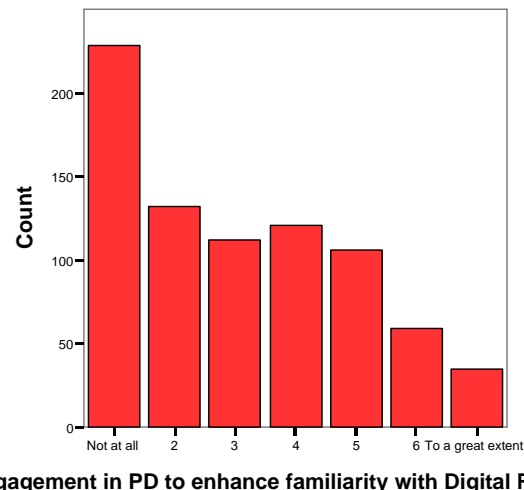


Figure 12: Teachers’ responses to the question: ‘To what extent have you engaged in professional development activities to enhance your familiarity with the use of digital resources in the classroom?’

It is clear that teachers vary considerably in their reported familiarity and professional development experiences with TLF materials; and report lower levels of professional development than of familiarity. About one in four or five report no familiarity and/or no related professional development with regard to TLF materials, and only a small minority report extensive familiarity and professional development. Nonetheless, these rates represent an increase over rates reported in earlier surveys (Freebody 2005; Freebody, Muspratt & McRae 2006).

Specifically on the use of TLF learning objects and digital resources, teachers were asked to offer approximations of the number of items used and the frequency of usage. Results are summarised in figures 13–16 (approximate number across all four questions = 660).

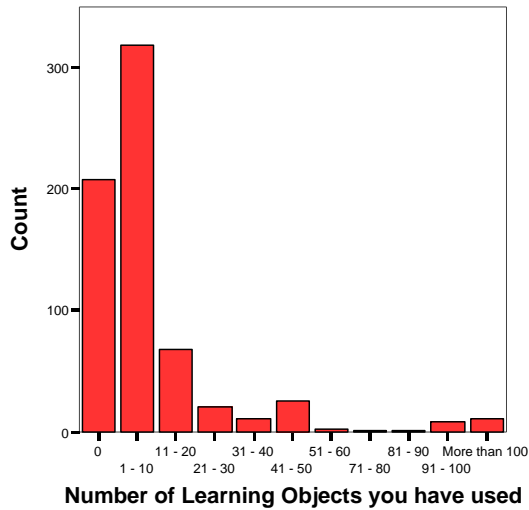


Figure 13: Teachers' responses to the question: 'Roughly how many learning objects have you used in the classroom?'

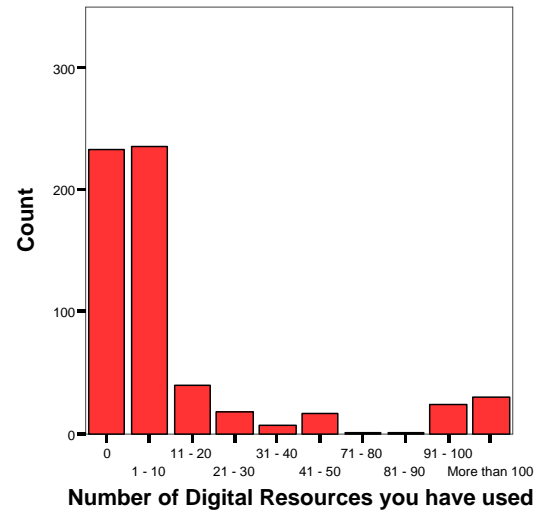


Figure 14: Teachers' responses to the question: 'Roughly how many digital resources have you used in the classroom?'

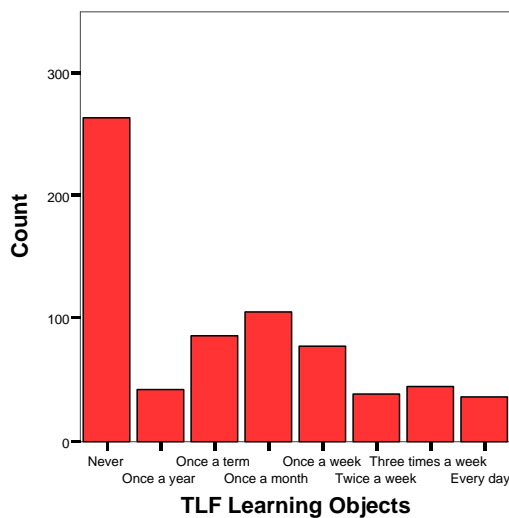


Figure 15: Teachers' responses to the question: 'How often do you use TLF learning objects in the classroom?'

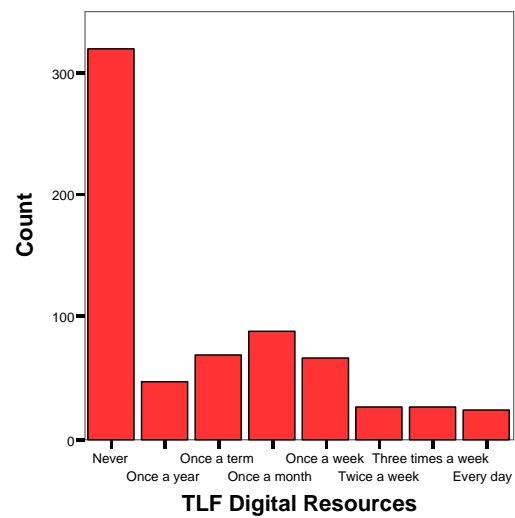


Figure 16: Teachers' responses to the question: 'How often do you use TLF digital resources in the classroom?'

Clearly, a large proportion of teachers in this sample have used a small number of learning objects and used them only infrequently. There is some evidence of a group of teachers (approximate number = 220 to 250) who use the materials between once a

term and once a week. As with the previous cluster of questions, responses represent some advance on use reported in earlier studies of TLF materials, but rates are low nonetheless.

As documented in earlier reports, usage is not equally distributed across year levels or curriculum areas, as Figure 17 and Figure 18 show.

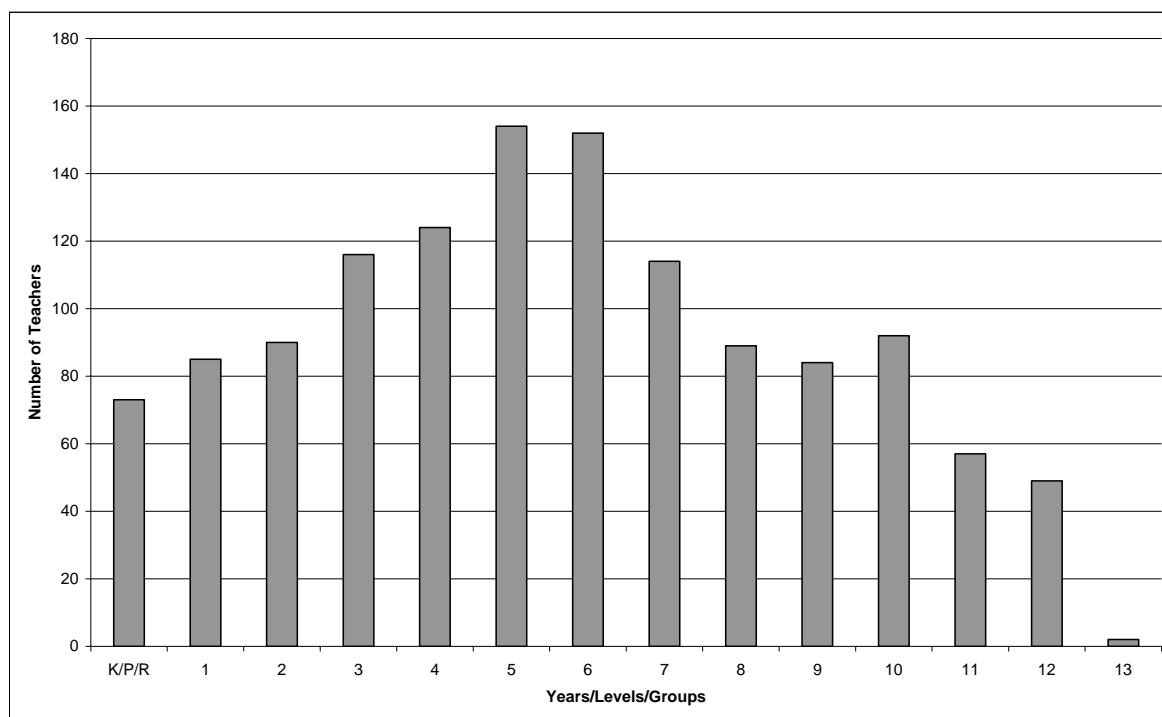


Figure 17: Teachers’ responses to the question: ‘At what years/levels are you currently using TLF content?’

For the most part, TLF materials are produced for use across the school years P to 10. Literacy learning objects, the exception, are specifically designated for years 7 to 9. There are, nonetheless, substantial numbers of teachers of students in years 11 and 12 who have used TLF materials, suggesting wider applicability of the materials, even though TLF has expected that syllabus expectations at years 11 and 12 are specific enough to make the use of general materials such as those produced by TLF less attractive.

