CHAPTER 4

RESULTS, INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction

This chapter presents findings of the incorporation of the Internet in the teaching and learning process in the five teacher training colleges in the Klang Valley. The pertinent data was obtained from the teacher trainers via five separate questionnaires, namely Stages of Concern towards Internet Instrument, SOCI, 1999, (which measures attitudes toward Internet innovation), Gratifications derived from Utilizing the Internet Questionnaire, GUIQ, 1997, (which measures benefits derived from the use of the Internet), Internet Integration Checklist, IIC, 1998, (which measures levels of integration of the Internet in the teacher-training curriculum), Self-Evaluation Internet Competency Checklist, SICC, 1995, (which measures abilities of teacher trainers in Internet use), Internet Use Questionnaire, IUQ, 1998, (which measures the personal, professional and instructional use of the Internet), and Semi-Structured Interview Schedule, SIS, 1998, (which measures the teacher trainers in-depth use of the Internet). The analyses of the data were carried out with the aid of the Statistical Package for Social Science (SPSS) Version 7.5 for Windows.

Two types of statistical techniques were used to analyze data, namely, descriptive and inferential statistics. Descriptive statistics comprising frequency counts and percentages were used to report data in the four quantitative questionnaires (SOCI, IIC, SICC and GUIQ). They were used to analyze data relating to:

a) educational background

b) teaching experience

c) computer experience

d) Internet experience

e) home access to the Internet

f) access to the Internet in the workplace

g) indirect use of the Internet

h) direct use of the Internet

i) stages of concern in adopting Internet innovation

j) self-perceived competency levels in Internet use.

k) personal, professional and instructional gratifications derived from utilizing the Internet

The dependent variable in this study is the integration of the Internet in the instructional process in the teacher-training curricula and the ten independent variables are educational background, teaching experience, computer experience and Internet experience, home access to the Internet, access to the Internet at the workplace stages of concerns, self-perceived competency levels in using the Internet as well as gratifications derived from utilizing the Internet and stages of integration of the Internet in the instructional process

Inferential statistics such as chi-square and t-tests were also used. Chi-square was computed to determine if relationships exist between the variables of educational qualification, teaching experience, computer and Internet experiences as well as home and workplace access to the Internet and the level of Internet integration among the early and late adopters.

Meanwhile, t-tests were carried out to determine if there were differences in the self-perceived competency levels in Internet use, attitudes toward Internet innovation, gratifications derived from utilizing the Internet and stages of integration of the Internet into instruction among the two groups of teacher trainers. The significance level set for all statistical tests was .05.

Qualitative data was also collected via interviews and open-ended questionnaires regarding types and frequency of usage of the Internet applications by the teacher trainers and their students.

Data was also collected pertaining to the ways in which the Internet is being used for lesson preparation, teacher professional communications and teacher-directed student use in instruction and in extra-curricular activities in the teacher-training curriculum.

In addition, evidence of Internet integration into the teacher-training curriculum was also collected. This includes, e-mail exchanges, students' assignments and academic and non-academic portfolios that were integrated with Internet-based activities.

The qualitative data from the open-ended questions and transcribed interviews were analyzed by coding the important themes in terms of frequency of responses for each of the categories outlined in the IUQ. Quick word counts to in-depth line-by-line scrutiny were also carried out by the researcher in the analysis of the interview data as suggested by Ryan and Bernard (1999).

Data from the two inter-case studies were analyzed by a constant comparison method to study the profiles of the early and late adopter in learning how to use the Internet to reach his or her current level of Internet integration in teaching.

In addition, samples of the documents obtained from the researcher's observations were submitted as evidence of Internet integration in the teacher-training curriculum.

4.2 Description of Sample of Teacher Training Colleges

Five teacher-training colleges in the Klang Valley constituted the sample for the study. Two of the teacher training colleges are located in Cheras. They are the Maktab Perguruan Teknik (MPT) and Maktab Perguruan Ilmu Khas (MPIK). One of the

teacher-training colleges, Maktab Perguruan Islam (MPI) is located in Bangi while Institut Perguruan Bahasa Antarabangsa (IPBA) and Institut Bahasa Melayu Malaysia (IBMM) are located in the Lembah Pantai area.

4.3 Description of Sample of Teacher Trainers

Table 4.1 shows that a total of 65 education teacher trainers constituted the sample for the study.

Table 4.1
Number of Education Teacher Trainers

Teacher Training College	Number of Teacher Trainers	Percentage
MPT	16	24.6
MPIK	19	29.2
MPI	15	23.2
IPBA	6	9.2
IBMM	9	13.8
Total	65	100.0

All the 65 education teacher trainers who teach the education syllabus and who were present in the five teacher training colleges took part in the study. The data analyses in Table 4.1 reveal that MPIK has the most number of education teacher trainers (29.2%) and IPBA has the least number of teacher trainers (9.2%).

4.4 Gender and Age of Teacher Trainers

With regards to the gender and age of the respondents in the study, Table 4.2 shows that 55.4% of the teacher trainers are females whilst the remaining (44.6%) are male. This reflects the general notion that females dominate the teaching profession in Malaysia.

Table 4.2
Gender and Age of Teacher Trainers
(N=65)

Characteristics	Frequency	Percentage
Gender of Teacher Trainers		
Male	29	44.6
Female	36	55.4
Age of Teacher Trainers (years)		
30-35	1	1.5
36-40	3	4.6
41-45	22	33.9
46-50	32	49.3
51-55	7	10.7

The majority of the respondents are above forty years of age. About fifty percent of the teacher trainers are in the 46-50 years age group and 33.9% of them are in the 41-45 age group. It can be seen from the data analyses that the education lecturers in the teacher training colleges in the Klang Valley predominantly consist of senior lecturers.

4.5 Internet Use of Teacher Trainers

The teacher trainers in the study responded to their Internet use in the demographic section of the SICC (Johnson, 1995), which is reflected in Table 4.3.

Table 4.3
Internet Use of Teacher Trainers

Internet Use	Frequency	Percentage
Never used	10	15.4
Less than 12 months	17	26.2
12 – 18 months	8	12.3
19 – 24 months	7	10.8
25-30 months	4	6.1
More than 30 months	19	29.2
Total	65	100.0

The data in Table 4.3 show that 15.4% of the education lecturers in the teacher training colleges in the Klang Valley have yet to utilize the Internet. On the other hand, 29.2% of the teacher trainers have already been using the Internet for more than two and a half years. The data analyses also show that more than fifty percent of the lecturers have been using the Internet for a period of one year to two and a half years.

The data analyses in Table 4.3 indicate that 84.6% of the teacher trainers are using the Internet. As a result of this finding, 10 teacher trainers who are not using the Internet were removed from the study.

4.6 Stages of Integration of the Internet into the Teacher-Training Curriculum

In order to answer the first research question: What are the stages of the integration of the Internet into the teacher-training curriculum of selected teacher trainers in the Klang Valley, analyses comprising of frequency counts and percentages were tabulated from the data in the IIC.

The IIC (Norris and Solloway, 1999) was administered to fifty-five teacher trainers identified in the study to ascertain their stages of integration of the Internet in the teacher-training curriculum.

A total of 15 statements listed under the IIC were given to teacher trainers. The respondents had to state whether they "Strongly Agree", "Agree", "Disagree", "Strongly Disagree" or "Undecided" for the fifteen statements in the IIC. From their responses, scores were calculated and, based on the range of the scores, six mean scores were calculated to form the six stages of integration as shown in Table 4.4.

Table 4.4
Stages of Integration of Teacher Trainers in the IIC

Adopter Types	Stages of Integration	Frequency	Percentage	Cumulative Percentage
Late Adopters (n=41)	Awareness	1	1.8	1.8
	Learning the Process	0	0.0	0.0
	Understanding and Application	12	21.8	23.6
	Familiarity and Confidence	28	50.9	74.5
Early Adopters (n=14)	Adaptations to other Contexts Stage	11	20.0	20.0
	Creative Applications to New Contexts Stage	3	5.5	25.5

Table 4.4 shows late adopters who were identified as the teacher trainers who are in the awareness, learning the process, understanding and application as well as familiarity and confidence stages as defined in the IIC. On the other hand, the early adopters were identified from the last two stages as described in the IIC namely, adaptations to other contexts stage and the creative applications to new contexts stage.

The data analyses in Table 4.4 indicate that fourteen (25.5%) of the education lecturers are classified as early adopters: eleven (20.0%) being in the adaptations to

other contexts stage and three (5.5%) being in the creative applications to new contexts stage.

The remaining 41 teacher trainers are classified as late adopters. It can also be seen that 50.9% of them are already in the familiarity and confidence stage of integrating the Internet into the education syllabus in the teacher-training curriculum.

Based on the operational definition of early and late adopters used in the study, the data in Table 4.4 indicate that there are more late adopters (74.5%) as compared to the early adopters (25.5%) among the education teacher trainers in the Klang Valley.

Similarly, McKenzie (1999b) in his study of American school teachers reported that most faculties are made up of a spectrum of teachers ranging from early adopters to late adopters. He too found that early adopters usually make up about twenty-five percent of the total number of a typical staff and are ready and eager to make dramatic use of networked resources. On the other hand, late adopters who often account for forty to sixty percent of the total number of a typical staff are quite skeptical, reluctant and hesitant to make use of similar resources. The remaining fifteen percent of the faculties never make use of networked resources.

4.7 Attributes of Early Adopters and Late Adopters

To answer the second research question: What are the attributes of early adopters and late adopters among the teacher trainers in terms of: a) educational background; b) teaching experience; c) computer experience; d) Internet experience; e) home access to the Internet; f) access to the Internet in the workplace; g) indirect use of the Internet and, h) direct use of the Internet, analyses comprising of frequency counts and percentages were calculated from the demographic data in the SICC.

4.7.1 Educational Background of Early Adopters and Late Adopters

With regards to their educational background, these teacher trainers are mostly graduates. Only 4.8% of them are diploma holders.

The data in Table 4.5 show that 21.4% of the teacher trainers who have a bachelor's degree, qualified for the status of early adopters while 19.5% of teacher trainers with similar qualifications were categorized as late adopters. Table 4.5 also shows that (71.4%) of the early adopters have a Master's degree compared to 68.4 percent of the late adopters.

Table 4.5
Educational Background of Early Adopters and Late Adopters

Educational Background	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Diploma	-	-	2	4.8
Bachelor's Degree	3	21.4	8	19.5
Master's Degree	10	71.4	28	68.4
PhD	1	7.2	3	7.3
Total	14	100.0	41	100.0

The findings of this study also reveal that one teacher-trainer with a PhD, qualified for the status of early adopter while three others with similar qualifications were categorized as late adopters. Thus, this study contradicts Bullard's (1998) study among college professors in University System of Georgia teacher education programs, which found that educators with doctoral qualifications tend to integrate the Internet into their teaching. Similarly, Bullard's (1998) in his study of university educators found that early adopters of Internet innovation had higher levels of education.

The results of the demographic section in the SICC indicate that even though there are about similar numbers of late adopters to early adopters with Master's degrees, they failed to qualify for the status of early adopters. This finding implies that despite having a postgraduate degree, this group of teacher trainers were still not able to integrate the Internet fully into the education syllabus in the teacher-training curriculum.

4.7.2 Teaching Experience of Early Adopters and Late Adopters

With reference to teaching experience, it can be seen from Table 4.6 that half of the early adopters who have 1 - 10 years of teaching experience qualified as early adopters compared to 39.0% of the late adopters. The data analyses also show that 56.1% of the late adopters have teaching experiences ranging from 11 - 20 years compared to 50% of the early adopters.

Table 4.6
Teaching Experience of Early Adopters and Late Adopters

Teaching Experience	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
1-10 years	7	50.0	16	39.0
11-20 years	7	50.0	23	56.1
21-30 years	-	-	2	4.9
Total	14	100.0	41	100.0

The majority of the education teacher trainers with more teaching experiences are late adopters and teacher trainers with less teaching experience are early adopters who show more interest in the instructional use of the Internet.

Thus, this study provides the evidence that despite having shorter teaching experiences, the younger education teacher trainers in the Klang Valley are able to

incorporate the Internet into the instructional process. Similarly, Haris (2000) in his study of computer skills among educators at Carl Schurz High School found that teachers with ten years of teaching experience used computers and the Internet more as opposed to teachers who had thirty-five years of teaching experience.

However, the findings of this study contradict Harris and Grandgenett's (1996) study among account holders of TENET, a statewide K-12 educational telecomputing network in Texas, which showed that early adopters had longer teaching and computing experience.

4.7.3 Computer Experience of Early Adopters and Late Adopters

The data analyses in Table 4.7 reveal that all the early adopters have used the computer for more than two and a half years as compared to only 75.7% of the late adopters.

For the teacher trainers who have less than one year of computer experience, 7.3% are late adopters. Of those who have one to two and a half years of computer experience, 14.6% are late adopters.

The data in Table 4.7 show that the early adopters clearly have more computer experience than the late adopters in the teacher training colleges in the Klang Valley. This fact is also supported in a study by Jacobsen (1998) who found that early adopters among faculty members at two large North American universities rated themselves higher in their self-perceived computer expertise and showed higher rates of adoption of technology for teaching compared to the mainstream faculty.

Table 4.7
Computer Experience of Early Adopters and Late Adopters

Computer Experience	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Never used	-	-	1	2.4
Less than one 1 year	-	-	3	7.3
One year to 2 ½ years	-	-	6	14.6
More than 2 ½ years	14	100.0	31	75.7
Total	14	100.0	41	100.0

On the same note, research generally has indicated that computer experiences correlate with reduced computer anxiety (Ayersman, 1996; Ayersman & Reed, 1996; Busch, 1995; Gardner *et al.*, 1993, Hadfield *et al.*, 1997; Houle, 1996; Maurer, 1994; Overbaugh, 1995; Savenye, *et al.*, 1992; Woodrow, 1991). Morahan-Martin *et al.*, (1992) also found that computer experience not only predicts computer competency but also Internet competency and behavior. Thus, reduced computer anxieties provide the early adopters with more confidence to utilize computer and Internet-related applications.

4.7.4 Internet Experience of Early Adopters and Late Adopters

There are 36.6% of the late adopters amongst teacher trainers who have less than one year of Internet experience as compared to 14.3% of those who had adopted it early. Table 4.8 indicates that there are more late adopters (39.0%) who have one to two and a half years of Internet experience compared to 21.4% of early adopters.

In addition, the data analyses show that more early adopters (64.3%) have more than two and a half years of Internet experience compared to 24.4% of the late

adopters. Thus, the findings of the study reveal that one of the ways in which early adopters differ from the late adopters is that they clearly have more Internet experience.

Table 4.8
Internet Experience of Early Adopters and Late Adopters

Internet Experience	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Less than one 1 year	2	14.3	15	36.6
One to two and a half years	3	21.4	16	39.0
More than 2 ½ years	9	64.3	10	24.4
Total	14	100.0	41	100.0

Hogle's study (1999) among faculty members in colleges of agriculture in the United States and Canada found Internet experience to be an equally important factor as computer experience for the successful adoption of the Internet in the instructional process.