Clearly, years 3–7 attract the heaviest use, but these figures need to be read alongside those summarised in figures 8–11 and 12–15, which show that overall rates of use are low.

Consonant with earlier findings, teachers in mathematics, English/literacy and science constitute the heaviest users of TLF materials, while those teaching Studies of Society

and the Environment and cross-curriculum integrated studies are now reporting higher rates than shown in earlier studies. It was shown through multilevel modelling of the teachers' responses concerning the value of the learning objects (in Freebody, Muspratt & McRae 2007) that reliable amounts of variation were associated with the individual learning object level and with the curriculum area. It was also shown that learning objects in some curriculum areas attracted higher ratings by teachers on most of the criteria. Respondents in the current sample also indicate strongly differing usage rates from one curriculum area to another, as shown in Figure 18.

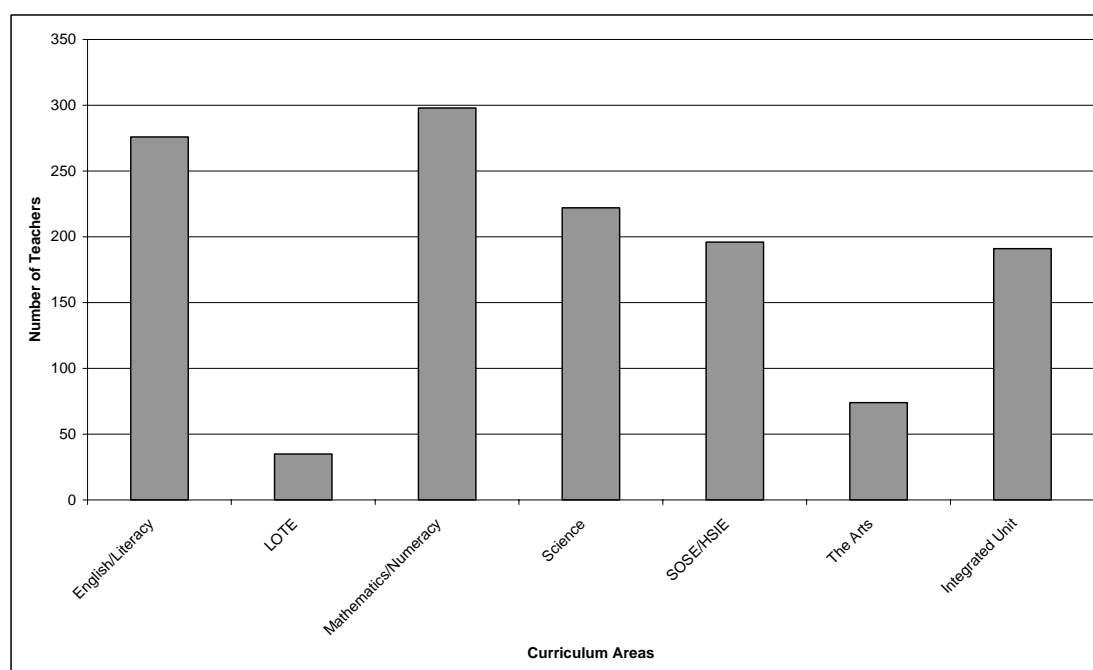


Figure 18: Teachers' responses to the question: 'In what curriculum area(s) are you currently teaching using TLF content?'

Finally we asked teachers currently using TLF materials, whether learning objects or digital resources, to give their views on the aspects of learning they found to be least and most facilitated by these materials. Results are summarised in tables 9 and 10.

The grouping of items under the four subheadings shown in these tables reflects the underlying dimensions established in earlier surveys (as reported in Freebody 2005; and Freebody, Muspratt & McRae 2006, 2007a).

Table 9: Teachers' estimates of aspects of learning for which the learning object in use helped students learn (7-point scale)

Aspect of learning	N responses	Mean	SD
<i>1 Factual/ content learning</i>			
know key factual content	358	5.17	1.46
know about key processes	356	5.19	1.45
label parts	317	4.85	1.71
state and define ideas and processes	341	4.94	1.56
<i>2 Conceptual understanding</i>			
summarise and paraphrase key concepts	330	4.60	1.57
explain connections among key concepts	344	4.89	1.55
compare and contrast key concepts	323	4.66	1.55
evaluate and justify key concepts	324	4.63	1.55
<i>3 Transfer of knowledge</i>			
apply new ideas to new settings	348	4.82	1.51
demonstrate applications to new settings	339	4.76	1.54
design new elements by applying key concepts	316	4.50	1.69
<i>4 Engagement</i>			
Motivation to engage	363	5.77	1.37
task persistence	362	5.54	1.41
task enjoyment	362	5.84	1.40
collaboration with peers	355	5.18	1.55
independence in task management and completion	359	5.21	1.50

Table 10: Teachers' estimates of aspects of learning for which the digital resource in use helped students learn (7-point scale)

Aspect of learning	N responses	Mean	SD
<i>1 Factual/ content learning</i>			
know key factual content	248	5.10	1.70
know about key processes	240	4.86	1.68
label parts	229	4.70	1.84
state and define ideas and processes	237	4.84	1.74
<i>2 Conceptual understanding</i>			
summarise and paraphrase key concepts	236	4.68	1.79
explain connections among key concepts	238	4.85	1.80
Compare and contrast key concepts	235	4.73	1.80
evaluate and justify key concepts	230	4.54	1.84
<i>3 Transfer of knowledge</i>			
apply new ideas to new settings	235	4.70	1.74
demonstrate applications to new settings	235	4.66	1.74
design new elements by applying key concepts	228	4.50	1.82
<i>4 Engagement</i>			
Motivation to engage	260	5.36	1.54
task persistence	259	5.06	1.56
task enjoyment	259	5.37	1.54

collaboration with peers	257	4.94	1.67
independence in task management and completion	258	4.90	1.65

These means reflect ratings consistently above the mid-point and into the high range and, again, are compatible with earlier survey findings. Within this overall pattern, we find some advantage for the items reflecting engagement in learning and motivation to learn, over the others, and some small advantage for the items relating to factual or content learning over conceptual learning and transfer. These, however, while also consistent with earlier findings, are minor variations within the moderately high range. Those teachers who use these materials, in short, continue to report favourably on their value for students’ learning and engagement.

School leaders’ and principals’ responses to TLF materials

Along with questions reported elsewhere in this report, school leaders and principals were asked a particular question about the use of TLF materials. School leaders’ responses are summarised in Figure 19.

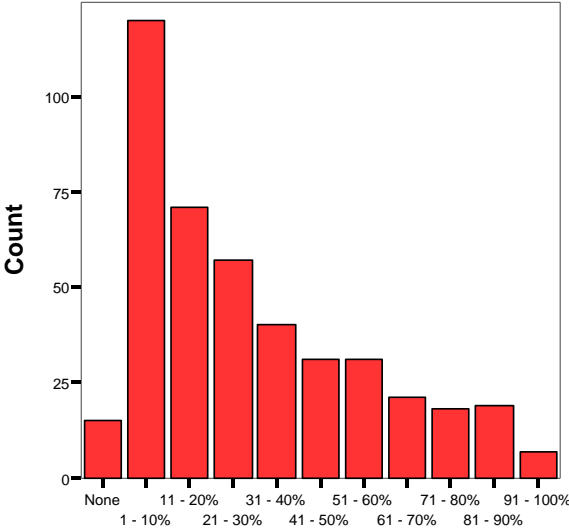


Figure 19: School leaders’ responses to the question: ‘Can you estimate the percentage of teachers in your school who regularly use TLF content in their classrooms?’ (n = 430)

All but a few school leaders in this sample indicated some regular usage of TLF materials (with a mean, in a badly skewed distribution of 3.4 (sd = 2.6) indicating an average estimate of about 20% of teachers). This again suggests an increase in overall observed and reported use of TLF materials by teachers, assuming the consistency of

the sampling and the equivalence of its representativeness with regard to earlier sets of respondents.

Similarly, principals, whose responses are summarised in Figure 20, reported relatively high levels of overall usage of TLF materials.

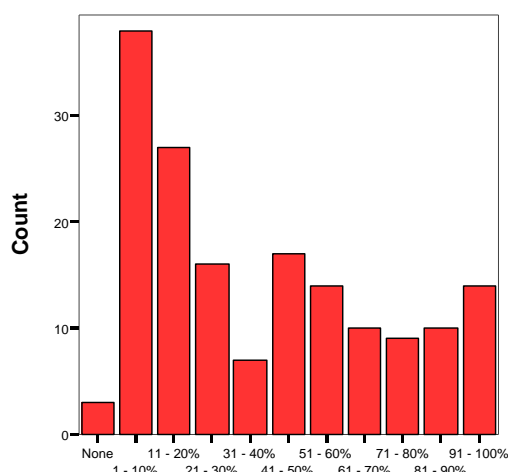


Figure 20: Principals' responses to the question: 'Can you estimate the percentage of teachers in your school who regularly use TLF content in their classrooms?' (n = 165)

This distribution of estimates (with a mean, as above in a badly skewed distribution of 4.3 (sd = 3.1) indicating an average estimate of about 27% of teachers) represents an increase in usage for this sample over those surveyed over the previous three years. In that regard, in response to the question concerning the estimated rates of increase in the use of TLF materials among school teachers, school leaders and principals provided estimates, shown in Table 11, that indicate strongly increasing exposure and usage.