About 75.6% of the late adopters have less than two and a half years of Internet experience compared to 35.7% of the early adopters. As such, late adopters have less Internet experience compared to the early adopters and this may account for the fact that they are in the lower rungs of integration as identified in the IIC. This finding shows that the late adopters still lack the abilities and confidence for instructional integration of the Internet and its applications.

This finding also indicates that in spite of the short span of Internet exposure, some of the early adopters are still able to integrate the Internet into the education syllabus. Similarly, Harris and Grandgenett (1996) found that early adopters of TENET had only two or more years of Internet experience. According to Rogers (1995), this may be attributed to characteristics of early adopters who are risk-takers and attracted

to technology. Lee's (1998) study on early adopters among faculty members at Mississippi State University also indicated that they were very interested in acquiring more computer and Internet training. Likewise, the early adopters identified in this study indicated a strong desire to learn more about the Internet and its applications and their use in the teaching and learning process.

4.7.5 Home Access to the Internet of Early Adopters and Late Adopters

The data in Table 4.9 show that all the early adopters have access to the Internet in their homes as compared to the 65.9 per cent of the late adopters. This implies that early adopters placed great importance of having accessibility to the Internet in the home setting.

Table 4.9
Home Access to the Internet of Early Adopters and Late Adopters

Home Access to the Internet	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Have access	14	100.0	27	65.9
Do not have access	0	0.0	14	34.1
Total	14	100.0	41	100.0

Similarly, Abdulla (2001) in a study on levels of adoption of the Internet among 42 teachers of English as a Second Language (ESL) at Ohio State University found that 78.6% of them have Internet access at home. This caused them to use the Internet for instructional purposes on an occasional to frequent basis.

Thus, the current values and beliefs of early adopters towards the Internet may also be closely linked to their home Internet ownership as 64.3% of them have indicated they are not getting access to the Internet at the workplace.

On the other hand, 34.1% of the late adopters still do not have Internet access at home. This may partly be attributed to the fact that the late adopters had more Internet accessibility in the workplace as compared to the early adopters.

4.7.6 Access to the Internet in the Workplace of Early and Late Adopters

Internet access has been provided by the Teacher Training Division of the Ministry of Education in all the five teacher-training colleges in the Klang Valley. Surprisingly, Table 4.10 shows that 48.8% of the late adopters claimed that they had more Internet access in the college premises compared to only 35.7% of the early adopters.

Table 4.10
Access to the Internet in the Workplace of Early Adopters and Late Adopters

Work Access to the Internet	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Having access	5	35.7	20	48.8
Not having access	9	64.3	21	51.2
Total	14	100.0	41	100.0

Even studies in western settings have proved that educators are not getting Internet access at the workplace. Chiero (1998) found that accessibility to e-mail facilities and the Internet at the workplace among 142 secondary school teachers in America was moderate or high for only 33.8 percent of her sample. Her study showed that the remaining two-thirds of the educators were not getting Internet access at their place of work.

She attributed this to the fact that although it was available in schools, Internet access was centered only in the library or in the computer laboratories, but not in the classrooms where the educators really needed it.

On the other hand, Abdulla (2001) found that although 98% of the ESL teachers at Ohio State University had Internet access at work, lack of access to this innovation in the classrooms seriously limited its instructional use.

This supports what Davis and Shade (1999) reported about Internet access found in computer laboratories and libraries. They opine that it is not effective in promoting Internet integration in the process of teaching and learning. Their opinion is also confirmed in the findings of this study, as the teacher trainers who claimed to have less access to the Internet at the workplace are in the higher rungs of integration of the Internet into the teacher-training curriculum.

It is also interesting to note that despite claiming to have less access to the Internet at the workplace, early adopters are still able to integrate the Internet and its applications into the instructional process. This finding also implies that early adopters may actually be finding innovative ways of integrating the Internet into the teacher-training curriculum. According to Edwards (1998), as early adopters among teacher-trainers placed high value on an innovation, they will plan, manage, create and sacrifice their resources to ensure that all their students benefited from the innovation.

4.7.7 Indirect Use of the Internet of Early Adopters and Late Adopters

The use of the Internet in the teacher training colleges in the Klang Valley was also investigated.

Table 4.11
Indirect Use of the Internet of Early Adopters and Late Adopters

Use of the Internet	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Indirectly	14	100.0	30	73.2
Not indirectly	-	-	11	26.8
Total	14	100.0	41	100.0

The data in Table 4.11 show that all the early adopters are integrating the Internet indirectly into the teaching and learning process. On the other hand, 26.8% of the late adopters are not directing their students to use the Internet indirectly in instruction as they are utilizing it more for personal use.

However, it is encouraging to note that 73.2% of the late adopters are directing their students to use the Internet indirectly in the teaching of the education syllabus. An earlier study by Becker and Anderson (1998) conducted in 898 public and private American schools supports this finding. They observed that the most popular Internet-integrated activity among teachers in their study was an indirect one where teachers were directing their students to do research and information-gathering activities.

Brown (1999) also reported that many teacher educators in Arkansas still perceived the Internet as a separate entity from the teaching of the education syllabus. Grove (1998) also found that that many teachers used computers and the Internet as "outside of instruction engagement" rather than an instructional tool that is involved in every aspect of classroom instruction. In view of these developments, Kwek (1999) in his study on perceptions of grade 4 to grade 8 Internet-using teachers advocated that systematic training is vital in showing teachers how to integrate all the components of the Internet directly into their teaching.

4.7.8 Direct Use of the Internet of Early Adopters and Late Adopters

The data in Table 4.12 show that three of the early adopters (21.4%) are integrating the Internet directly into the teacher-training curriculum. On the other hand, none of the late adopters are integrating the Internet directly into the teacher-training curriculum in the five teacher-training colleges in the Klang Valley.

Table 4.12
Direct Use of the Internet of Early Adopters and Late Adopters

Use of the Internet	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Directly	3	21.4	0	0.0
Not directly	11	78.5	41	100.0
Total	14	100.0	41	100.0

An implication of this finding is that a majority of the subjects in this study are not able to incorporate the Internet directly into the teaching and learning process. This may be due to the fact that there is no direct Internet access in the classrooms and lecture halls in the teacher training colleges where they teach. This similar situation is also found in American schools. Becker and Anderson (1998) reported that teachers are not using the Internet directly in classroom situations due to the lack of Internet access in classrooms.

Thus, the current mode of using the Internet by the education lecturers remains a teacher-directed one where they direct their students to use the Internet and its applications in the teaching and learning process. According to Drnek (1998), the current mode of teacher-directed student use of the Internet in American schools is very important because studies have shown that the more teachers make use of the Internet and its applications, the more their students will do likewise. The study also revealed that in response to their teachers' directions, students were e-mailing their teachers, conducting research for written assignments and exchanging e-mail with other students.

4.8. Attitudes toward Internet Innovation, Self-Perceived Competencies in Internet Use and Gratifications derived from Use of the Internet

In order to answer the third research question: How can early and late adopters among the teacher trainers be characterized with respect to: a) attitudes towards the adoption of Internet innovation b) self-perceived competencies in Internet use, c) personal, professional and instructional gratifications derived from use of the Internet, frequency counts and percentages were tabulated from the data obtained via the SICC, GUIQ and SOCI and the results are reported as follows:

4.8.1 Attitudes of Early and Late Adopters towards Internet Innovation

The attitudes of the teacher trainers have a great impact on the success of any innovation initiative. With regard to attitudes towards Internet innovation, the SOCI by Anderson and Wells (1997) identified the concerns of educators in the adoption of a new innovation (Clark, 1999). The attitudes of early and late adopters towards the Internet are reflected via their internal and external concerns.

4.8.1.1 Internal Concerns of Early Adopters and Late Adopters

A total of 35 statements listed under the SOCI were given to the teacher trainers (Appendix C). The respondents had to state whether they "Strongly Agree", "Agree", "Disagree", "Strongly Disagree" or "Undecided", with the statements. From their responses, the scores were calculated, and, based on the range of the scores, seven mean scores were calculated to form the seven levels of concern as shown in Table 4.13 below. The range of scores was also divided into low, medium and high scores for comparison purposes.

The personal stage is characterized by how the knowledge of an innovation personally affects an individual. With regard to personal concerns, slightly more of the early adopters (35.7%) have high concerns compared to 29.3% of the late adopters.

According to Rogers (1995), although early adopters are already utilizing the Internet, they could still be unsure about certain demands that the innovation requires of them due to infrastructure or personal reasons. It can be seen that more of the late adopters had medium personal concerns (58.5%) compared to the early adopters (50.0%). This indicated that the late adopters also have some measure of concern in their ability to meet the demands of this innovation. This could also be linked to their lack of confidence in their abilities to utilize Internet innovation.

Table 4.13
Internal Concerns of Early Adopters and Late Adopters

Sub-domains of Internal Concerns	Level of Internet Integration	Levels of Concerns						
		Low	%	Medium	%	High	%	Total
Awareness	EA	11	78.6	3	21.4	0	0.0	14
	LA	25	60.9	16	39.1	0	0.0	41
Informational	EA	-		9	64.3	5	35.7	14
	LA	4	9.76	22	53.7	15	36.5	41
Personal	EA	2	14.3	7	50.0	5	35.7	14
	LA	5	12.2	24	58.5	12	29.3	41
Management	EA	6	42.9	7	50.0	1	7.1	14
	LA	10	24.4	25	61.0	6	14.6	41
Internal Concerns	EA	2	14.2	11	78.7	1	7.1	14
	LA	6	14.6	33	80.6	2	4.8	41

EA= Early Adopters, LA= Late Adopters

In terms of management, the individual's concern is related to the amount of time required to use the innovation effectively and efficiently. A big difference is seen in management concerns of early and late adopters. The results of data analyses in Table 4.13 reveal that more of the late adopters (14.6%) have high management

concerns compared to 7.1% of the early adopters. Moreover, more of the late adopters (61.0%) have medium management concerns compared to the early adopters (50.0%). The implication of these findings is that more late adopters are concerned about managing Internet innovation efficiently especially in relation to time management concerns.

The characteristic of the informational stage is the desire to learn more about the innovation with little concern for its impact on the individual. Table 4.13 shows that more of the late adopters (36.5%) have high informational concerns compared to the early adopters (35.7%). This finding implies that late adopters are interested to find out more about this innovation and its uses in the instructional process. On the contrary, more of the early adopters (64.3%) have medium informational concerns compared to the late adopters (53.7%).

The awareness stage is indicative of knowledge of the innovation with little or no involvement with the innovation. The medium awareness category in Table 4.13 indicates that more of the late adopters (39.1%) have medium awareness concerns compared to the early adopters (21.4%). This suggests that, of the two groups, late adopters are more concerned about their existing knowledge of Internet innovation. On the other hand, the findings of this study reveal that neither group have high awareness concerns.

Thus, the data reveal that the awareness concern is not a priority for both parties as both groups of teacher trainers have already been exposed to Internet innovation. This is also reflected in a high number of early adopters (78.6%) and late adopters (60.9%) who have low awareness concerns.

With regards to internal concerns, more late adopters (80.6%) have medium internal concerns as compared to 78.7% of the early ones. According to Anderson and Wells (1997), late adopters of an innovation will have more internal concerns in the initial part of the adoption of an innovation.

4.8.1.2 External Concerns of Early Adopters and Late Adopters

Table 4.14 shows the components of external concerns, which are consequence, collaboration and refocusing concerns.

The consequence stage involves focusing attention on the impact of the educational innovation on one's students. The data in Table 4.14 indicate that there are more early adopters (35.8%) who have high consequence concerns than the late adopters (9.8%). This creates a big difference between early and late adopters in their consequence concerns.

This finding implies that early adopters are more concerned about the impact of adopting the innovation on their students and how it can enhance their academic performance.

However, there are more late adopters (78.1%) who have medium consequence concerns as compared to the early adopters (50.0%). This finding implies that although the late adopters are starting to have concerns about the effects of Internet integration on their students, they are still not too worried about these issues.

The collaboration concern sees the individual focusing his efforts on using the innovation in coordination and cooperation with others. The data in Table 4.14 indicate that there are more early adopters (71.4%) who have high collaboration concerns compared to 34.1 per cent of the late adopters. Thus, the findings of the study reveal that there is a big difference between the early and late adopters in their collaborative concerns.

Table 4.14
External Concerns of Early Adopters and Late Adopters

Sub-domains of External Concerns	Level of Internet Integration	Levels of Concerns						
		Low	%	Med	%	High	%	Total
Consequence	EA	2	14.2	7	50.0	5	35.8	14
	LA	5	12.2	32	78.1	4	9.8	41
Collaboration	EA	2	14.3	2	14.3	10	71.4	14
	LA	4	9.8	23	56.1	14	34.1	41
Refocusing	EA	-	-	5	35.7	9	64.3	14
	LA	3	7.3	23	56.2	15	36.5	41
External Concerns	EA	1	7.1	5	35.8	8	57.1	14
	LA	4	9.8	28	68.2	9	22.0	41

EA= Early Adopters, LA= Late Adopters

Table 4.14 also shows that more early adopters (64.3%) have refocusing concerns compared to 36.5% of the late adopters. The finding indicates that more of the early adopters are interested in exploring the universal benefits that could be derived from adopting and utilizing Internet innovation.

On the whole, early adopters have more consequence, collaboration and refocusing concerns compared to the late adopters. According to Irani and Sharp (1997), educators who are in these stages wish to carry out a wide range of activities such as collaborating with other schools and participating in live events over the Internet. Hence, for educators who have more external concerns, they can focus on their roles as innovation diffusers as their internal concerns have decreased (Reed, 1990).

External concerns toward Internet innovation are felt considerably less by late adopters. Currently, they are not very interested in exploring the universal benefits that can be derived from using the Internet and neither are they very concerned about engaging in professional communications with other educators via the Internet. They

are also not too concerned about the impact of the innovation on their students as they

are still dealing with self-related concerns in handling Internet innovation.

Thus, attitudes of the teacher trainers towards Internet innovation are important

as they can affect the integration of the Internet into the teacher-training curriculum.

Wallace's (1998) study concurs with this view that attitudes of those involved are also

important in the use of the Internet. His study showed that early adopters among

teachers in a school system in Tennessee had positive attitudes towards the adoption of

the Internet for instruction.

However, other studies in this area found that the use of the Internet is

significantly related to one's Internet self-efficacy (Eastin, 2001). Lennertz (1999) also

found that faculty members in small Christian colleges in America needed to acquire

Internet literacy competencies before they can utilize this innovation effectively in the

teaching and learning process.

4.8.2 Self-Perceived Internet Competencies of Early Adopters and Late Adopters

Table 4.15 shows the self-perceived Internet competencies of early and late

adopters in the study. A total of 15 statements listed under the SICC were given to the

teacher trainers (Appendix F). The respondents had to state whether they had the

following levels of competencies; "Zero, no skills", "Low, have some basics",

"Moderately high", "High", "Expert, can guide others." From their statements, the

scores were calculated, and, based on the range of the scores, four mean scores were

calculated to form the four levels of self-perceived Internet competency.

The education lecturers who have the highest self-perceived level of Internet

competencies are classified as 'advanced' and those with the lowest Internet

competencies are classified as 'unaware.'

Table 4.15
Four Levels of Self-Perceived Internet
Competencies of Early Adopters and Late Adopters

Self-Perceived Internet Competency	Early Adopters		Late Adopters	
	Frequency	Percentage	Frequency	Percentage
Unaware	-	-	25	60.9
Aware	6	42.9	13	31.8
Mastery	6	42.9	3	7.3
Advanced	2	14.2	0	0.0
Total	14	100.0	41	100.0

It can be noted in Table 4.15 that 60.9% of the late adopters perceive themselves to be in the unaware level of competency in Internet use. However, none of the early adopters perceive themselves as such. The findings of the study reveal that the late adopters still lack the personal confidence in their ability to use the Internet.

On the other hand, 57.1% of the early adopters perceive themselves to be in the mastery and advanced level of Internet competencies compared to only 7.3% of the late adopters. Thus, feelings of self-efficacy in one's ability to utilize the Internet and its applications are very important for the instructional integration of the Internet. Bandura (1993) found that an individual's perceived self-efficacy affected how much effort he or she will exert and how long he or she will persist with a particular task.

Only three of the late adopters perceived themselves to be in the mastery level of Internet competency. It is also interesting to note that although these late adopters perceive themselves as having high Internet competencies, they are still not fully integrating the Internet into the education syllabus that they are teaching. Falba (1998), in his study among teacher educators in a College of Education teacher-preparation program, reported that educators who rated themselves as having high knowledge and

skills in the various Internet-based technologies such as the WWW and e-mail did not necessarily transfer these feelings of confidence into their teaching.

From this, it is apparent that the early and late adopters differ in the levels of self-perceived Internet competencies. Although self-efficacy in one's Internet technical skills are important, related studies in this area indicate other factors as influencing the integration of the Internet into the educational process. The results of the study by Fusayil (2000) indicated that gratifications derived from using the Internet are also a strong motivator among the adopters of this innovation at Ohio University.

4.8.3 Gratifications Derived from Use of the Internet by Early Adopters and Late Adopters

Table 4.16 shows the different types of gratification that the early and late adopters derive from their use of the Internet. A total of 15 statements listed under the GUIQ (Anderson and Harris, 1997, Appendix D) were given to the lecturers. The respondents had to state whether they "Strongly Agree", "Agree", "Disagree", "Strongly Disagree" or "Undecided" with the statements.

Each type of gratification had five statements. From their statements, the scores were calculated, and, based on the range of the scores, three mean scores were calculated to form the three types of gratification.

The scores for the three types of gratification; personal, professional and instructional were each divided into three categories of low, medium and high. This was based on the range of scores in the GUIQ as reflected in Table 4.16.

Personal gratification refers to the personal advantages derived from the use of the Internet whereas professional gratification refers to the benefits derived from collaborations carried out via the Internet. Instructional gratification then, refers to the benefits derived from the utilization of the Internet and its applications in the teaching and learning process.

Table 4.16
Gratifications Derived from Using the Internet by
Early Adopters and Late Adopters

Types of Gratification	Level of Internet Integration	Levels of Gratification						
		Low	%	Medium	%	High	%	Total
Personal	EA	2	14.2	3	21.4	9	64.3	14
	LA	4	9.8	25	60.9	12	29.3	41
Professional	EA	-	-	3	21.4	11	78.6	14
	LA	3	7.4	29	70.7	9	21.9	41
Instructional	EA	-	-	7	50.0	7	50.0	14
	LA	6	14.7	32	78.0	3	7.3	41

EA= Early Adopters, LA= Late Adopters

Table 4.16 shows that more of the early adopters are obtaining higher personal gratification (64.3%) from the use of the Internet compared to late adopters (29.3%). In terms of medium personal gratification, more of the late adopters (60.9%) derive personal gratification compared to 21.4% of the early adopters.

The findings of this study show that less than one-third of the late adopters are utilizing the different Internet applications for the purpose of self-fulfillment. This tendency is more profound in early adopters as their higher Internet experiences and self-perceived competencies spur them on.

There are more early adopters (78.6%) who derive high professional gratification compared to 21.9% of the late adopters. This finding is also closely related to the fact that the early adopters have more collaboration concerns. The professional gratification obtained by more than three-quarters of the early adopters are basically derived from their use of WWW and e-mail applications.

Bowman (2001) found that the main professional gratification that educators at Texas colleges derived from the utilization of the Internet lies in their ability to reach

more of their students. Chiero (1998) also reported that a majority of America public secondary school teachers felt that they were more professional, creative and better informed as a result of their computer and Internet use.

On the other hand, a higher number of the late adopters (70.7%) derived more medium professional gratification compared to the early adopters (21.4%). This may be related to the finding that more of them perceive the WWW and the e-mail as being more useful for personal rather than for professional purposes.

With regard to instructional gratification, half of the early adopters derive high instructional gratification compared to 7.3% of the late adopters. Overall, the data analyses in Table 4.16 show that early adopters derive higher personal, professional and instructional gratification from their use of the Internet compared to the late adopters.

Chiero (1998) reported that the main instructional gratification derived by American public secondary school teachers is that it provides significant real life data sources, which alters the role of the teachers from providers of information to facilitators of strategies. The other perceived advantage of using the Internet is that it aids teachers in creating more effective materials. This saves a substantial amount of their time in the teaching and learning process. Bowman (2001) also found that educators in Texas colleges derived instructional gratification of greater access to new opportunities for teaching and learning.

Although educators are deriving gratifications from their use of the Internet, Wallace (1998) reported that very little research has been carried out with respect to attitudes, demographics, personality types, and other significant variables that contribute to teachers' adoption of Internet technology. Thus, another purpose of this study is to identify the significant variables that contribute to the teacher trainers' adoption of the Internet for instruction and the extent to which early and late adopters differ in these variables.

4.9 Relationships between Variables in the Study

In order to answer the fourth research question: Are there significant differences in the attributes of early and late adopters in terms of: a) educational background; b) teaching experience; c) computer experience; d) Internet experience; e) home Internet access; f) Internet access at the workplace; g) attitudes towards Internet innovation via internal concerns and late concerns; h) self-perceived competencies in Internet use, i) gratifications derived from Internet use; j) stages of integration of the Internet into instruction, inferential statistics compromising chi-square and t-test analyses were conducted using the scores obtained from the SICC, IIC, GUIQ and SOCI.

The purpose of the inferential statistics is to test for significant differences that exist in the above variables between the early and late adopters. The level of significance for both statistical tests were set at $p = .05$. According to Sternberg and Horvath (1995), it is important to compare early adopters and late adopters of instructional technology to better understand the commonalities and differences that exist between them.

4.9.1 Relationship between Early Adopters and Late Adopters in Educational
Background and Internet Integration

Chi-square analyses were carried out to ascertain if there is any relationship between educational background and level of Internet integration among early and late adopters. As shown in Table 4.17, there is no significant relationship between educational background and level of Internet integration, ($\chi^2 = 0.05$).

Table 4.17
Relationship between Early Adopters and Late Adopters in
Educational Background

Educational Background	Early Adopters	Late Adopters	Total
Non-postgraduate degree	# 3 (21.4%)	10 (24.3%)	13
Post-graduate degree	11 (78.6%)	31 (75.7%)	42
Total	14 (100.0%)	41 (100.0%)	55

$\chi^2 = 0.05$ $df = 1$ $p = 0.82$
#1 cell have expected count less than 5 and df=1, Yates correction yield a $\chi^2 = 0.21$
$(p < .05)$

The data in Table 4.17 show that there are more early adopters (78.6%) with a second degree compared to the late adopters (75.7%). However, the differences are not big enough to cause significance in the relationship between educational background and the level of Internet integration. This finding implies that academic achievement is not a factor in ascertaining whether education lecturers integrate the Internet in the instructional process.

Thus, the findings of this study are contradictory of Boulware's (1994) study on Internet innovation. He found that early adopters of the Florida information resource network had significantly higher levels of schooling and longer teaching experiences than late adopters. Similarly, Chmielewski (1998) also found that working adults and those with higher education significantly used the Internet more often.

On the other hand, a related study in the area of Internet integration indicate that the attributes of educational background, age and duration of teaching experience did not have significant effects on the integration of computers and the Internet in the teaching and learning process (Layfield, 1998).

4.9.2 Relationship between Early Adopters and Late Adopters in Teaching Experience and Internet Integration

Chi-square analyses were also carried out to ascertain if there is any relationship between teaching experience and the level of Internet integration among early and late adopters. As shown in Table 4.18, there is no significant relationship between teaching experience and the level of Internet integration, ($\chi^2 = 0.52$).

The data in Table 4.18 show that more of the early adopters (50.0%) had less than ten years of teaching experience as compared to the late adopters (39.0%). However, the differences are not big enough to cause a significant difference in the relationship of length of teaching experience and Internet integration. This finding implies that the length of an educator's teaching experience in the teacher education sector is not crucial in the instructional integration of the Internet.

Table 4.18
Relationship between Early Adopters and Late Adopters in
Teaching Experience

Teaching Experience	Early Adopters	Late Adopters	Total
10 years and below	7 (50.0%)	16 (39.1%)	23
More than 10 years	7 (50.0%)	25 (60.9%)	32
Total	14 (100.0%)	41 (100.0%)	55

$\chi^2 = 0.52$ $df=1$ $p = 0.47$

Again, the findings of this study contradict the findings of Bullard (1998) who found that college professors in University System of Georgia teacher education programs who had more teaching experience were more superior in the use of the WWW and e-mail in the classroom than the professors with less teaching experience. Bullard (1998) found that the flexibility of using educational technology among these college professors was significantly affected by the composite set of variables of rank, efficacy and length of teaching experience.

On the other hand, Lee's (1998) findings showed that older faculty members at Mississippi State University with higher educational levels, more teaching experience, and higher professional rank seemed to have significantly less confidence about Internet software application programs than the younger faculty members who had lower educational levels, less teaching experience, and lower professional rank. This finding is also supported by Chmielewski (1998) who found that working adults over the age of fifty-five used the World Wide Web significantly less than any other age group.

The findings of this study are similar to the findings of a study pertaining to teacher-education by Brown (1999). Brown's findings revealed that teaching experience did not significantly affect the integration of the Internet among faculty members. The level of knowledge and frequency of use of the Internet by the educators increased with years of teaching and rank but began to decline as faculty members passed the age of forty-nine and advanced to full professor status. Brown (1999) concluded that accumulated years of service among teacher educators in Arkansas did not contribute to the active pursuit of instructional use of the Internet.

Thus, the researcher has arrived at the conclusion that the length of the teaching experiences and the educational qualification of the teacher trainers in this study are not major requirements for the instructional integration of the Internet in the teacher training colleges in the Klang Valley. These results also imply that there are other factors, besides personal attributes of network adopters, which play a more important role in the integration of the Internet in the teacher-training curriculum.

4.9.3 Relationship between Early Adopters and Late Adopters in Computer
    Experience and Internet Integration

Chi-square analyses were also carried out to ascertain if there is any relationship
between computer experience and the level of Internet integration among the early and
late adopters. Two and a half years was chosen as the time frame to compare computer
and Internet use between early and late adopters, as this time frame is deemed adequate
by Anderson and Harris (1997) for an individual to be competent in computer and
Internet use. As shown in Table 4.19, a significant relationship is found between
computer experience and the level of Internet integration ($\chi^2 = 4.17$).

Table 4.19
Relationship between Early Adopters and Late Adopters in
Computer Experience

Computer Experience	Early Adopters	Late Adopters	Total
2 ½ years below	# 0 (0.0%)	10 (24.3%)	10
More than 2 ½ years	14 (100.0%)	31 (75.7%)	45
Total	14 (100.0%)	41 (100.0%)	55

$\chi^2 = 4.17$ $df=1$ $p = 0.04$
#1 cell have expected count less than 5 and df=1, so Yates correction was carried out
yielding a $\chi^2 = 4.33$ ($p < .05$)

The data in Table 4.19 show that all the early adopters have computer
experience of more than two and a half years compared to 75.7% of the late adopters.
The implication of this finding is that early adopters definitely have more computer
experience than the late adopters. The study also shows that computer experience
would be a prerequisite to the integration of the Internet in the teacher-training
curriculum.

This finding is similar to the findings of Owen (1999) who found that computer
experience was significantly related to Internet use at $p = .05$ among educators at the
North Carolina Cooperative Extension. Similarly, Chmielewski (1998) found computer

experience to be a significant factor in the use of the e-mail and the WWW among working adults.

The findings of this study is also akin to that of Delcourt and Kinzie (1993) who found that computer experience with educational innovations was the strongest positive factor in determining computer use among teacher educators. Instructional technology research too showed that there is a positive relationship between Internet use and exposure to prior experience with computers (Morahan Martin, 1998).

Hignite and Echternacht (1992) also reported that both positive attitudes toward computers and adequate computer and Internet experiences are critical for prospective educators for the successful incorporation of the Internet in the teaching and learning process.

4.9.4 Relationship between Early Adopters and Late Adopters in Internet Experience and Internet Integration

Chi-square analyses were also carried out to ascertain if there is any relationship between Internet experience and the level of Internet integration among the early and late adopters. As shown in Table 4.20, a significant relationship is found between Internet experience and the level of Internet integration ($\chi^2 = 7.35$).

Table 4.20
Relationship between Early Adopters and Late Adopters in
Internet Experience

Internet Experience	Early Adopters	Late Adopters	Total
2 ½ years below	5 (35.7%)	31 (75.7%)	36
More than 2 ½ years	9 (64.3%)	10 (24.3%)	19
Total	14 (100.0%)	41 (100.0%)	55

$\chi^2 = 7.35$ *df* =1 *p* = 0.00
Since df=1, Yates correction yielded a $\chi^2 = 5.69$ (*p* < .05)

The data in Table 4.20 show that a higher number of early adopters (64.3%) have more than two and a half years of Internet experience compared to (24.3%) the late adopters. Thus, adequate Internet experience is vital for the instructional integration of Internet in the teacher training colleges in the Klang Valley.

Studies conducted in the area of Internet innovation research among elementary school teachers in Mississippi also show that self-efficacy concerns in using the Internet in the teaching and learning process lessened significantly with raised Internet knowledge levels of the participants (Herring, 1999). Similarly, Philson (1999) in his study of also found a significant relationship between experiences in using the e-mail with the collaboration efforts of educators from institutions of learning from over fifty countries.