Table 11: School leaders' and principals' responses to the question:

'How would you best describe the increase in adoption of TLF content in classrooms in your schools in the last three years?' (in %)

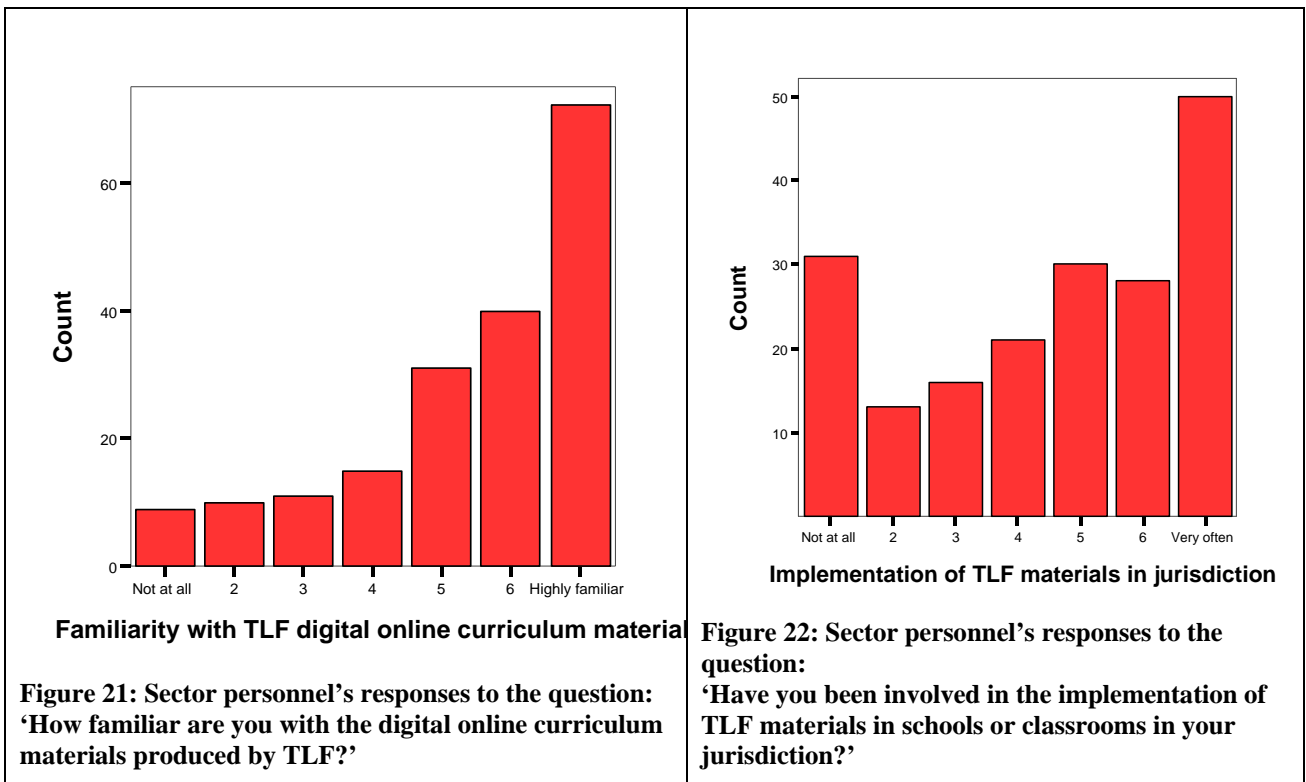
Estimated increase	School leaders (n = 435)	Principals (n = 165)
Minor	39	38
Moderate	39	32
Significant	22	30

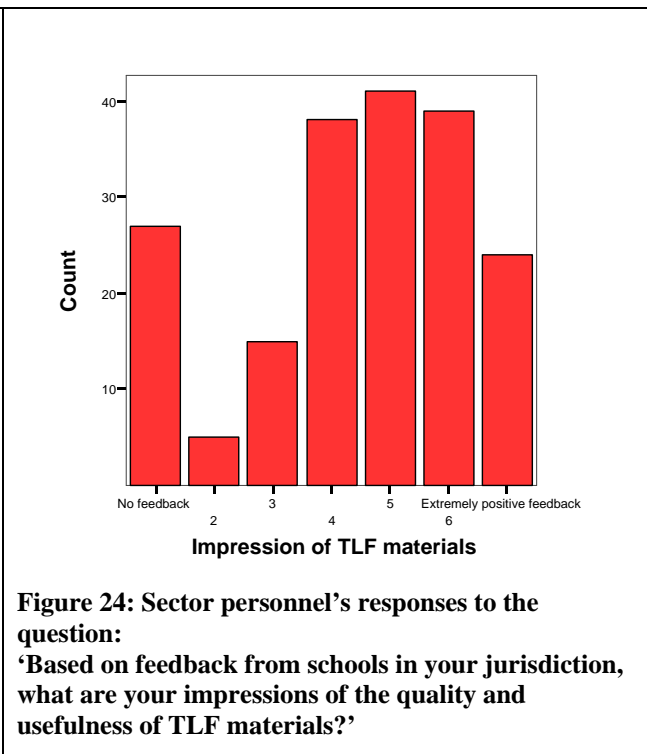
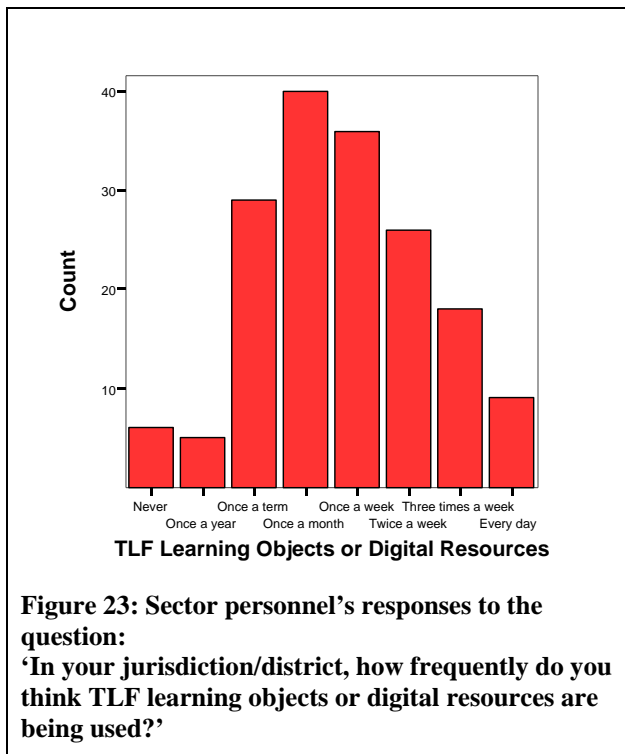
This represents a substantial increase in the use of TLF materials, as perceived by principals and other school leaders. It is clear that, from an extremely small base in 2003–04, TLF materials are at least known by a significant proportion of Australian

and New Zealand educators, and that usage rates seem to be increasing. Again, however, these reports need to be set alongside the low number of learning objects reportedly in use and the low to moderate frequency of their use in classrooms.

Sector personnel’s responses to TLF materials

A number of specific questions concerning TLF materials were asked of the sector personnel. Their responses are summarised in this section. Initial concern was with the overall level of familiarity and engagement with TLF materials among sector personnel, and the kinds of feedback reported to them from schools. Responses to questions related to these issues are summarised in figures 21–24.





Taken together, this sample of sector personnel reports high levels of familiarity and involvement with the goals of TLF, higher rates of school use than do the other three groups of respondents, and a positive view of the quality of TLF materials.

Reported uses of ICT

Below we describe how the four groups of participants responded to survey items that dealt with:

- Frequency of use of various forms of ICT in classrooms
- purposes for using ICT for teaching and learning
- benefits of using ICT in mainstream classroom settings and, separately, non-mainstream classroom settings
- factors that enable and impede the adoption of ICT in schools.

One aim of this comparison is to document empirically the nature and extent of alignments and misalignments of perceived use and benefits of ICT among the four groups.

Frequency of classroom ICT use reported by teachers

Figures 25–30 summarise the responses to this survey item. It can be seen that, apart from the primary school teachers' use of the Internet, usage rates are generally low.

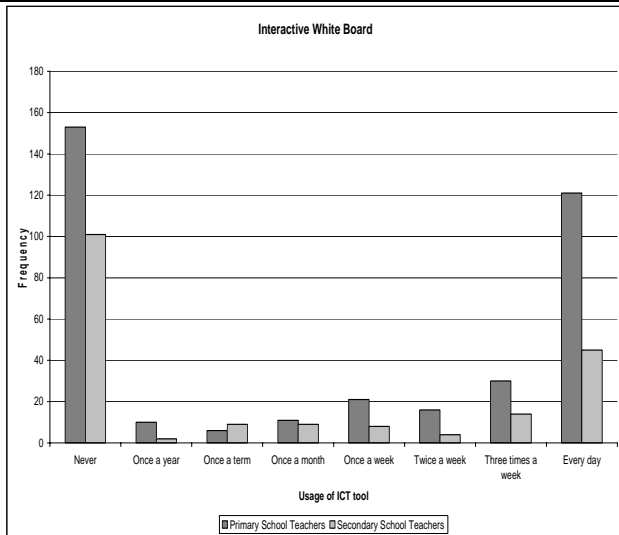


Figure 25: Primary and secondary teachers' reported use of the interactive white board in their classrooms

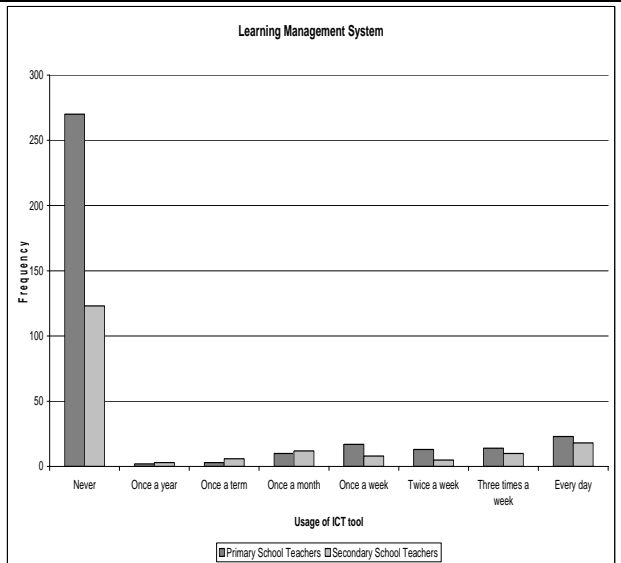


Figure 26: Primary and secondary teachers' reported uses of a learning management system in their classrooms

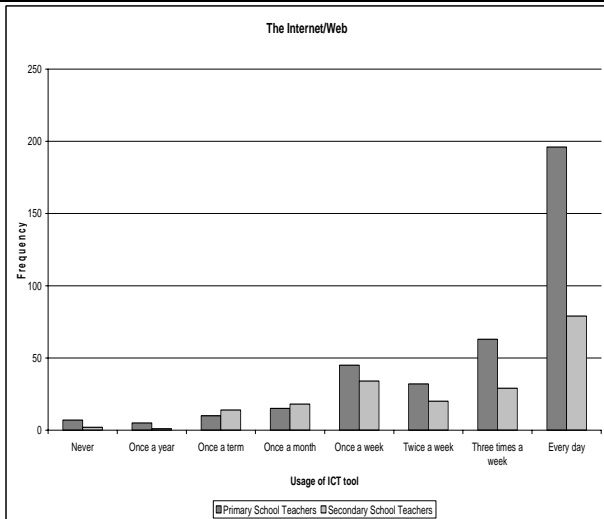


Figure 27: Primary and secondary teachers' reported use of the Internet/web in their classrooms

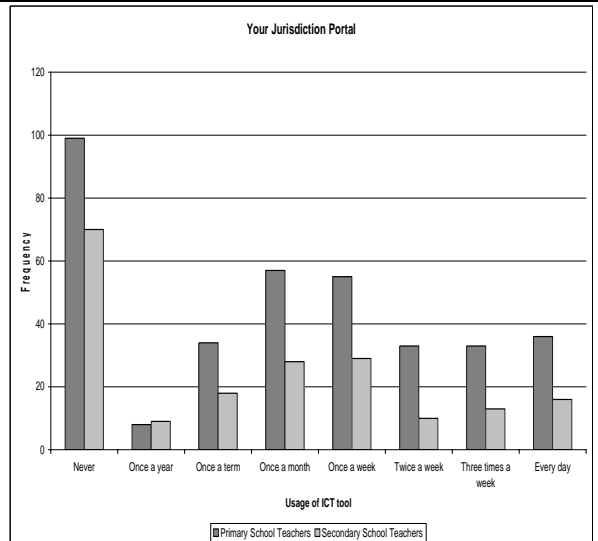


Figure 28: Primary and secondary teachers' reported use of their jurisdiction's portal in their classrooms

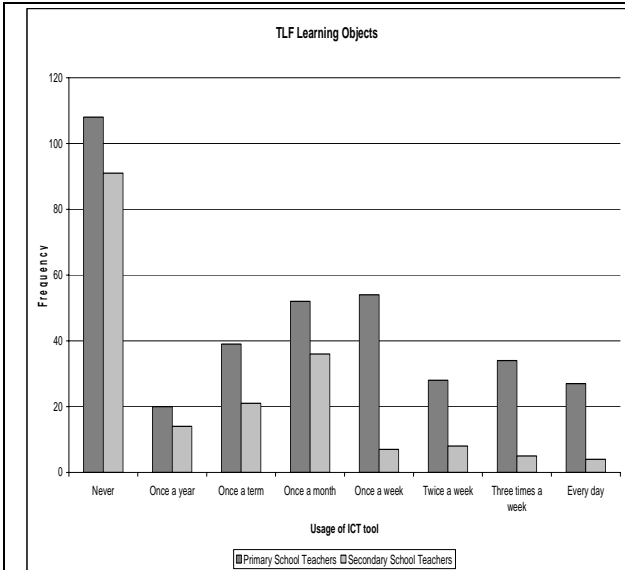


Figure 29: Primary and secondary teachers' reported use of TLF learning objects in their classrooms

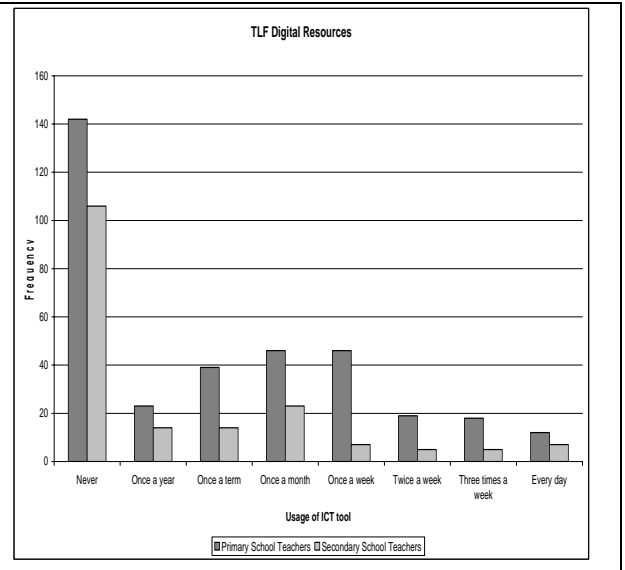


Figure 30: Primary and secondary teachers' reported use of TLF digital resources in their classrooms

Further, over all six variables, there was a highly significant multivariate difference ($F(\text{Wilks}') (6, 481) = 9.87, p < .001, \eta^2 = .11$) between primary and secondary school teachers in their frequency of use. This significant difference applied to all univariate measures (p 's $< .01$) except for the use of jurisdictional portals. Figure 31 shows that the primary school teachers in this sample reported significantly more use of all six types of ICT except for learning management systems, for which the effect was reversed.

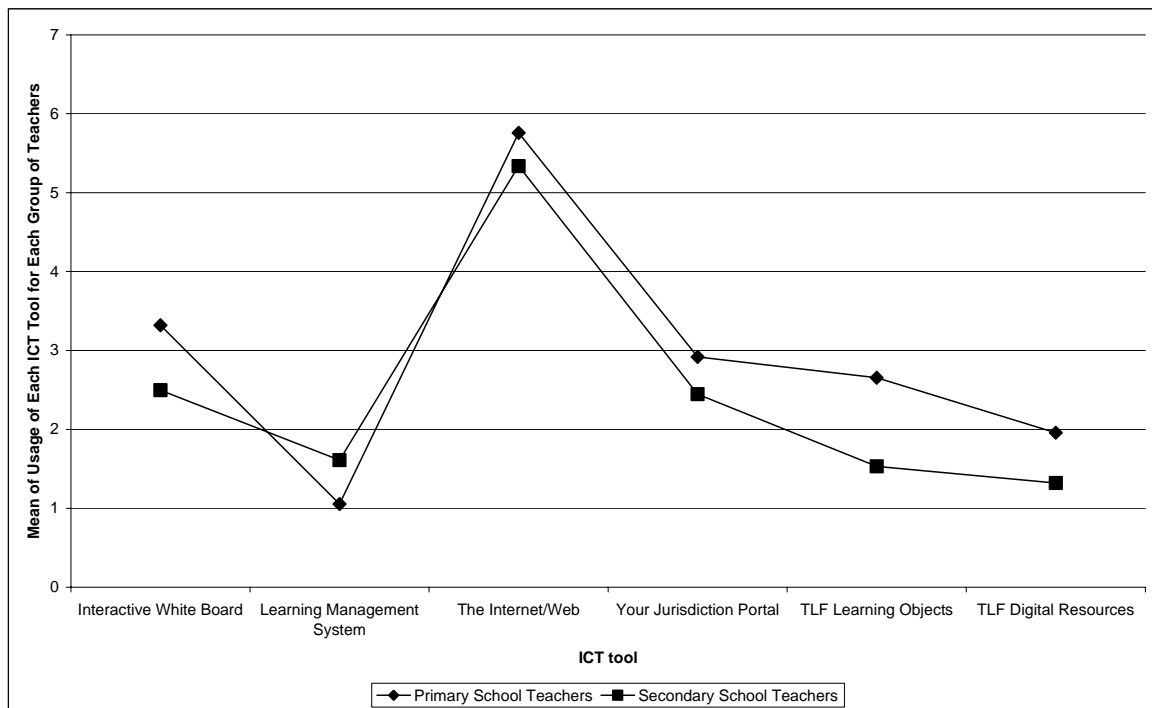


Figure 31: Reported usage rates of six types of ICT in the classrooms of primary and secondary teachers

The difference in favour of primary school teachers was most marked in the case of both forms of TLF materials – learning objects and digital resources.