Further, Chmielewski (1998) substantiated these findings when he found that working adults who had more Internet experience used the e-mail and WWW significantly more often than those who lacked in this experience.

In a related study, Wallace (1998) who studied the relationship between adopter type and Internet use among educators in a school system in Tennessee, found a significant relationship between adopter types and frequency of Internet use at $p = .01$ level. He concluded that innovators and early adopters use the Internet more regularly than the late adopters.

Similarly, Mubarak (2001) in his study of adoption of Internet technologies among faculty members in Saudi Arabian universities supported this finding. He found that early adopters had significantly higher Internet experience than the late adopters

Similarly, the findings of this study have important implications as it proves that longer computer and Internet experiences enhance Internet use for instructional purposes. Shunk's (1993) study denoted that implementation of a technology-based innovation is greatly influenced by an individual's personal perception as to how far he or she is efficient and comfortable in utilizing the innovation.

Thus, the process of learning more about the Internet becomes more difficult for late adopters as most of their computer and Internet experiences are limited. Weil and Rosen's (1997) study also showed that late adopters usually get little help from the computer and technical support staff who appear to speak a different language of technological jargon to them.

Thus, an important implication of these findings is that prior to the integration of the Internet, teacher-training institutions should provide more computer and Internet experiences to their faculty members. In supporting this, Jacobsen (1998) recommended that key personnel and those in the Teacher-Training Division should place more emphasis in providing more basic computer and Internet training especially among late adopters before asking them to integrate these technologies into their teaching and learning.

However, it must be cautioned that, even after faculty members are subjected to more computer and Internet experiences, integration of the Internet into the teaching and learning process may still not be assured. This is related to the fact that although successful examples of district level in-service Internet training programs have been reported (Kluver et al., 1994), other studies indicate that even substantial amounts of in-service Internet training programs were insufficient to develop teacher capacity for the implementation of the Internet in the classrooms (Espinosa & Chen, 1996; Greenberg et al., 1998).

Thus, it is the view of the researcher that other factors may also play equally important roles in the utilization of the Internet for teaching and learning purpose such as Internet home access of the education teacher trainers which was found to be a significant factor in the integration of the Internet in the teacher-training curriculum.

4.9.5   Relationship between Early Adopters and Late Adopters in Home Access
        to the Internet and Internet Integration

Chi-square analyses were carried out to ascertain if there is any relationship

between home access to the Internet and the level of Internet integration. As shown in

Table 4.21, there is a significant relationship between home access to the Internet and

the level of Internet integration, $(\chi^2 = 6.41)$.

Table 4.21
Relationship between Early Adopters and Late Adopters in
Home Access to the Internet

Home Access to the Internet	Early Adopters	Late Adopters	Total
Yes	14 (100.0%)	27 (65.8%)	41
No	# 0 (0.0%)	14 (34.2%)	14
Total	14 (100.0%)	41 (100.0%)	55

$\chi^2 = 6.41$ $df=1$ $p = 0.01$
1 cell has an expected count less than 5 and $df=1$, so Yates correction yielded a
$= 4.74$ $(p < .05)$

The data in Table 4.21 show that all the early adopters have home access to the

Internet as compared to 65.6% of the late adopters. This finding indicates that having

Internet access in the home environment is an important factor for instructional

integration to occur in teacher-training colleges.

This finding is similar to the findings of Owen (1999) who found that ease of

access was significantly related to Internet use at $p = .05$ among educators at North

Carolina Cooperative Extension. He also reported that ease of access was the strongest

predictor for the adoption and use of the Internet. Most of the participants in his study

reported having adequate access to the Internet both at home and at the workplace.

Similarly, Abdulla (2001) found statistically significant moderate associations

between home Internet access of ESL teachers at Ohio State University and Internet

proficiency. He also reported Internet access at home as the variable explaining the greatest variance in the teachers' Internet uses.

In line with this, home use of the Internet in the integration of information communication technologies (ICT) into the educational process has already been implemented in the new national curriculum for initial teacher training in England and Wales (DFEE, 1998). Wellington (2001) noted that more efforts and attention had been given recently towards ICT home use of the educators in the planning of teacher-training programs in England. Other studies also reported that home Internet use by educators and teacher education students has become very important for its instructional use (Gray and Wilcox, 1995; Myint Swe Khine; 2001, Sanger *et al.,* 1997).

Similarly, the early adopters in this study are depending more on Internet access at home as they have indicated that it is inadequate in the teacher training colleges in the Klang Valley.

According to Rogers (1995), early adopters are more comfortable with situations where there is not an immediate solution to a problem and they expect to encounter problems with the technology. Therefore, the finding of this study provides further evidence that early adopters are more concerned about figuring out how to integrate the Internet into their teaching and to introduce new technological methods by finding their own solutions to existing problems.

Thus, this finding indicates that home Internet access of Malaysian teacher educators should be further exploited to enhance the use of Internet in the teacher-training curriculum.

4.9.6 Relationship between Early Adopters and Late Adopters in Access to the Internet at the Workplace and Internet Integration

Chi-square analyses were also carried out to ascertain if there is any relationship between access at work to the Internet and the level of Internet integration among early and late adopters. As shown in Table 4.22, there is no significant relationship between them ($\chi^2 = 0.72$).

Table 4.22
Relationship between Early Adopters and Late Adopters in
Access to the Internet at the Workplace

Access to the Internet at the Workplace	Early Adopters	Late Adopters	Total
Yes	5 (35.7%)	20 (48.7%)	25
No	9 (64.3%)	21 (51.3%)	30
Total	14 (100.0%)	41 (100.0%)	55

$\chi^2 = 0.72$ $df=1$ $p=0.29$

The data in Table 4.22 show that although more of the late adopters (48.7%) claimed easy access to the Internet at the workplace compared to 35.7% of the early adopters, chi-square analysis show no significant relationship between the two groups. This finding indicates that current Internet access in the workplace is not contributing to the integration of the Internet in the teacher-training curriculum.

Thus, this finding contradicts the findings of Philson (1999), who found that access to the Internet at the workplace as the most significant predictor of collaboration efforts of educators with the use of e-mail and WWW applications. Similarly, Hogle' study (1999) among education faculty in a university setting in America found that one of the most important factors that contributed to their use of the Internet in instruction was availability and access to Internet equipment.

Layfield (1998) also found that Internet use among 708 secondary agriculture teachers in twelve states in America were encouraged by reliable access to the Internet as well as availability of equipment needed to access the Internet. Similarly, Fusayil's (2000) study among faculty members in Ohio University discovered that the factors that promoted the use of the Internet among faculty members were access to this innovation at the workplace, adequate time, availability as well as training. Anderson *et al* (1997) also found that adequate infrastructure, Internet access, time and skills were important factors in the integration of the Internet in the teaching and learning process.

On the other hand, one reason cited for the lack of integration of the Internet in American schools is the lack of computers in the workplace that provide personal interaction as Internet connection was rarely made available to individual learners or particular classrooms (Kitchell, 1995). This is related to the fact that Internet access in American schools is restricted to centralized locations for the use of the masses, or, where many students and faculty members congregate (Thomas, 1996). Gibson and Oberg (1997) also found that the location of Internet access in Alberta schools directly influenced a teacher's decision to utilize the Internet in his or her teaching.

However, the finding of this study shows that the lack of access in the workplace did not hinder the early adopters' decision from integrating Internet into the teacher-training curriculum. As such, providing Internet access alone will not result in the integration of the Internet in instruction in the teacher-training curriculum. This is also related to the fact that there might be other factors, which may be contributing to the integration of the Internet into the teacher training colleges in the Klang Valley. Besides Internet access, Cooperman (1998) in his study of fifth to eight grade teachers found that attitudes of educators towards the Internet via their concerns also determined whether or not this innovation entered classrooms.

4.9.7   Internal Concerns of Early Adopters and Late Adopters

Existing attitudes towards new technologies could also be influencing teacher trainers to integrate Internet innovation despite their current constraints pertaining to Internet access at the workplace. According to Knezek and Christensen (1999), there is a need to measure current attitudes of educators towards the Internet in teacher training programmes.

T-test analysis was used to ascertain the differences between the early and late adopters in the remaining variables of attitudes towards the Internet innovation, self-perceived Internet competencies and gratifications derived from using the Internet as well as stages of integration of the Internet into instruction. The level of significance was set at $p = .05$.

Attitudes towards Internet innovation consist of internal and external concerns. Internal concerns consist of awareness, informational, personal and management concerns.

The awareness stage is indicative of knowledge of the innovation with little or no involvement with the innovation. As shown in Table 4.23, there are no significant differences in the mean awareness scores of the early adopter group and late adopter group ($t =1.60$). Hence, the finding indicates that there is no difference between the two groups of teacher trainers, with regard to concerns relating to their existing knowledge of Internet innovation.

The characteristic of the informational stage is the desire to learn more about the innovation with little concern for its impact on the individual. The data in Table 4.23 show that there are no significant differences in the mean informational scores of the early adopter group and late adopter group ($t = 0.99$). This finding implies that there is no difference between the early and late adopters, with respect to concerns pertaining to their motives to enquire more about the Internet.

Table 4.23
Comparison of Internal Concerns of
Early Adopters (n = 14) and Late Adopters (n = 41)

Sub-domains of Internal Concerns		Early Adopters	Late Adopters	t*	p
Awareness	Mean	7.57	10.24	1.60	NS
	SD	6.24	5.09		
Informational	Mean	23.50	21.54	-0.99	NS
	SD	5.13	6.77		
Personal	Mean	20.50	20.29	-0.09	NS
	SD	6.82	6.89		
Management	Mean	13.79	16.41	1.36	NS
	SD	4.99	6.61		
Internal Concerns	Mean	65.36	68.49	0.51	NS
	SD	16.25	20.78		

S= Significant NS= Non-significant
*No comparisons were significant with Bonferroni adjustment for multiple comparisons, $p = 0.01$

The personal stage is characterized by how the knowledge of an innovation personally affects an individual. It deals with concerns that relate to how an individual meets the demands of the innovation and of the individual's role in relation to the innovation.

For personal concerns, the t-value of 0.09 is not significant at $p < .01$. The finding implies that there is no difference between the early adopters and late adopters in their self-concerns in meeting the demands of Internet innovation.

In terms of management, the individual's concern is related to the amount of time required to use the innovation effectively and efficiently. The data in Table 4.23 show that there are no significant differences in the mean management scores of the

early adopter group and late adopter group ($t = 1.360$). The finding implies that there is no difference between the two groups of teacher trainers, with regard to concerns relating to their efficiencies in organizing and managing Internet innovation.

As for internal concerns of the teacher trainers, the data in Table 4.23 show that there are no significant differences in the mean internal scores of the early adopter group and late adopter group ($t = 0.51$). Hence, it can be concluded that there is no difference between the two groups of teacher trainers with respect to concerns relating to their intrinsic motivations in utilizing the Internet

With regards to the attitudes toward the Internet innovation, the early adopters faced slightly higher personal and informational concerns. However, these differed from the concerns of the late adopters. On the other hand, the findings of the study indicate that the late adopters are still concerned about enhancing their basic knowledge levels of the Internet and time management issues in handling this innovation. This is related to the fact that the late adopters have not experimented or adapted it in as many different ways as the early adopters have.

On an overall basis, the late adopters still faced higher internal concerns than the early adopters as they indicated that they were still ambivalent about the Internet innovation. This finding could be related to Herring's (1999) finding that the internal concerns of late adopters among elementary school teachers in a rural district in Mississippi would be initially high, but would be mitigated with the regular use of the innovation.

Thus, due to the early adopters' regular involvement with Internet innovation, their internal concerns have decreased but are not major enough to cause a significant difference with the internal concerns of the late adopters. In relation to this, Westfall (1998) found that with Internet training, internal concerns of middle school teachers toward Internet innovation decreased.

4.9.8 External Concerns of Early Adopters and Late Adopters

External concerns encompass consequence, collaboration and refocusing concerns. The consequence concern sees the individual feeling anxious about the impacts of the innovation on his or her students. As shown in Table 4.24, there are no significant differences in the mean consequence scores of the early adopter group and late adopter group ($t = 1.35$). This finding indicates that there is no difference between the two groups of teacher trainers, with regard to concerns relating to the perceived impacts of Internet innovation on their students.

Table 4.24
Comparison of External Concerns of Early Adopters
(n =14) and Late Adopters (n = 41)

Sub-domains of External Concerns		Early Adopters	Late Adopters	t^*	p
Consequence	Mean	20.43	18.09	-1.35	NS
	SD	6.27	5.32		
Collaboration	Mean	24.29	20.46	-1.82	NS
	SD	7.44	6.53		
Refocusing	Mean	25.71	20.93	-2.74	S*
	SD	5.03	5.84		
External Concerns	Mean	70.43	59.49	-2.30	NS
	SD	14.69	15.58		

S=Significant NS =Non-significant
*With Bonferroni adjustment for multiple comparisons, $p = .012$

The collaboration concerns sees the individual focusing efforts on using the innovation in coordinating and cooperating with others. The data in Table 4.24 show that there are no significant differences in the mean collaboration scores of the early adopter group and late adopter group ($t = 1.82$). Hence, the finding implies that there is

no difference between the two groups of teacher trainers, with respect to concerns relating to their intentions to coordinate and cooperate with others via the Internet.

In the refocusing stages of concerns, the individual focuses on the other ways to benefit from the innovation and explores alternatives to the innovation. The data analyses in Table 4.24 show that there are significant differences in the mean refocusing scores of the early adopter group and late adopter group ($t = 2.74$, $p < .01$) (effect size =. 95, power = .65).

This finding implies that more of the early adopters than the late adopters are concerned about focusing on different ways in which they could benefit from the Internet and about exploring different alternatives of using this innovation on a universal scale. This finding is supported with Roger's (1983) observation that early adopters engaged in more social and academic participation relating to the exchange of teaching ideas and were more highly connected in a social system than the late adopters. However, considerably fewer of the late adopters are concerned in utilizing Internet innovation for similar purposes. This may also have accounted for the significant difference in this concern.

Thus, refocusing concerns of the early adopters contribute to the integration of the Internet into the education syllabus in the teacher-training curriculum. Westfall (1998) concluded that once teacher-trainers have learned to use the Internet, their refocusing concerns changed to that of a higher level.

The data in Table 4.24 also show that there are no significant differences in the mean external concerns score of the early adopter group and late adopter group ($t = 2.30$). Hence, this finding implies that there is no difference between the two groups of teacher trainers, with regard to concerns relating to their extrinsic motivations in using the Internet innovation.

On the whole, the findings of the study revealed that the early adopters are more concerned with the extrinsic aspects in the adoption of Internet innovation. The early

adopters are more concerned about the effects of Internet innovation on their studies and collaborating with other individuals via the WWW and e-mail applications as well as engaging in global associations.

According to Herring (1999) early adopters among Mississippi elementary school teachers displayed more external concerns when they were less worried about the impact of the Internet on themselves and became more aware of the impact it had on their students.