Estimated frequency of classroom ICT use for particular purposes

All four sets of respondents were asked to rate the frequency of use of ICT in classrooms with respect to eight potential educational uses. These uses arose from the statements of teachers, in earlier administrations of similar surveys over the previous three years, regarding how they used ICT (see Freebody 2005). Figure 32 shows the mean scores for the four groups of respondents as they relate to these eight uses.

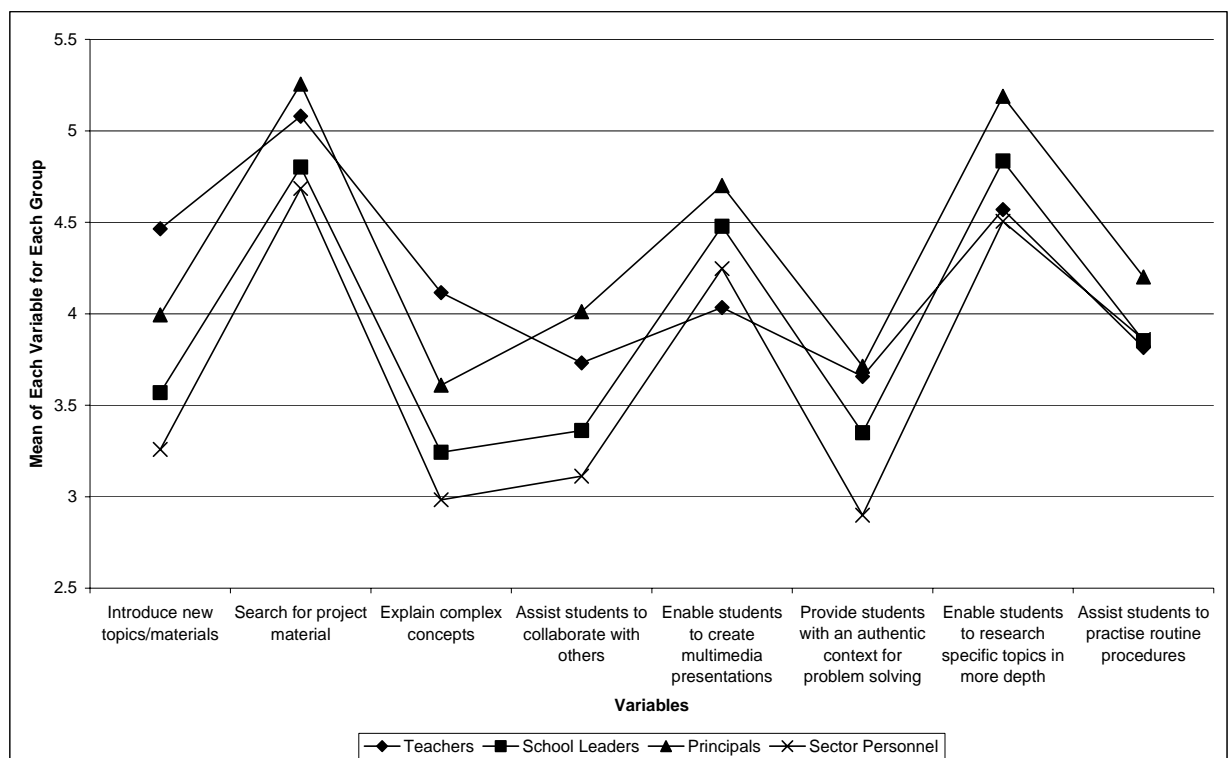


Figure 32: Means of the four groups of educators for their estimates of the frequency of usage of ICT in classrooms for eight separate purposes (7-point scale)

The factor structure (using PCA) underlying these variables was examined as a way of reducing the dimensionality of the group-wise tests for differences. One clear factor (see Figure 33) was found to account for 64% of the total variance (KMO = .89; Cronbach's Alpha = .92; weightings ranging from .62 to .92).

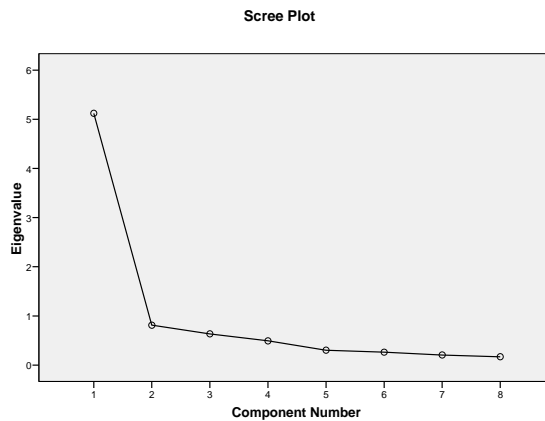


Figure 33: Scree-plot for the factor solution to eight variables indicating rates of usage of ICT for various purposes

Applying ANOVA to the factor scores from this solution revealed significant differences for the four groups of respondents ($F(3, 1432) = 7.90; p < .01$). Mean factor cores for the four groups are shown in Figure 34.

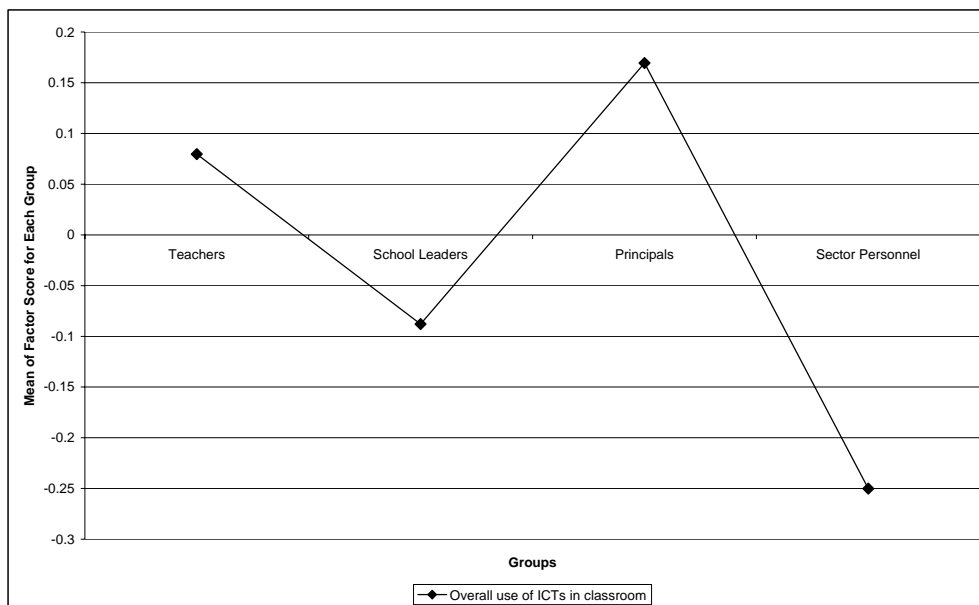


Figure 34: Means of the four groups of educators for their estimates of the frequency of usage of ICT in classrooms (single-factor standard scores)

Using Tukey’s HSD test for post-hoc multiple comparisons, it was found that sector personnel estimated significantly less usage of ICT in classrooms for all purposes than did principals and teachers (all p ’s $< .01$). We can establish, therefore, that in the simply empirical matter of estimated frequency of the various purposes to which various types of ICT are put in classrooms, these groups are not in good alignment.

Perceived benefits of using ICT, compared with traditional classroom activities and tools, in mainstream classrooms

All four groups of respondents were asked to rate the relative benefits of using ICT in classrooms with respect to 13 potential benefits. Note that the emphasis in this item is on mainstream classrooms. As for the previous item, the list of 13 benefits arose from the statements of teachers in earlier administrations of similar surveys over the last three years. Figure 35 shows the mean scores for the four groups of respondents as they relate to these 13 benefits.

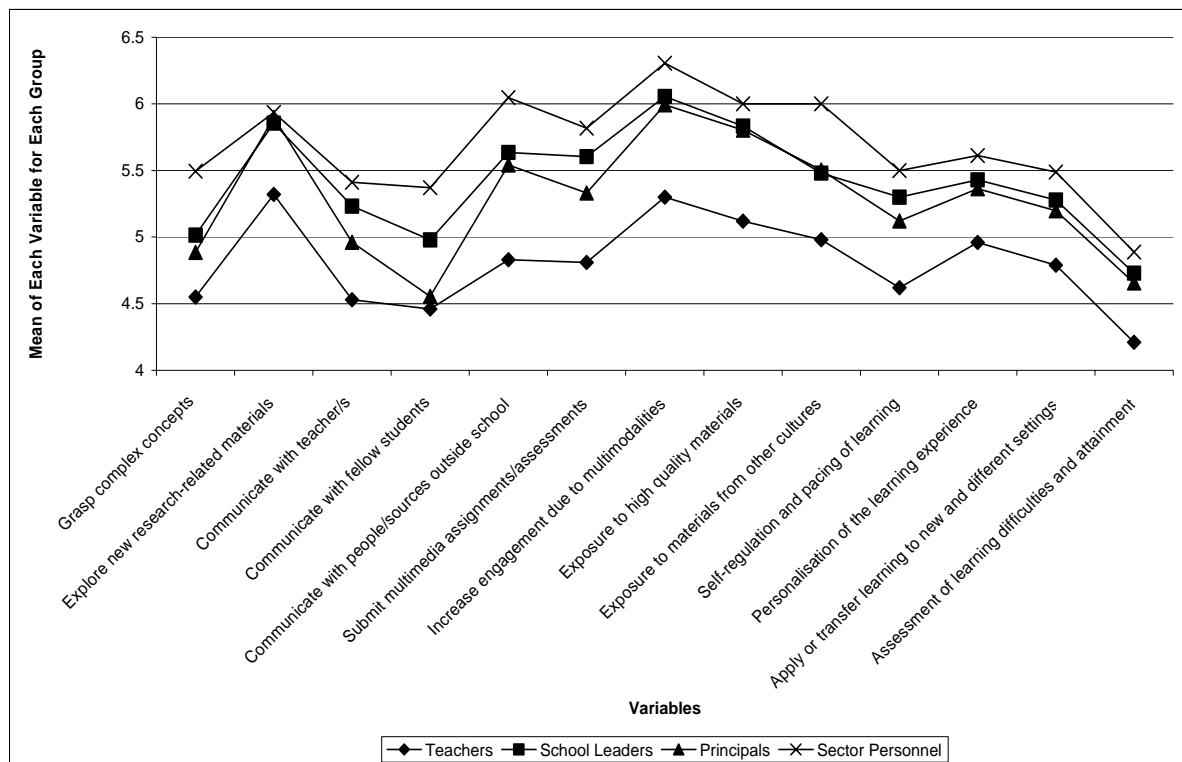


Figure 35: Means of the four groups of educators for their judgements of the benefits of ICT in mainstream classrooms on 13 separate variable criteria (7-point scale)

The factor structure (using PCA) underlying these variables was examined as a way of reducing the dimensionality of the group-wise tests for differences. Two factors showed eigenvalues > 1 (see Figure 36) and they were together found to account for 64.7% of the total variance (KMO = .94; Cronbach's Alphas = .92 and .86). The scree plot is shown in Figure 36 and the simplified factor solution is shown in Table 12.

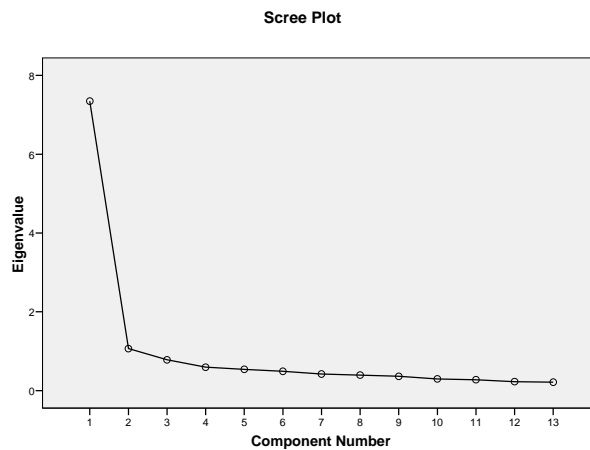


Figure 36: Scree-plot for the factor solution to 13 variables indicating judgements of benefits of ICT for mainstream classrooms

Table 12: Simple factor solution for the 13 variables indicating judgements of benefits of ICT for mainstream classrooms

	Benefits for learning and curriculum	Benefits for communication
Transfer of learning	.91	
Personalisation of learning	.85	
Exposure to quality curriculum	.85	
Self-regulation and pacing	.84	
Assessment of learning difficulties	.74	
Grasping complex concepts	.72	
Materials from other cultures	.71	
Engagement from multimodalities	.60	
Access to new research materials	.51	
Communicating with fellow students		.91
Communicating with teachers		.91
Communicating with outside sources		.77
Submitting multimedia assignments		.60

These variates (Factors 2 and 3 in the original analyses) were termed, respectively: *benefits for learning and curriculum* and *benefits for communication*. Means for the four groups on these two factor scores are shown in Figure 37.

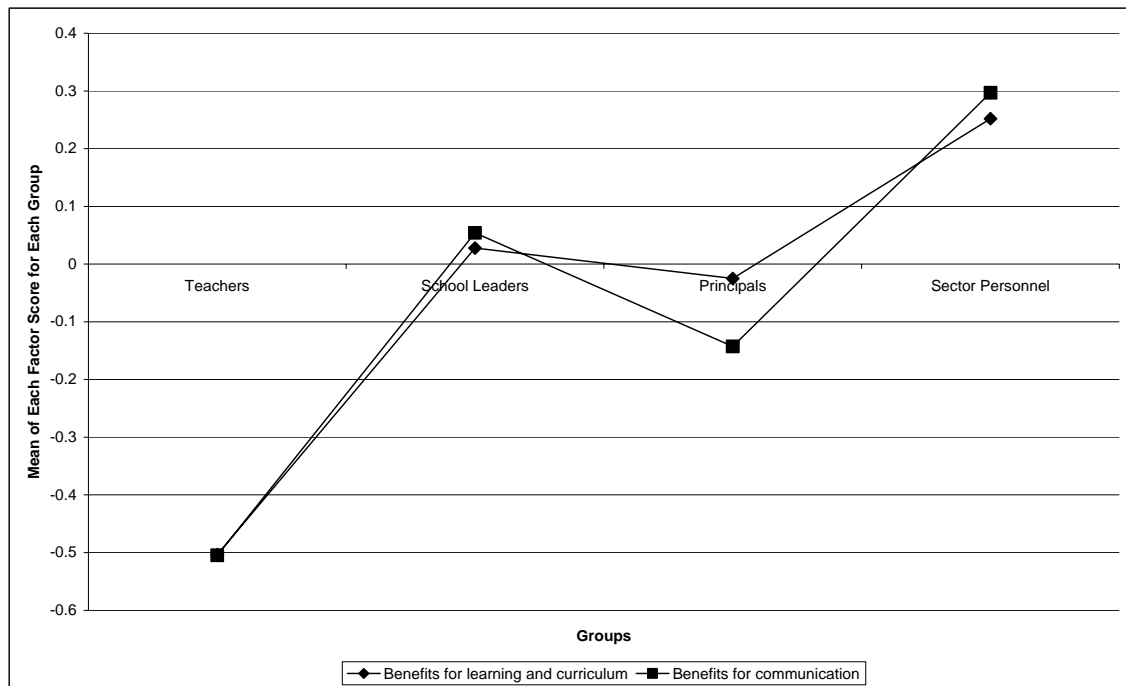


Figure 37: Means of the four groups of educators for their judgements of the benefits of ICT in mainstream classrooms on 13 separate variable criteria (two-factor standard scores)

Differences among the four groups on these two new factor scores were subjected to MANOVA and showed a significant multivariate effect ($F(\text{Wilks}') (6, 1672) = 9.04, p < .001, \eta^2 = .031$). Examination of the univariate effects shows that group differences were significant for both factors (both $ps < .01$).

Using Tukey's HSD test for post-hoc multiple comparisons, it was found (with all $ps < .01$) that:

- teachers estimated significantly lower levels on the factor relating to *benefits for learning and curriculum* than did the other three groups
- teachers estimated significantly lower levels on the factor relating to *benefits for communication* than did either school leaders or sector personnel
- principals estimated significantly lower levels on the factor relating to *benefits for communication* than did sector personnel.

We can establish, therefore, that on the matter of the estimated benefits of using ICT in schools – particularly their benefits for learning and curriculum access, and for communicating with fellow students, teachers and others outside the school – there are substantial and statistically reliable differences among the four groups, with teachers showing comparatively less enthusiasm generally, and sector policy personnel showing stronger enthusiasm.

Benefits of using ICT, compared with traditional classroom activities and tools, in non-mainstream classrooms?

Respondents were asked to repeat the exercise reported above – estimating the benefits of using ICT in classrooms – this time with regard to students in non-mainstream classrooms. Figure 38 shows the mean scores for the four groups of respondents as they relate to these 13 benefits.