However, external concerns are felt considerably less by the late adopters. At present, they are not very interested in exploring the universal benefits that can be derived from the Internet and neither are they too concerned about engaging in professional communications with other educators via the Internet. In addition, they are also not too concerned about the impact of the innovation on their students as they are still dealing with self-related concerns in handling Internet innovation. Thus, although more of the early adopters have external concerns than the late adopters, the differences are not big enough to warrant a significant difference.

Herring (1999) found that early adopters among school teachers in a small rural district in Mississippi had more external concerns, as once they were able to perceive ease of operations on new search engines and browsers, they were able to see how far this innovation had come and imagine where it might take them individually. It is also apparent that they had more external concerns as they were moving beyond the impact of the Internet on themselves and became more aware of the impact it would have on fellow teachers and their students.

According to Reed (1990), it is normal for external concerns of early adopters to increase earlier in the process of adoption of an innovation compared to late adopters, as early adopters have more experience with a particular innovation. Similarly, Wallace's (1998) study showed a significant relationship between attitudes toward

using the Internet and teachers' instructional use of the Internet in a school system in Tennessee.

However, attitudes toward Internet innovation are not the only factor influencing the integration of the Internet in the teacher-training colleges in the Klang Valley. According to Ravitz (1999) curriculum integration resources, adequate time and relevant Internet skills for teachers to develop and carry out Internet-based activities are also important for the incorporation of this innovation in the instructional process.

Similarly, Westfall (1998) found that collaborative efforts of middle school teachers on the Internet were inherently dependent upon adequate funding of technical and support personnel, strategies pursued in learning about the Internet and self-ratings on Internet skills (the higher the rating, the greater the integration of the Internet into the curriculum).

4.9.9 Self-Perceived Internet Competencies of Early Adopters and Late Adopters

As shown in Table 4.25, there are significant differences between the mean self-perceived Internet competency scores of the early adopter group and late adopter group (t = 5.64) (effect size = 1.90, power = .99). Hence, this finding implies that a difference exists between the two adopter-types, with respect to their self-perceived abilities in handling Internet innovation.

Table 4.25
Comparison of Self-Perceived Internet Competencies of Early
Adopters (n =14) and Late Adopters (n = 41)

Internet Competency		Early Adopters	Late Adopters	t-value	p
Self- Perceived Internet Competency	Mean	47.36	29.80	-5.64	S
	SD	12.28	9.21		

S= Significant   NS= Not-Significant

The implication of this finding is that the self-perceived Internet competency levels of the teacher trainers are contributing to the integration of the Internet in the teacher-training colleges in the Klang Valley.

Similarly, Roberts and Ferris (1998) found those teachers' self-perceptions of their expertise highly correlated with the implementation of new technologies in their teaching. Therefore, Internet integration into classes will require faculty members who are competent and comfortable in using this technology as well as who can accept changes in their teaching methodologies and roles as teachers.

Likewise, Drnek's (1998) study found that there were significant differences between Internet users and non-users among university students in relation to their self-perceived skills in utilizing the Internet. Chao (2001) also found that Internet literacy, perceptions of the Internet as an innovation, Internet operational skills and access to the Internet explained 35.8 percent of the variance in Taiwan university students' use of the Internet in their studies.

In the instructional use of the Internet, Harvey, Kell and Drexler (1990) found that there was a significant correlation between teachers' levels of computer and perceived Internet literacy and the amount of time their students used computers and the Internet. Thus, the most important implication of this finding is that it is crucial for the teacher-trainers in the Klang Valley to acquire the necessary skills to utilize the various Internet applications.

In relation to the Internet competencies of American educators, the Annual Technology in Education (1988) report showed that although Internet access had increased dramatically, only seven per cent of schools claimed that a majority of teachers are at an 'advanced' skill level where they are able to integrate technology use into the curriculum.

Similarly, what is worrying about the findings in this study is that a high number of late adopters are still not very confident about their perceived abilities of using the Internet. Thus, it is imperative that the Teacher Training Division identifies the type of competencies that both groups of teacher trainers need to ensure the successful integration of Internet innovation in the teacher education sector.

4.9.10 Gratifications Derived from Use of the Internet by Early Adopters and Late Adopters

The data analyses in Table 4.26 show that there are no significant differences in the mean personal gratification scores of the early adopter group and late adopter group (t =1.32). Hence this finding implies that there is no difference between the two groups of teacher trainers, with respect to the personal benefits that they derive from the use of the Internet.

Since both groups of teacher trainers derive some kind of personal benefit from their use of the Internet, this may have attributed to the non-significance in the relationship between personal gratification and Internet integration.

Fusayil's (2000) study revealed some personal benefits of using the Internet by faculty members in Ohio University. The benefits were divided into three categories; a) better communication with colleagues and students, b) ease of use and c) ability to work anytime and any place. These are also some of the personal benefits that the education teacher trainers derive from their use of the Internet.

Table 4.26
Comparison of Gratifications derived from Internet Use
of Early Adopters (n =14) and Late Adopters (n = 41)

Sub-domains of Gratification		Early Adopters	Late Adopters	t-value	p
Personal	Mean	18.00	16.41	-1.32	NS
	SD	4.54	3.63		
Professional	Mean	19.21	16.07	-2.84	S*
	SD	3.51	-3.59		
Instructional	Mean	18.79	14.85	-3.44	S*
	SD	3.29	3.81		

S= Significant   NS= Non-Significant
* With Bonferroni adjustment for multiple comparisons, $p = .016$

The data in Table 4.26 also show that there are significant differences in the mean professional gratification scores of the early adopter group and late adopter group ($t = 2.84$) (effect size = .89, power = .59). This finding implies that there is a difference between the two groups of teacher trainers, with regard to the professional benefits that they derive from their use of the Internet. Thus, an important implication of this finding is that current professional gratification derived by the teacher trainers is contributing to the integration of the Internet in the education syllabus.

Similarly, Philson (1999) in his study on the use of the Internet and the World Wide Web in higher education found a significant relationship between collaboration efforts of educators with the professional gratification derived from the use of the e-mail application. His study showed that because of the ability of the Internet to facilitate communications, the early adopters among the educators were keen in collaborating with other academicians to enhance their teaching.

With regards to instructional gratification, the data in Table 4.26 show there are significant differences in the mean instructional gratification scores of the early adopter

group and late adopter group ($t = 3.44$) (effect size =1.2, power = .89). Thus, it can be concluded that there exist a difference between the two adopter-types, with respect to the instructional benefits that they derive from their use of the Internet.

The implication of this finding is that instructional gratification derived by the teacher trainers is contributing to the integration of the Internet in the education syllabus. This finding is similar to the findings of Al-Najran (1998) who found that significant factors that influenced the adoption of the Internet in Kuwait University are demographics, Internet attitudes and benefits derived from using the Internet. However, the results of this study confirmed that gratifications derived from the use of the Internet was far more superior in predicting the time spent online in the classroom compared to the demographic attributes.

According to Jacobsen (1998) early adopters in two large North American universities who advocate the integration of the Internet cite a variety of learning benefits for their students such as access to a wide variety of resources through the Internet and the opportunity to communicate in real time or asynchronously with instructors, peers and experts around the world. Zakari (2000) in his study on Internet use by Saudi Arabian graduate students also perceived the benefits of instant and easy access to a variety of information resources, enhanced academic communication and a way to update students with the latest information resources for teaching.

Therefore, educators who are extending the use of the Internet into the teaching and learning processes perceive many benefits for their students. Anderson (1992) found that the more gratifications educators derived from the use of Internet, the higher the rate of integration of the Internet into the teaching and learning process.

The findings of the study provide the evidence that the early adopters are significantly obtaining more professional and instructional gratifications from their use of the Internet, which in turn are driving them to integrate the Internet into teaching. These findings suggest that once the teacher trainers are convinced that the Internet

can aid them in their professional communication and instruction. they will incorporate it into their teaching.

Thus, this finding has important implications for administrators in charge of teacher training colleges with regards to the need to identify the specific benefits that teacher trainers are deriving from the use of the Internet since this influences their instructional use of the Internet for the teaching of the education syllabus.

4.9.11 Stages of Integration of the Internet into Instruction of Early and Late Adopters

The stages of integration of the Internet into instruction, which were ascertained from the IIC, were subsequently used to categorize the teacher trainers into the two-adopter categories of the study. The data analyses in Table 4.27 shows that the t-value of 8.55 is significant at $p < .05$ (effect size = 3.3, power = 1.0). Thus, it can be concluded that there exists a difference between the early adopters and late adopters, with respect to the levels of integration of the Internet into the education syllabus in the teacher-training curriculum.

Table 4.27
Comparison of Stages of Integration of the Internet into Instruction
of Early Adopters (n = 14) and Late Adopters (n = 41)

Sub-domain of Integration		Early Adopters	Late Adopters	t	p
Stages of Integration	Mean	62.36	47.05	-8.55	S
	SD	4.63	6.11		

S= Significant NS= Not Significant

The main implication of this finding is that the early adopters demonstrate more superior knowledge in the instructional integration of the Internet in the education syllabus as compared to the late adopters. This finding also proves that differences exist

between the early and late adopters in the methodologies in which they incorporate the Internet into the teacher-training curriculum. Early adopters of instructional technology often use technology to 'reengineer' or transform the teaching-learning transaction, thus changing teacher and student roles (Hammer and Champy, 1993).

Literature on Internet adoption suggests that faculty members who are innovators or early adopters of instructional technology for teaching and learning are "lone wolves" and experimenters (Wertheimer & Zinga, 1997), who are confident and efficacious (Rogers, 1995), comfortable with constant change, are risk takers (Gilbert, 1995) and are excellent teachers whose use of technology appears to be a natural extension of their area of expertise (Sheingold & Hadley, 1990).

Therefore, the findings of this study prove that differences exist between the early and late adopters in the manner in which they incorporate the Internet and its applications into the teacher-training curriculum.

4.9.12 Conclusion for the Quantitative Section of the Study

The chi-square and *t*- tests reveal that there are significant differences between the early adopters and late adopters in the following variables; computer experience, Internet experience, home access to the Internet, refocusing concerns, self-perceived competencies in Internet use, professional gratifications and instructional gratifications as well as stages of integration of the Internet into instruction.

It appears that the early adopters have more computer and Internet experiences, more access to the Internet at home, more refocusing concerns in their attitudes toward Internet innovation and perceive themselves to more competent in its use. They also derive more professional and instructional gratifications from their use of the Internet than the late adopters. They are also significantly different from the late adopters in their stages of integration of Internet into instruction.

On the other hand, there are no significant differences between these two groups of adopters in the variables of teaching experience, educational background, work access to the Internet, internal concerns, consequence, collaboration and external concerns and personal gratifications derived from the use of the Internet. Thus, it can be assumed that these variables do not affect the rate of instructional integration of the Internet in the teacher-training curriculum.

The findings of this study show clearly that there are differences between the early and late adopters in the adoption of the Internet innovation. Hence, these differences are studied in greater detail in the qualitative part of the study, i.e. to see how the early and late adopters are using the Internet in various ways in the teacher-training curriculum.

4.9.13 Introduction to the Qualitative Section of the Study

Prior diffusion studies recommend the use of both survey and interview methods for gathering data about the time dimension and determining causality in the adoption of an innovation (Rogers, 1995; Jacobsen, 1998; Wallace, 1998). Thus, a mixed method research design, which uses a quantitative methodology (selected-response survey items) and qualitative methodologies (open-ended survey response items and semi-structured interviews), were employed for the purpose of investigating the differences between educators who readily adopt the Internet for teaching and learning in the teacher training college and those who do not.

Fourteen early and fourteen late adopters were selected for the qualitative part of the study as shown in Table 4.28. All the fourteen early adopters identified among the teacher trainers were included for this part of the study. However, the fourteen late adopters who represent about a third (34.1 percent) of the total sample of late adopters were randomly selected. This was because of the time commitment necessary for analysis of the open-ended questionnaires and for conducting in-depth interviews as

well as for data transcription. Thus, a sample size of twenty-eight respondents constituted the qualitative part of the study.

Table 4.28
Number of Early and Late Adopters for the Qualitative Study

Name of Teacher Training Colleges	Number of Early Adopters	Number of Late Adopters
MPI	4	4
MPT	3	3
IB	3	3
MPIK	2	2
IPBA	2	2
Total	14	14

Open-ended questionnaires and semi-structured interviews were used to gather information on the incorporation of the Internet in the education syllabus in the teacher-training curriculum. While the purpose of the open-ended questionnaires was to gather a large amount of baseline qualitative data relating to the incorporation of the Internet in the education syllabus, the primary objective of the interviews was to gather more in-depth and specific information about how the teacher trainers were integrating the Internet and its applications in the teacher-training curriculum.

The open-ended questionnaires were distributed to all the twenty-eight lecturers in the study. Ten open-ended responses and six closed items were included in the open-ended-questionnaire to investigate the type of Internet applications used and the frequency of their usage as well as the utilization of these technologies in the teacher training colleges.

The questions in the open-ended questionnaires were based on the following sub-topics: (a) Types and frequency of usage of the Internet applications of teacher trainers, (b) Directing students' use of the Internet applications and their frequency of

use, (c) Integration of the Internet into the education syllabus, (d) Perceived importance of integrating the Internet in the education syllabus, (e) Problems in integrating the Internet in the education syllabus and (f) Perceived needs for integrating the Internet in the education syllabus.

All the twenty-eight lecturers also participated in the face-to-face interviews. Although the interview used a semi-structured format guided by specific topics, it was open-ended in nature so as to be responsive to emergent topics and themes. Though some of the questions in the interview schedule were repetitive in nature, it was deemed necessary by the researcher as responses from the faculty members about the incorporation of the Internet for teaching in the open-ended questionnaires were brief and lacked in-depth reflections. Thus, the interviews provided a forum for the teacher trainers to offer and elaborate further on the integration of the Internet into the teacher-education sector and to discuss their ideas and opinions on the integration of the Internet into the education syllabus in the teacher-training curriculum as well as issues pertaining to their problems and needs.

The responses from the interviews were recorded and analyzed as well as interpreted based on each of the teacher trainer's experiences, opinions and perspectives with regard to the integration of the Internet in the process of teaching and learning. Although a standard list of topics and question categories was used to structure the interview sessions, the results from each interview were unique.

The direction each interview took was influenced by the nature of the lecturer's integration efforts for academic and non-academic purposes, length of computer and Internet experiences and competencies as well as access to the Internet. It was also influenced by their attitudes towards Internet innovation as well as the gratifications that they derived from the Internet as well as problems and needs which are unique to the respective teacher training colleges in the study.

The following section presents the qualitative data according to the research questions in the study.