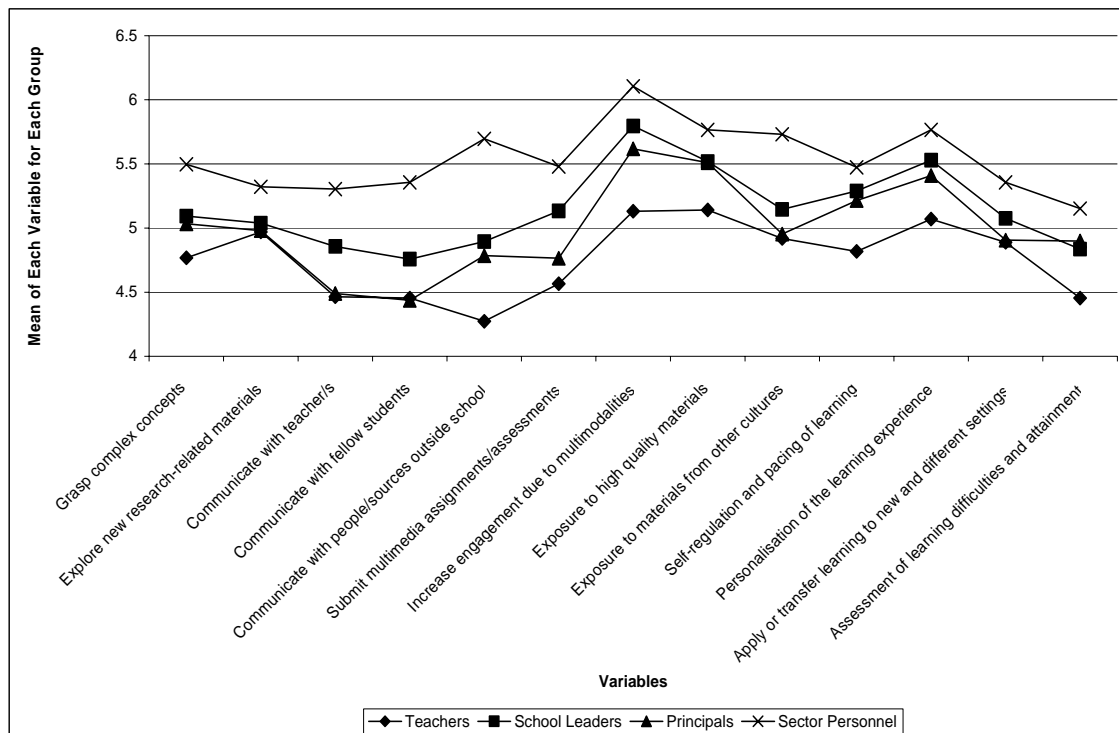


Figure 38: Means of the four groups of educators for their judgements of the benefits of ICT in non-mainstream classrooms on 13 separate variable criteria (7-point scale)

Two factors showed eigenvalues > 1 (see Figure 38) and they were together found to account for 69.8% of the total variance ($KMO = .93$; Cronbach's Alphas = .92 and .91). The scree plot for this two-factor solution is shown in Figure 39 and the simplified factor solution is shown in Table 13.

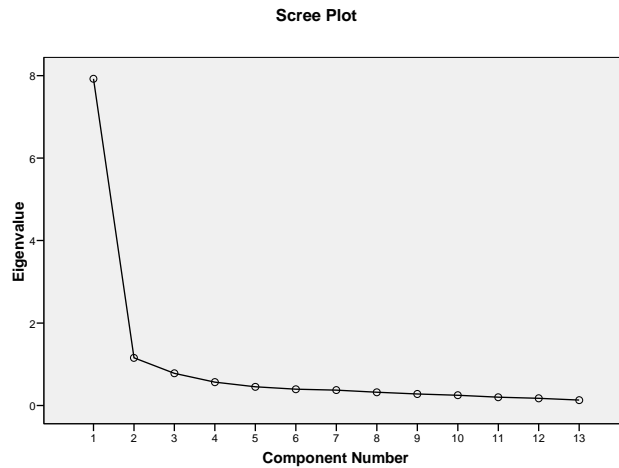


Figure 39: Scree-plot for the factor solution to 13 variables indicating judgements of benefits of ICT for non-mainstream classrooms

Table 13: Simple factor solution for the 13 variables indicating judgements of benefits of ICT for mainstream classrooms

	ICT valuable for learning	ICT valuable for communicating and exploring
Personalisation of learning	.87	
Self-regulation and pacing	.80	
Transfer of learning	.75	
Exposure to quality curriculum	.75	
Assessment of learning difficulties	.69	
Engagement from multimodalities	.67	
Grasping complex concepts	.62	
Communicating with outside sources		.85
Communicating with fellow students		.84
Communicating with teachers		.81
Submitting multimedia assignments		.74
Exploring new materials for research projects		.69
Materials from other cultures		.63

These variates (Factors 4 and 5 in the original analyses) were termed, respectively: *ICT valuable for learning* and *ICT valuable for communicating and exploring*. Means for the four groups on these two factor scores are shown in Figure 40.

Figure 38 shows that ratings are generally well above the mid-point on the scale but there are notably consistent differences among the four groups in their judgements of the level of various benefits of ICT for students with special needs and from non-mainstream backgrounds. Sector personnel register the highest ratings generally and teachers generally the lowest. Teachers gave the highest ratings to the increase in non-

mainstream students’ engagement in learning brought about by multimodalities (visual, animations, graphs, maps, etc), their exposure to high-quality curriculum materials, and the personalisation of the learning; and gave the lowest ratings to assessment/diagnosis.

The differences in estimated benefits nominated by all four groups of respondents for mainstream classrooms, compared with those nominated for non-mainstream classrooms are also worth noting. It is evident that, in considering students in non-mainstream classrooms, respondents reinterpreted two variables – access to materials from other cultures and access to new research materials – in terms of their communication benefit rather than their benefit for learning. It may be that students in non-mainstream settings (defined in the survey item as those with ‘e.g. learning disabilities, non-English speaking background, perceptual or intellectual impairment’) are taken to need more in-school ICT-based stimulus to look for new and cross-cultural materials, or support in doing so; it may also be that respondents considered that, relative to using non-ICT-based strategies to these ends, teachers would have more difficulty especially in the case of non-mainstream students. Accounting validly for this difference is beyond the capacity of the present survey, but the difference does indicate that respondents have relatively finely tuned judgements, accurate or otherwise, about the benefits of ICT in classrooms for diverse groups of students.

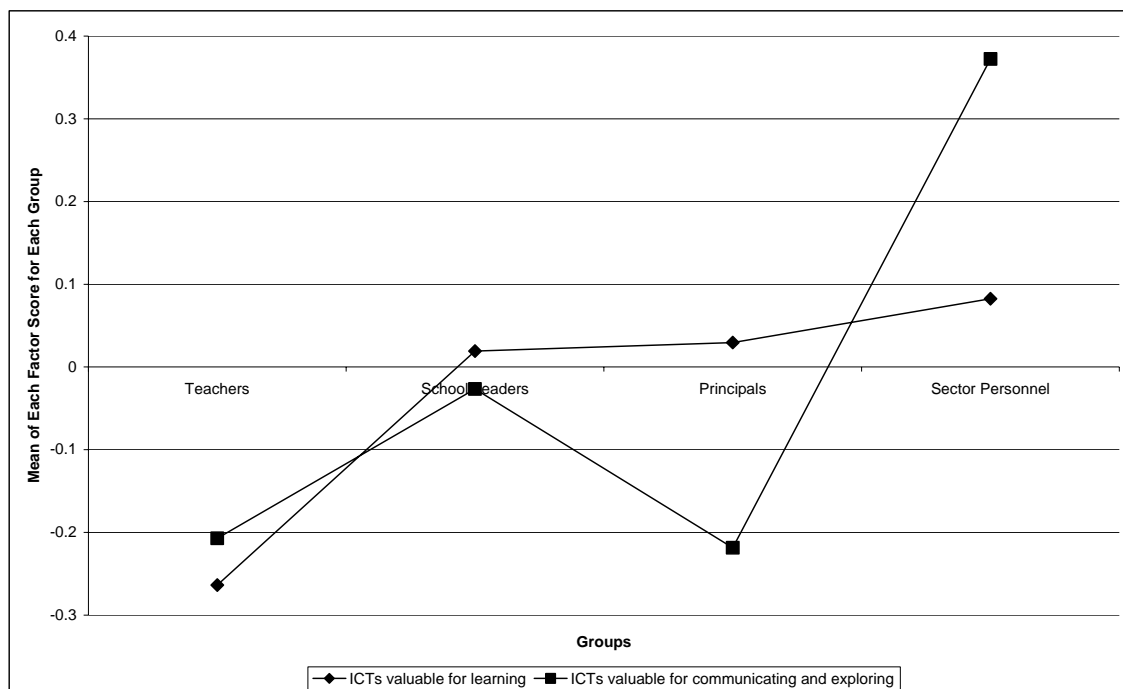


Figure 40: Means of the four groups of educators for their judgements of the benefits of ICT in non-mainstream classrooms on 13 separate variable criteria (two-factor standard scores)

Differences between the four groups on these two new factor scores were subjected to MANOVA and showed a significant multivariate effect ($F(\text{Wilks}') (6, 1622) = 7.51, p < .001, \eta^2 = .03$). Examination of the univariate effects shows that group differences were significant only for the factor pertaining to communication and exploring new materials ($p < .01$).

Using Tukey's HSD test for post-hoc multiple comparisons, it was found that sector personnel reported significantly elevated estimates of benefits accruing from the uses of ICT to do with communication and exploring new materials, compared to the other three groups (all p s $< .001$). As with the previous analysis, teachers registered lower levels of estimated benefits than did the other groups, but the difference attained significance only in the comparison with sector personnel.