4.10 Personal and Professional Use of the Internet

In order to answer the fifth research question: In what ways do early and late adopters differ in their personal and professional use of the Internet in the teacher training colleges in terms of: a) usage of the newsgroup and listserv applications, b) usage of the WWW and e-mail applications and c) frequency of usage of the WWW and e-mail applications, qualitative analyses was carried out. A summary of the responses according to the major themes used in the open-ended questionnaires is illustrated with the excerpts from the interview data of the twenty-eight respondents in the study.

4.10.1 Personal Use of Newsgroup and Listserv Applications

The findings of the study showed that the four Internet applications that are being used by both the early and late adopters are newsgroups, listservs, World Wide Web (WWW) and e-mail. Table 4.29 shows the number of early and late adopters who are using newsgroups for personal purposes.

Table 4.29
Personal Use of Newsgroups among Early Adopters and Late Adopters

	EA		LA	
Use of Newsgroups for Personal Purposes	N	%	N	%
Using	6	42.9	5	35.7
Not using	8	57.1	9	64.3

EA = Early Adopters, LA = Late Adopters

With regards to newsgroups, more of the early adopters (42.9%) use newsgroups compared to 35.7% percent of the late adopters. Similarly, Table 4.30

shows that more of the early adopters (28.6%) utilize listservs compared to 14.3% of the late adopters.

Table 4.30
Personal use of Listservs among Early Adopters and Late Adopters

	EA		LA	
Use of Listservs for Personal Purposes	N	%	N	%
Using	4	28.6	2	14.3
Not using	10	71.4	12	85.7

EA =Early Adopters, LA = Late Adopters

The Internet applications of listservs and newsgroups are basically being used for personal purposes by both the early and late adopters. Although the early adopters find the applications of newsgroups more useful for the purposes of discussion and exchange of ideas, their use is restricted more for personal purposes. This is based on the evidence from faculty comments such as,

"Can use both newsgroups and listservs. However, I use it more for personal reasons, they are not very useful. I tried to look for material for my thesis but was not successful. They are okay for discussion purposes and for exchanging ideas. But for academic writing, they are not so effective." EA14

On the other hand, the late adopters are still not very familiar with the use of listservs and newsgroups as evidenced by the comments like,

"I don't know what listservs and newsgroups are. What I understand about newsgroups is that they are just like newspapers. What I have done is to click on The Star Paper, New Straits Times and The Sun, to read the news." LA3

Thus, the implication of this finding is that, even for personal purposes, more of the early adopters are using these applications as compared to the late adopters who are still not very familiar with these Internet applications.

Although, the early adopters have tried to use newsgroups and listservs on a personal basis, they are still unable to see the relative advantages of using these applications for professional purposes. Similarly, Becker and Anderson (1998) reported that professional communications via newsgroups and listservs are not popular even among educators in the United States.

4.10.2 Professional Use of Newsgroup and Listserv Applications

The professional communication activity that the early and late adopters are participating in is the posting of opinions and suggestions via newsgroups and listservs on the WWW. Table 4.31 and Table 4.32 show that only 21.4 percent of the early adopters are posting opinions and suggestions via newsgroup and listserv applications as compared to 7.1 per cent of the late adopters.

Table 4.31
Professional Use of Newsgroup Application among Early Adopters and Late Adopters

	EA		LA	
Use of Newsgroups for Professional Purposes	N	%	N	%
Using	3	21.4	1	7.1
Not using	11	78.3	13	92.9

EA= Early Adopters, LA= Late Adopters

Table 4.32
Professional Use of Listserv Application among Early Adopters and Late Adopters

	EA		LA	
Use of Listservs for Professional Purposes	N	%	N	%
Using	3	21.4	1	7.1
Not using	11	78.6	13	92.9

EA= Early Adopters, LA= Late Adopters

One early adopter is already sharing his expertise about computers and posting queries on computers to the newsgroups.

"I like to exchange views through messenger MSN, where I go into the newsgroup to talk to one individual or many individuals. I currently use the Putera newsgroup that is Putera@com which allows me to forward any queries regarding computers to the discussion group, which will later answer my queries." EA5

On the other hand, the late adopters hardly seem to be using these applications for professional purposes. This is attributed to the fact that although the late adopters have come across newsgroups and listservs, they still cannot see the benefits of using these technologies for their own professional development. For example, this is evidenced from comment of a late adopter who finds using listservs very time-consuming and troublesome.

"Not really, I have not really ventured earlier. I went to a listserv, and they keep reminding me to subscribe, since I was not so active." LA12

On the other hand, although more of the early adopters are using these applications, a majority of them are still not posting information and suggestions via these applications for professional purposes as they find them more apt for personal use. There is also limited use of the newsgroups and listservs among the education teacher trainers.

This finding indicates that posting information and suggestions on the WWW is still a relatively new activity for the teacher trainers in the Klang Valley. This finding is similar to the finding of Becker and Anderson (1998). They state that relatively few teachers have begun posting information, suggestions, opinions or student work via newsgroups and listservs on the WWW.

Becker and Anderson (1998) investigated the use of this type of communication in their study on Internet use by teachers in American national schools. The sample of

teachers in his study consisted of 4th through 12th grade class teachers in the U.S public and private schools. Approximately, 2,250 teachers responded to mail surveys and classroom observations as well as telephone interviews in this study.

Thus, it is clear that there is a gap between the early adopters and late adopters in the utilization of newsgroup and listserv applications as more of the early adopters find these applications useful for personal and professional purposes.

Related studies have indicated that there is a lot of potential for these applications for professional and instructional purposes. Consistent with this, Page (1999) found listservs to be one of the most valuable Internet applications as it could link students from all over the globe for interactive learning projects.

However, the use of listservs and newsgroups for professional and instructional purposes among early and late adopters is still very restricted in the teacher-training colleges in the Klang Valley as they are still unable to see the relative advantages of using them for these purposes. In contrast, the education teacher trainers in the Klang Valley can already see the advantages of using the e-mail and WWW applications for personal and professional purposes.

4.10.3 Personal Use of WWW Application

Table 4.33 shows the number of early and late adopters who are using the WWW application for personal purposes. Slightly more of the late adopters (92.9%) are using the WWW for personal purposes as compared to 85.7% of the early adopters.

Table 4.33

Personal Use of WWW Application among Early Adopters and Late Adopters

Use of WWW for Personal Purposes	EA		LA	
	N	%	N	%
Using	12	85.7	13	92.9
Not using	2	14.3	1	7.1

EA= Early Adopters, LA= Late Adopters

Two of the early adopters are using the Internet for sourcing articles relating to 'Master Teaching.' Four are using it for personal studies and three are using the Internet to source materials for personal development. While one of them is sourcing the WWW for current news, two others are using it to pursue their diving and football interests.

On the other hand, the late adopters are using the WWW application for personal studies and religion-related purposes as well as for general browsing such as on health issues. One example of such personal usage of the WWW among one of the female late adopters is,

"*Are you aware, that I use the Internet to find out about medical terms like fibroid, menopause. I have gathered much information via the Internet, especially about fibroids.*" *LA8*

Although the late adopters are already utilizing the WWW for personal purposes, they still face difficulties while using this Internet application. Among the late adopters who are using the Internet for personal purposes, some admit that they lack the confidence and are not very well versed with the WWW.

"*I am so scared of technical words such as the WWW. You know, because I am not sure. I am not very well versed, you know what with the Explorer or not, I usually get my son to help me.*" *LA4*

The data analyses from the interviews also indicate that the late adopters are aware of their own inadequacies in using the WWW application.

"If to access materials and print out those materials, I can, that is all I can currently do. That is my level now. When I need more info, by trial and error sometimes. If I don't have the address, I type certain words on the Internet. I have to go through many times. Sometimes, I cannot get what I want." LA12

It can also be seen that although the late adopters are already utilizing this Internet application, they still face difficulties in using different search engines and in looking for the exact information that they want on the WWW. The main implication of this finding is that the late adopters perceive the WWW application more apt for personal use.

Thus, it is not surprising that fewer of the late adopters are using the WWW application for professional purposes as compared to the early adopters in the teacher training colleges in the Klang Valley.

4.10.4 Professional Use of WWW Application

The data in Table 4.34 shows that all the early adopters are already utilizing the WWW application for professional purposes as compared to 71.4% of the late adopters.

According to Becker and Anderson (1998), professional activities via the WWW include activities such as researching, publishing as well as for professional communications. Professional communications via the WWW includes publishing one's own work or students' work on the WWW. It also includes contributing articles to the home page of one's educational institution.

Table 4.34
Professional Use of WWW Application among Early Adopters and Late Adopters

	EA		LA	
Use of WWW for Professional Purposes	N	%	N	%
Using	14	100.0	10	71.4
Not using	0	0.0	4	28.6

EA= Early Adopters, LA= Late Adopters

In addition, the data in Table 4.35 show the types of professional communication via the WWW that are being carried out by the early and late adopters among the teacher trainers in the Klang Valley.

The first professional use of the Internet by the teacher trainers in the Klang Valley is browsing the WWW for academic purposes. More of the early adopters (35.7%) are using it to browse for educational materials to obtain the latest articles in their area of specialization as compared to the late adopters (28.6%). These early adopters seem to have realized the potential of the Internet to browse for educational materials to keep track of developments in their area of specialization.

> "Yes, I use the Internet a lot at home to get materials from the WWW for the KPSK (In-Service Teacher Programme). I want to give them more materials, which are up-to-date. I don't want to give them ordinary materials." EA1

Another individual among the early adopters has also realized the benefits that can be derived from using the WWW to find current articles that are related to her teaching.

> "Personally, I find it very useful, whenever I am free, I browse for the latest articles in the areas that I am teaching." EA12

Table 4.35
Types of Professional Activities on the WWW by Early Adopters and Late Adopters

Use of the Internet for Professional Activities	EA		LA	
	N	%	N	%
Browsing for Academic Purposes				
Current Articles in Area of Specialization	5	35.7	4	28.6
Latest Ideas on New Teaching Methodologies	6	42.9	2	14.3
Research for Professional Development Activities				
Research for Motivational Talks	2	14.3	0	0.0
Research for Seminars on Collaborative Learning	2	14.3	0	0.0
Research for Seminars on Mentoring	2	14.3	1	7.1
Professional Research Projects	0	0.0	3	21.4
Professional Communication Contributing Articles to College Home Page	4	28.6	2	14.3
Publishing Web-Building Skills for Publishing	2	14.3	0	0.0

EA= Early Adopters, LA= Late Adopters

Four out of the fourteen late adopters also find the Internet useful for this purpose. One of them finds the Internet particularly useful for his area of specialization.

"I am teaching Evaluation, and the area is under Statistics. I think there are a lot of resources available. They even have tutorials and you can access online, even complete online textbooks are available."LA9

Another late adopter has also already realized the potential of the Internet to browse for current academic materials.

"The last time I search was for college level, because of the new curriculum, I searched for the PKPG (Graduate Teacher Programme) *group. Recently, on the topic of Expository Learning." LA12*

However, the same late adopter faces difficulties in utilizing the WWW for professional academic browsing and for finding materials for the newer topics in the education syllabus.

"I look for academic stuff, but they are not so available. Let us say I want to find a certain website, sometimes to get to the website, it is not so easy to find, it takes time." LA12

About 42.9 % of the early adopters are already using the WWW to source for new ideas on teaching methodologies as compared to 14.3% of the late adopters. This is evident from the following response of an early adopter,

"Some ideas on teaching pedagogy, I will take from the Internet ever since Mr. X became the expert, he has told me new ideas on 'Master Teaching' on the Internet. Tips on teaching, every month I collect. It gives me tips to teach, on how to upgrade my teaching, on how to look after the class." P2

It can be seen from the data in Table 4.35 that the early adopters find the Internet extremely useful as a fast and convenient source of current information when browsing for articles relating to their areas of teaching as well as for innovative teaching ideas.

Therefore, the early adopters found that the biggest advantage of using the WWW application was that they were able to access materials that they wanted from the Internet in a short span of time.

"The Internet has been a useful source for me to get information fast for the education syllabus." EA12

Hence, it can be concluded that more of the early adopters are aware of the Internet's relative advantages as a fast and current source of information. Rogers (1995) lists the relative advantage of an innovation as important, which, he describes as the degree to which an innovation is perceived to be better than the innovation it supersedes.

Consequently, if the teacher trainers perceive the benefits of using the Internet as being advantageous as compared to traditional methods of teaching, the probability of adopting Internet innovation for instructional purposes will be very high.

Another aspect of professional use of the WWW includes carrying out research pertaining to professional development activities that are being conducted in the teacher training colleges. Two of the early adopters have realized the relative advantages of using the Internet to research for materials for professional activities such as for motivation programmes that are carried out in the teacher training colleges. One of them is currently sourcing materials on 'Stephen Covey' for motivational talks that he conducts periodically in his capacity as a motivational expert.

Two the early adopters have also used the Internet to source for materials and ideas for carrying out research for professional development programs, which they are also required to conduct on a periodical basis for pre-service trainee teachers and in-service teachers.

"Yes we had a seminar, on collaborative and cooperative learning for a group of in-service teachers and we used a module by a Professor from a local university and we downloaded articles from the Internet in this area and we distributed to the teachers in the course." EA11

However, none of the late adopters are carrying out these two types of professional development activities.

Two other early adopters have already started using the WWW for professional development activities for the purposes of sourcing materials on mentoring skills for practicum seminars, which they conduct for their students and teachers from surrounding schools. Only one late adopter out of the fourteen late adopters is carrying out a similar type of professional activity.

"For practicum purposes, I have mentoring materials for practicum courses, and for briefing courses for teachers or trainee teachers. I can find materials on development of self-esteem on the Internet." LA1

The data in Table 4.35 also show that in all the different professional research development activities, more of the early adopters are utilizing the WWW for these purposes except in conducing professional research projects. In this activity, three of the late adopters (21.4%) carry out this activity compared to none of the early adopters.

Two of the late adopters have started using the Internet for conducting professional research projects that are required by college administrators.

"It is just like that like now I am having my research on 'Reflection', so I am using the Internet. I have found many articles pertaining to Reflection on the Internet." LA4

The other late adopter is currently doing research on stress management among teacher trainees and depends heavily on the WWW to get materials and articles for this research project.

Another aspect of professional communication consists of contributing articles to the college homepage. However, this type of professional communication is not very popular among the teacher trainers in the Klang Valley. Not many of the early and late adopters are contributing ideas and articles to the college homepage. The data in Table 4.35 shows that only 28.6% of the early adopters are contributing ideas and articles to the college home page whilst 14.3 % of the late adopters are doing so.

One of the early adopters is giving materials in his area of expertise to committee members of the college homepage.

"I provide synopsis for disciplines offered for the private teacher training courses as advertisements. If anybody is interested in pursuing a particular course, they look at the synopsis. For example, I teach pedagogy, so I provide the synopsis for pedagogy. "EA9

However, for this particular early adopter, these materials have yet to be uploaded into the website of his college. This is because he has not acquired the necessary web-building skills and has to wait for the college Webmaster to upload these materials into the Internet.