Factors enabling teachers' adoption of new digital/online technologies in their teaching

Finally, respondents were asked to give their estimates of the importance of a range of factors arising from the research literature and from the case-study components of earlier evaluations of TLF materials conducted by the first author and various colleagues. Means for the four groups are shown in Figure 41.

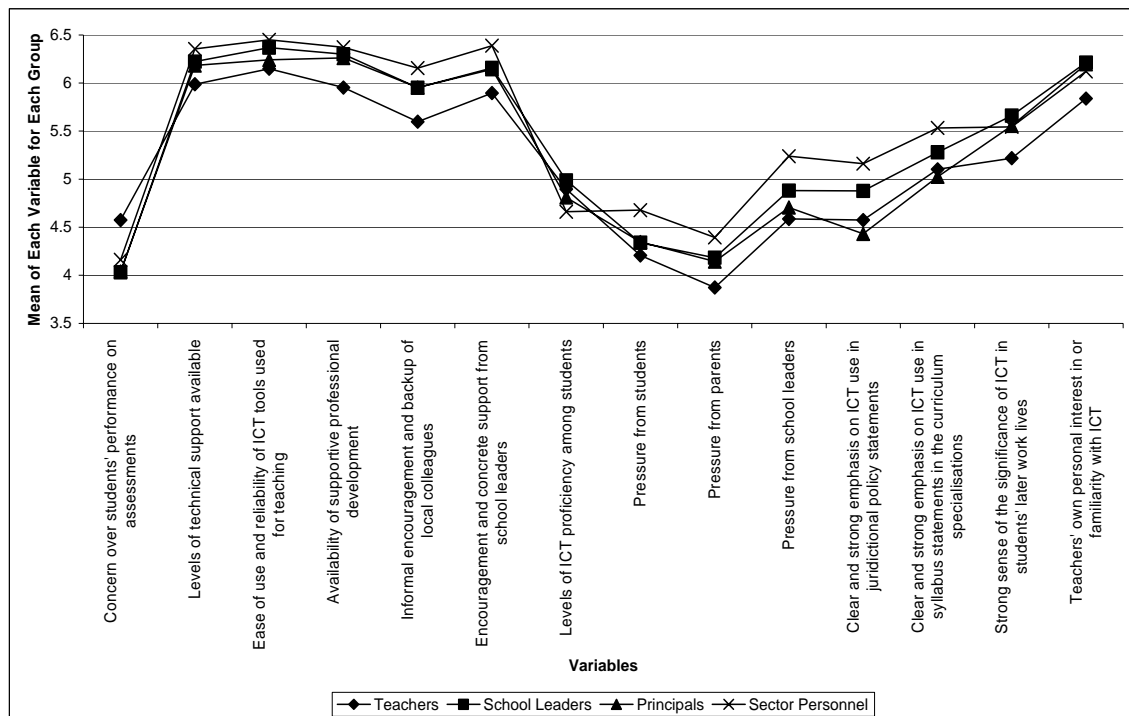


Figure 41: Means of the four groups of educators for their judgements of the factors affecting adoption of ICT in mainstream classrooms on 14 separate variables (7-point scale)

The tight comparability of the levels of emphasis is striking. Three factors¹ showed eigenvalues > 1 (see Figure 42) and they were together found to account for 67.3% of the total variance (KMO = .86; Cronbach's Alphas = .90, .84 and .79). The scree plot for this three-factor solution is shown in Figure 42 and the simplified factor solution is shown in Table 14.

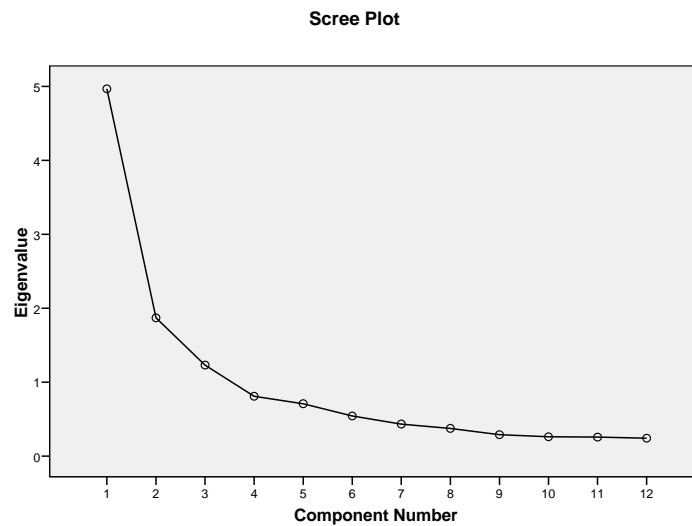


Figure 42: Scree-plot for the factor solution to 14 variables indicating judgements of the factors affecting adoption of ICT in mainstream classrooms

Table 14: Simple factor solution for the 14 variables indicating judgements of the factors affecting adoption of ICT in mainstream classrooms

	Ease of use and support in ICT	Pressure on teachers for ICT usage	Emphasis on policies and syllabuses for ICT
Ease and reliability of ICT use	.86		
Availability of professional development	.85		
Levels of technical support available	.82		
Support from school leaders	.75		
Support from local colleagues	.73		
Teachers' own interest and familiarity	.58		
Pressure from parents		.92	
Pressure from students		.92	
Pressure from school leaders		.74	
Emphasis in syllabuses			.90

¹ Note that two variables – *concern over students' performance on assessments* and *levels of ICT proficiency among students* – were omitted from the full factor solution as they did not locate reliably in the factor structure, as assessed by Cronbach's Alpha.

Emphasis in jurisdictional policies			.84
Significance for students' later lives			.80

These variates (factors 6, 7 and 8 in the original analyses) were termed, respectively: *ease of use and support in ICT*; *pressure on teachers for ICT usage*; and *emphasis on policies and syllabuses for ICT*. Means for the four groups of respondents on these three factor scores are shown in Figure 43.

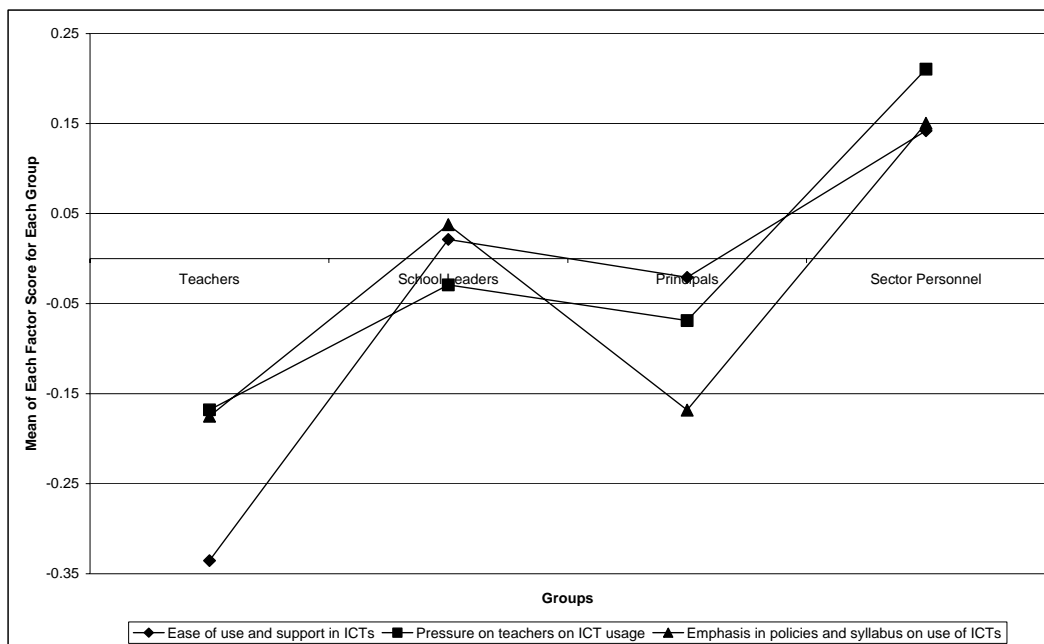


Figure 43: Means of the four groups of educators for their judgements of the factors affecting adoption of ICT in mainstream classrooms on 14 separate variable criteria (three-factor standard scores)

Differences between the four groups on these two new factor scores were subjected to MANOVA and showed a significant multivariate effect ($F(\text{Wilks}') (9, 2001) = 2.98, p < .002, \eta^2 = .011$). Examination of the univariate effects shows that group differences were significant for all variates ($p < .01$). The contrasts attaining statistical reliability were that:





- teachers indicated less support for *ease of use and support in ICT* than did school leaders and sector personnel (both $ps < .01$);
- teachers indicated less support for *pressure on teachers for ICT usage* than did sector personnel ($p = .016$); and
- principals indicated less support for *emphasis on policies and syllabuses for ICT* than did sector personnel ($p = .019$).

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Appendix

The surveys administered to each of the four groups of educators are provided below as separate files in PDF format:

Survey of teachers	 TLF Survey_Teachers.pdf
Survey of school leaders	 TLF Survey_School Leaders.pdf
Survey of principals	 TLF Survey_Principals.pdf
Survey of sector personnel	 TLF Survey_Sector Personnel.pdf