Thus, currently even the early adopters among the teacher trainers lack basic web-building skills. So far, only two of the early adopters (14.3%) have acquired these skills. One of them is utilizing his web-building skills to put up academic materials onto the college homepage. Another early adopter who has recently acquired this skill is using it to post both personal pictures and articles pertaining to the college home page on some free storage space that is available on 'Free Drive' in the Yahoo website.

Only two of the late adopters are contributing articles to the homepage and one of them admits that he still lacks web-building skills.

> *"I have given some materials for evaluation and also some of the notes that I have conducted for some courses. So I just give the materials from these courses but I do not have the skills to upload them into the college homepage."LA8*

Thus, the teacher trainers in the Klang Valley still lack web-building skills for publishing and are not able to utilize these skills for the purposes of teaching and learning. However, more of the early adopters show an interest in this area.

On the other hand, Nettles (1998) propounded that many instructors in western countries are taking advantage of the Internet by creating web pages for instructional purposes. However, none of the teacher trainers in the Klang Valley are engaging in such an activity, although the early adopters have indicated that they are interested in carrying out a similar activity in the near future.

In the use of the WWW application for professional development activities, the only aspect where more of the late adopters than the early ones are utilizing this application is in conducting professional research projects. This may be attributed to the fact that the late adopters are experimenting with alternative ways of using the

Internet outside of the classroom before moving on to utilize it for instructional purposes in the classroom. This is in line with Rogers' (1995), theory, which states that late adopters usually try out the innovation on a trial basis before adopting it fully.

This finding therefore proves that there is a clear gap between the early adopters and late adopters in the utilization of the WWW application for professional purposes. This is attributed to the fact that the early adopters have also managed to broaden the use of the WWW application in different ways and have extended it to other areas besides instructional purposes in the teacher training colleges. On the other hand, the late adopters have carried out very little professional activities with the WWW application.

Jacobsen (1998) in her study of Internet use among faculty members in North American universities provided further evidence to this phenomenon by implying that early adopters have relatively higher levels of innovativeness as they are usually the earliest in adopting forms of technology for professional and instructional uses compared to other members in a social system. According to McKenzie (1999a), this is also related to the fact that late adopters were still hesitant or fearful about using the different Internet applications for professional purposes.

Besides adopting the WWW application, the teacher trainers also utilize the e-mail application for professional and personal purposes.

4.10.5 Personal Use of E Mail Application

Both the early and late adopters are using the e-mail for personal and professional purposes. Table 4.36 shows that all the early adopters are already using the e-mail for personal purposes as compared to 57.1% of the late adopters. This finding implies that the early adopters are more competent in using the e-mail application.

The ways in which the early adopters are using the e-mail for personal purposes are as follows; three of them are e-mailing their children, seven of them are using the e-

mail to receive mailing lists on personal interests and four of them are using the e-mail to contact friends. From the interview data, it was found that that the early adopters do not face any problems in utilizing the e-mail application for personal purposes.

Table 4.36
Personal Use of E- Mail Application among Early Adopters and Late Adopters

	EA		LA	
Use of E- Mail for Personal Purposes	N	%	N	%
Using	14	100.0	8	57.1
Not using	0	0.0	6	42.9

EA= Early Adopters, LA= Late Adopters

On the other hand, the late adopters (four of them are using the e-mail to contact their relatives while another four are using it to contact friends) face difficulties in their personal utilization of the e-mail application.

One of the late adopters describes some of the problems that she faces as,

"Yes, I use the e-mail, but more for personal purposes. I gave the e-mail address to my friends. But I have got no response from them."LA12

The late adopters are also frustrated by their lack of skills in using the e-mail application and they indicate the desire to learn more about this application.

" I have no expertise at all, I have just learned how to communicate with my son in Australia. I have to learn more." LA13

It seems clear from the nature of these responses, that there is a difference between the early and late adopters in the utilization of the e-mail application for personal purposes. Thus, it is not surprising that more of the early adopters compared to the late adopters are using the e-mail for personal and professional communications in the teacher training colleges. The fact that all the early adopters have Internet connections at home may have also contributed to their higher use of the e-mail application.

Another implication of this finding is that the teacher trainers are utilizing more of the WWW and e-mail applications than the newsgroups and listserv applications for personal and professional purposes.

4.10.6 Professional Use of E-Mail Application

The education lecturers in the Klang Valley are already engaging in professional communication via e-mail with individuals in and out of the country in an effort to develop themselves professionally. According to Becker and Anderson (1998), professional communication via the Internet includes e-mailing colleagues and academicians out of one's own educational establishment for the purposes of professional enhancement. However, in his study on Internet use among American teachers, he found that very few teachers were engaging in these types of communication.

Unlike the American teachers in Becker and Anderson's (1998) study, there are quite a high number of early adopters among the teacher trainers who are using the e-mail for professional communications. The data in Table 4.37 show that 85.7% of the early adopters are already using e-mail for professional communications as compared to 64.3 % of the late adopters.

Table 4.37
Professional Use of E-Mail Application among Early Adopters and Late Adopters

	EA		LA	
Using E-Mail for Professional Purposes	N	%	N	%
Using	12	85.7	9	64.3
Not using	2	14.3	5	35.7

EA= Early Adopters, LA= Late Adopters

This finding indicates that more of the early adopters use the e-mail for professional communications in the teacher training colleges in the Klang Valley. This is also in keeping with the quantititative findings of the study, which showed that the

early adopters significantly derive more professional gratification from their use of the Internet than the late ones.

From the data analyses of the interviews that were conducted in the five teacher training colleges in the Klang Valley, it was found that there are basically three types of professional activity that are being carried out via the e-mail by respondents in the study. These include communicating with their colleagues in their respective teacher training colleges and with individuals and teacher trainers outside of the teacher training colleges. In addition, they are collaborating with other teacher training colleges and institutions of higher learning in joint projects or key-pal projects.

Table 4.38 shows that more of the early adopters are communicating with their colleagues (35.7%) as compared to 14.3% of the late adopters. This type of communication is mainly for work-related purposes.

Table 4.38
Types of Professional Communication via the E-Mail
by Early Adopters and Late Adopters

	EA		LA	
Professional Communications via the E-mail	N	%	N	%
To contact colleagues	5	35.7	2	14.3
To contact individuals out of college	5	35.7	1	7.1
Collaboration on joint projects	4	28.6	1	7.1

EA= Early Adopters, LA= Late Adopters

An early adopter who is a quality control expert has adapted the use of the e-mail for professional communication with his colleagues in one of the teacher training colleges. He has designed a unique way of utilizing the e-mail in his college to exchange materials and notes. He sees it as a useful application to enhance effective communication among teacher educators.

"I think there is tremendous potential in e-mail, I am also all over the place. I told them (colleagues) *if you want to catch me, do pass me the diskette, just to use the office computers, and I put my name there. I tell them to copy that file and send it to me in attachment. Before I punch out, I will copy that file into my diskette. The mechanism is for communication, so people will be exchanging materials and notes." P1*

Thus, this early adopter has come up with an innovative way to utilize the e-mail as a medium for communicating with the colleagues who do not have Internet access in their homes. They pass him information via attachment files on office computers. According to Wertheimer and Zinga (1997), faculty members who are early adopters of instructional technology for teaching and learning are experimenters and usually try out new ways of using an innovation for professional and instructional purposes.

Another early adopter, who holds an administrative post in the college, finds the e-mail a convenient way to communicate with her colleagues on the managerial aspects of her lectures.

Responses from another early adopter who also has given her e-mail address to her colleagues indicated that she uses the e-mail to contact other colleagues and has also been sending them "notes and stuff" via attachment files. The other two early adopters in the college are also using the e-mail to contact other lecturers regarding work matters. Thus, the early adopters who are indulging in this activity can already perceive the relative advantages of time efficiency and ease of communication.

On the other hand, 85.7% of the late adopters do not find this activity as beneficial. Only two of them are currently contacting colleagues for professional purposes. However, it is still irregular in nature. This is related to the fact that they perceive their e-mailing skills as very basic and have problems with Internet access at home.

Thus, very few of the late adopters are utilizing the e-mail to enhance professional communication with their colleagues. It can be seen that this particular use of Internet innovation is still very low in its diffusion level among the late adopters.

Another way that the teacher trainers in the Klang Valley are enhancing their professional communication via the Internet is to contact individuals outside of the college premises. With regard to this aspect, 35.7% of the early adopters are already communicating with individuals or teacher trainers outside of their respective teacher training colleges as compared to 7.1%of the late adopters (Table 4.38). Thus, it is clear that it is predominantly, the early adopters who are carrying out external professional communications via the e-mail application.

Two of the early adopters especially those who studied abroad are very enthusiastic about the potential of the e-mail as a convenient mode for enhancing professional communication and collaboration with former professors. One of them contacts her colleagues from other teacher training colleges via e-mail to exchange teaching materials and ideas in her area of specialization. She also contacts former friends who are studying overseas by e-mail for professional communication in this area. The remaining three early adopters contact officers in the Teacher Training Division for queries that are coursework and assessment-related.

The use of the e-mail to communicate with individuals in other teacher training colleges is very rare among late adopters. So far, only one late adopter is indulging in this type of mutually beneficial communication. This may be due to the fact that this late adopter realized that he could use the e-mail application for fast and convenient exchange of educational-related materials.

With regards to the use of the e-mail for professional communication with individuals outside of the college premises, it can be seen that its use is still very limited in the teacher training colleges in the Klang Valley. More of the early adopters are using it to collaborate with individuals and academicians outside of the teacher

training colleges as compared to the late adopters. The early adopters can already perceive the benefits of e-mailing outsiders as a means of obtaining additional academic materials and keeping abreast with the latest developments in their area of specialization.

The data in Table 4.38 also show that collaborating with key-pals is still a relatively new development even for the early adopters in the study. In this form of professional communication, the teacher trainers in the Klang Valley have started utilizing the e-mail application to collaborate with other institutions of higher learning on joint projects. So far, only 28.6% per cent of the early adopters and 7.1% of the late adopters are carrying out this kind of collaboration.

A study by Jacobsen (1998) revealed that the early adopters in her study already reported using the e-mail to participate in international discussions with colleagues overseas on similar educational programmes for the purposes of professional discourse and management as well as for administrative purposes.

Similarly, one of the early adopters finds the e-mail extremely useful for a key-pal project, which is currently in progress between the teacher training college and a local university,

> "*So for like the PKPG programme* (Graduate Teacher Education Programme) *which is running, they ask us to send questions to the lecturers there in UPSI* (University Perguruan Sultan Idris). *Sometimes you have to contact the lecturers about the development of this educational project.*" *EA12*

Similarly, another early adopter is already collaborating via the e-mail with the Teacher Training Division (BPG) on a computer project, which is known as the 'Intel Project' while two other early adopters are involved in a key-pal project that involves the teacher training college and a university which is based overseas.

On the other hand, only one late adopter is carrying out similar professional collaboration with a university on a joint twinning program. However, this is not on a regular basis.

Thus, the teacher trainers who are involved in these kinds of professional communication are already collaborating on examination, coursework and administrative matters as well as in the exchange of academic materials. Therefore, the Internet gives teacher trainers increased opportunities to use tools such as the e-mail to enhance their professional communication with institutions of higher learning and individuals locally and overseas.

The main implication of these findings is that early and late adopters differ in ways in which they perceive the usefulness and relevance of the e-mail application in their personal life and professional careers. Although, 64.3% of the late adopters are using the e-mail for professional purposes, only 28.6% of them are currently engaging in the three types of professional collaborative activities that have been adopted by the early ones.

It also proves that although early adopters are already using the e-mail application, they perceive it more beneficial for professional rather than for personal purposes. This is related to the fact that more of the early adopters are using the e-mail to collaborate on professional joint projects. More of them are also using the e-mail to contact colleagues and individuals as well as teacher trainers outside of their respective teacher training colleges compared to the late adopters.

This can also be explained by the study of Agarwal *et al.*, (1999) which describes differences in communication behavior among early and late adopters. They note that early adopters exhibit greater social participation, and are more highly interconnected through personal networks in the relevant social system than late adopters.

The current values and beliefs of the early adopters in the use of the e-mail for professional purposes may also be closely linked to their home Internet ownership. The quantitative analysis revealed that all the early adopters have already acquired computers with Internet connection in the home premises compared to two-thirds of the late adopters. It also indicated that they are significantly deriving more professional gratification from the use of the Internet.

Another plausible explanation for the higher professional utilization of the e-mail and the WWW applications among the early adopters is that they are familiar with these applications as they are already exploiting them in the teaching and learning process. The quantitative analyses also indicated that the early adopters significantly derive more instructional gratification and are significantly more competent in the use of the Internet.

As such, early adopters who perceive these technologies useful for instruction will tend to use them more for professional purposes because they are already comfortable in using these applications. This finding was also substantiated in the findings of Karchmer (1999) who reported that teachers who used the Internet to support teaching and learning experienced many changes that affected their professional roles. These changes were reflected in their communication with colleagues, parents and students as well as changes in professional responsibilities.

In contrast, the diffusion of the e-mail application for professional purposes is much lower among the late adopters. This could be attributed to the fact that the quantitative analyses indicated that the late adopters had significantly lower refocusing concerns than the early adopters reflecting that they are not too keen in exploiting the universal potentials of the different Internet applications. Since they had significantly lower self-perceived competencies in Internet use, this finding also suggests that the late adopters lack the literacy and may still be anxious in using the e-mail application.

Ruberg and Miller (1999) suggested that computer literacy in relation to technology influences the speed and effectiveness of e-mail communications. However, a computer-anxious person may find the technological process intrusive and may need to overcome this fear before he or she can use the e-mail effectively.

Similarly, Russell (1995) found that educators who were anxious about using the e-mail could not adjust to this application, as there is loss of control over the physical appearance of information and loss of personalization of communication of social context clues. Thus, the late adopters could be facing similar problems such as those mentioned by Russell (1995).

Conversely, the early adopters have managed to expand their Internet use for professional communication, which improves their teaching. Thus, the rates at which the Internet is being incorporated into the teacher-training curriculum would also be reflected in the frequency of usage of these applications.

4.10.7 Frequency of Usage of the WWW and E-Mail Applications

Table 4.39 shows the frequency of usage of the WWW and e-mail applications of the early and late adopters in a typical week. Overall, the data analyses show the early adopters are using the WWW and e-mail applications more frequently as compared to the late adopters in all the categories of usage.

For example, 28.6% of the early adopters are using the WWW once a day as compared to none of the late adopters. Besides that, more of the early adopters (28.6%) are using the WWW once a week as compared to the late adopters (21.4%). Similarly, more of the early adopters (42.8%) are using the WWW a few times a week compared to 35.7% of the late adopters.

Table 4.39
Usage of the WWW and E-Mail of Early and Late Adopters in a Typical Week

Frequency of Use	EA				LA			
	WWW		E-Mail		WWW		E-Mail	
	N	%	N	%	N	%	N	%
More than once a day	-	-	-	-	-	-	1	7.2
Once a day	4	28.6	4	28.6	0	0.0	2	14.3
Once a week	4	28.6	5	35.7	3	21.4	0	0.00
Few times in a week	6	42.8	5	35.7	5	35.7	3	21.4
Seldom use	0	0.0	0	0.0	3	21.4	3	21.4
Never use	0	0.0	0	0.0	3	21.4	5	35.7

EA = Early Adopters, LA = Late Adopters

With regards to frequency of use of the WWW, an early adopter says,

"For work purposes, I would say two to three hours per week. I want to use

more, I wish I can use it more." K2

Correspondingly, a study by Kelly (1998) found that early adopters among

faculty members at the University of Maryland would use the WWW more frequently

and for longer periods of time than the late adopters.

As expected, there are more late adopters who hardly use the WWW and e-mail

applications. Nearly twenty-one percent of the late adopters hardly use the e-mail and

WWW applications. The data analyses also indicate that 21.4% of the late adopters do

not use the WWW while 35.7 % of them do not use the e-mail application in a typical

week. This finding indicates that the late adopters among the teacher trainers are not

using these applications on a weekly basis but could be using them on a much more

irregular basis.

There are also more early adopters (28.6%) who are using the e-mail once a day

as compared to 14.3% of the late adopters. Moreover, there are more early adopters

(35.7%) who are using the e-mail once a week as compared to none of the late adopters. In addition, there are more early adopters (35.7%) who are using the e-mail a few times a week as compared to 21.4% of the late adopters.

Thus, it is evident that the early adopters are using the e-mail more often than the late adopters in all categories of frequency of usage. Similarly, a study by Henry (1998) found that the e-mail was the most widely used Internet application for communicating with colleagues daily for work-related purposes.

Overall, with regards to the frequency of use of the Internet applications, it can be seen that the early adopters are investing more time in utilizing these technologies because of their belief that their investment of time would eventually yield positive personal and professional returns (Rogers, 1995).

An important implication of this finding is that the early and late adopters differ in the frequency in which they are utilizing the different Internet applications, with the early adopters using the various Internet applications more frequently.

It is also important to interpret this finding with caution because high frequency of usage of the Internet applications may not necessarily reflect higher levels of integration of the Internet into the teaching and learning process. This is related to the fact that Falba's (1999) study on technology use indicated that over 50% of teacher-educators reported teaching with Internet only once during the 1997 spring semester. A similar study by Fusayil (2000) reported that although more than four-fifths of the respondents in his study from Ohio University were using e-mail and WWW applications on a regular basis, these uses were mainly for research and not for instructional purposes.

Brown (1999) also found that even though teacher education faculty members in Arkansas reported frequent use of the e-mail and WWW applications, the data showed a low level of knowledge for hardware, software and basic trouble shooting

skills needed for the effective integration of these technologies into the teaching and learning process.

4.11 Instructional Use of the Internet

In order to answer the sixth research question: In what ways do early and late adopters differ in their instructional use of the Internet in the teacher training colleges in terms of: a) perceived importance of integrating the Internet into the education syllabus; b) using the Internet for classroom preparation; c) directing their students usage of different types of Internet applications; d) directing their students' frequency of usage of the Internet applications; e) designing Internet-based activities for students in instruction; and f) designing Internet-based activities for students in extra-curricular activities, qualitative analyses were carried out.

The data in the open-ended questions were analyzed by coding the important themes and frequency of responses for these categories in the Internet Use open-ended Questionnaire (IUQ). In-depth and line-by-line scrutiny analyses were also carried out for the interview data pertaining to this research question.

Education teacher trainers have integrated the Internet and its applications into the teacher-training curriculum by utilizing the WWW application for the preparation of their lessons. They have also begun designing Internet-based activities that incorporate the WWW and e-mail applications for their students. Basically, more of the early adopters have embraced Internet innovation and integrated it into the teacher-training curriculum than the late adopters, as they perceive it to be more important for the teaching of the education syllabus.

4.11.1 Perceived Importance of Integrating the Internet into the Education
 Syllabus by Early and Late Adopters

One of the purposes of this research was to study the perceptions of early and

late adopters towards the integration of the Internet into the education syllabus and to

see if both groups of teacher trainers differ in the way they perceive the importance of

instructional integration of the Internet.

The data in Table 4.40 show that all the early adopters feel that the Internet is

important for the teaching of the education syllabus in the teacher-training curriculum

as compared to only 57.2% of the late adopters.

Some of the early adopters consider the Internet as of prime importance in the

teaching of the educations syllabus. This can be seen from the comments of an early

adopter who remarked,

"In fact, I don't know how I lived without it."EA7

Table 4.40
Importance of Integration of the Internet into the Education Syllabus
to Early Adopters and Late Adopters

	EA		LA	
Integration of the Internet into the Education Syllabus	N	%	N	%
Important	14	100.0	8	57.2
Not important	0	0.0	5	35.7
Not sure	-	-	1	7.1

EA=Early Adopters, LA=Late Adopters

Similarly, another early adopter gave the following response.

"I feel it is a very important alternative as it provides reference materials and

there are many other benefits as well, because you can access information very

fast. Moreover, it is easy and there is a lot of information and it is very advance

and up to-date because it's so new."EA14

On the other hand, some of the late adopters still do not see the importance of using the Internet in the teaching of the education syllabus. This is evident from their responses such as,

"I have not done any courses that I teach using coursework portfolios. So far, I have not seen the need to incorporate the use of the Internet in the education syllabus."LA8

On the other hand, there is one late adopter, who is not sure of the importance of integrating the Internet into her teaching as she has yet to try it out.

To integrate, if there are facilities, sure I will use, but right not, how do we know whether it is important or not, I cannot answer, because I have never used it. If I have used, I would know." LA9

There are probably a number of reasons why some of the lecturers are able to exploit the potential of the Internet and its applications whilst others are not. For some of the late adopters, the Internet is more important for personal purposes. As such, this hinders the opportunity to try out the various Internet applications in the teaching and learning process. One late adopter felt that the education syllabus could still be taught via traditional methods.

However, 57.2% of the late adopters already perceive the Internet to be important for the education syllabus.

"There is a lot of scope for education and practicum, and for teaching methods, research, psychology and others." LA13

Thus, it is encouraging to note that more than half of the late adopters already perceive the importance of integrating the Internet into the education syllabus. Although, some of the late adopters are deriving the same instructional benefits, more of them are deriving personal rather than instructional benefits from the use of the Internet.

In accordance with this, the CEO Forum School Technology and Readiness Report (Year Two) (1999) stated that, 'Only 20% of teachers report feeling very well prepared to integrate education technology into classroom instruction.' This report implies that eighty percent of teachers still do not perceive incorporating education technology into the instructional process as an important endeavor.

Thus, McKenzie (1999b) advocated that the late adopters had special characteristics that made them different from early adopters and that they had to be treated with respect if they were to embrace new technologies.

On the other hand, more of the early adopters perceive using the Internet as important for the teacher-training curriculum as it provides them with reference materials and the latest information relating to the education syllabus, which is constantly updated by the Teacher Training Division.

Thus, the main implication of this finding is that the higher rate of diffusion of Internet applications among the early adopters for professional purposes can be attributed to their placing more importance in utilizing the latest educational technologies in the instructional process. This finding is also supported by the fact that the early adopters significantly derive more instructional gratification from the use of the Internet.

This is also reflected in the way they are infusing the Internet in the pre-teaching phase for the preparation of the lessons and also in the manner in which they are integrating the Internet indirectly into the education syllabus in the teacher-training curriculum.

4.11.2 Use of the Internet for Preparation of Lessons by Early and Late Adopters

A study carried out by Becker and Anderson (1998) found that one of the ways instructors in American classrooms used resources from the Internet was in classroom

preparation activities. Similarly, the education teacher trainers in the Klang Valley also utilize the Internet for the preparation of their lessons.

Table 4.41 shows that nearly all the early adopters (92.8%) are already using the Internet for preparing for their classes. On the other hand, only 35.7% of the late adopters have already started using the Internet to prepare for classroom lessons while another 35.7 % are only doing it on an irregular basis.

Table 4.41
Using the Internet for the Preparation of Lessons
by Early Adopters and Late Adopters

	EA		LA	
Use of the Internet for Preparation of Lessons	N	%	N	%
Using	13	92.8	5	35.7
Not using	1	7.2	4	28.6
Sometimes	0	0.0	5	35.7

EA= Early Adopters, LA= Late Adopters

This can be linked to the findings in the interview data, which revealed that 50% of the early adopters found the Internet extremely useful especially for locating information quickly as compared to only 7.1% of the late adopters. It was also found that more of the early adopters (35.7%) perceive the Internet useful for accessing information on the latest developments in the field of education as compared to 28.6% of the late adopters.

Some of the early adopters find the Internet very useful for the preparation of lessons that require them to discuss difficult topics and current issues.

"I take the important topics like creative and descriptive analyses. The topics that I give, like in the 'Curriculum Topic', there is a section on current issues and trends. For this section, I take a lot of materials from the Internet, because there are a lot of current developments, they also have examples." EA14

The early adopters also perceive the Internet to be useful for preparing lessons on new topics in the education syllabus as these topics are not found in the present college textbooks.

> *"Like the other day, I wanted to download for the KPLI* (Graduate Teacher Programme). *Now, there is one more topic for the KPLI on 'Emergent Curriculum'. I just go there* (WWW) *and is quite useful for my teaching."EA13*

Similarly, some of the late adopters find the Internet extremely useful for getting reference materials for specific topics in the education syllabus.

> *"Depends on what topics, like 'Multiple Intelligence'. I use to check on the Internet. I read the articles and sometimes use the notes to deliver to my students."LA13*

However, more than half of the early adopters described how by integrating the Internet into their teaching increases faculty workload, at least initially. In addition, it also takes more time and effort than traditional classroom preparation.

> *"I do but even after I get the materials for the KDPM* (Pre-service Teacher Programme), *I have to do the translation for them* (from English to the National Language), *just in point form. I take out the gist and give it to them." EA7*

Similarly, another early adopter explains the extra work entailed in preparing lesson plans with the Internet as,

> *"I use the Internet to source for materials, then I translate the important points from them and save it into PowerPoint."EA1* (Appendix J)

Appendix J shows a sample page of the Microsoft PowerPoint presentation of this early adopter in the area of behavioral modification. The early adopter had resourced materials from the Internet in the preparation of this lesson. For example, the notes in slide 5 on Economy Token in this presentation were incorporated from the following website: http://www.pacificnet.net/~mandel/Special Education.html under the article titled 'Behavioral Modification Systems'.

Although the early adopters are aware that it takes them more time to prepare materials and resources using the Internet, they indicated that they are willing to engage in this self-directed use as it provides enriched learning opportunities for their students. The late adopters who are using the WWW for the preparation of their classes are going through the same procedures.

>*"I do use it, then I translate it and put into transparency. It is not for*
>
>*distribution to my students." LA9*

Thus, the preparation of lesson plans using the Internet is an extremely tedious process for these Malaysian teacher trainers. This could be because after accessing the relevant articles pertaining to the education syllabus, they have to translate the important points into the National Language, before transferring the translated materials on transparencies or into PowerPoint presentations. Nevertheless, the early adopters in the study believe that the investment of their time and effort will eventually yield a return as the materials that have been prepared with the use of the Internet can be utilized many times over.

A case study analyses by Jacobsen (1998) found that the early adopters among educators in North American universities also faced the barriers of technical problems and of translating students' submission for one electronic format to another in the instructional use of the Internet. Jacobsen (1998) also reported that the main drawback of integrating the Internet into classroom preparation was the increased time spent developing and preparing materials for instruction.

Similarly, other studies reported that educators in western settings face numerous problems in the preparations of lessons using the Internet. McKenzie (1999) reported that little had been done to prepare late adopters for the networked computers flooding into their rooms and indicated that these teachers might not be sure about the methods of preparing their classes using the Internet.

For example, comments by a late adopter provide evidence of some of the problems faced when using the Internet for the preparation of her lessons, such as,

"Last time, I used to find for education, I just go for education and then click on something and print out, but when I give to my students, they do not want. All they want is to refer to the textbook." LA2

Despite these problems, the late adopters who are using it on an intermittent basis can already see the potential of the Internet for the preparation of their lessons.

"I have tried before, there is a lot of information up there. After I have found the articles, I print it out and give to my students."EA6

Thus, in the aspect of self-directed use, all the early adopters are using the Internet for the preparation of their lessons. However, only a third of the late adopters are using the Internet for similar purposes. Another third indicated that they have just started using the Internet towards this end. Thus, this finding contradicts Haris's (2000) study, which revealed that the highest percentage of use of both computers and the Internet among teachers at Carl Schurz High School, was for preparing instructional materials.

The main implication of this finding is that there is a big difference in the way in which the two groups of teacher trainers are using the Internet to prepare their lesson plans. Over ninety percent of the early adopters are carrying out this activity on a regular basis and perceive this activity beneficial for them compared to only one-third of the late adopters. Thus, it can be implied that one of the main instructional gratifications that is being derived by the early adopters is utilizing the WWW for the preparation of their lessons as it has shown to improve the quality of teaching and learning.

Thus, the findings of the study also indicated that both groups of teacher trainers realized the potential of the Internet as a source of reference for materials in the pre-teaching phase and they are basically using the same methods in the preparation of their

lessons using the Internet. Consequently, the education lecturers have started to direct their students to use the various Internet applications in the teacher-training curriculum.

4.11.3 Directing Students' Use of Internet Applications by Early and Late Adopters

Currently, in the integration of the Internet in the teacher-training curriculum, the education teacher trainers have to take the initiative to direct their students to use the various Internet applications. This is due to the fact that most of the teacher trainees would not use Internet applications without these initiatives. Only a very small number of them are Internet savvy and can use this innovation on their own accord.

For example, so far only one of the early adopters reported that when she started directing her students to use the Internet, she discovered that some of her students are already using the Internet for instructional purposes on their own initiatives,

"I ask the PKPG (Graduate Teacher Programme) students to find stuff from the WWW, but they also find on their own initiatives." EA6

However, most of the time the teacher trainers in the Klang Valley have to direct their students to use specific Internet applications to promote the use of this new innovation in the teacher education sector.

With regard to the use of Internet applications, the data in Table 4.42 show that the early and late adopters are already directing their students to use the WWW, e-mail and newsgroup applications in their coursework and assignments in the teacher-training curricula. However, more early adopters are directing their students to use all of these applications as compared to late adopters.

The data in Table 4.42 also show that all the early adopters are already directing their students to use the WWW application for academic purposes as compared to 78.6 percent of the late adopters.

Table 4.42
Directing Students' Use of Internet Applications
by Early Adopters and Late Adopters

Types of Internet Applications	EA		LA	
	N	%	N	%
WWW	14	100.0	11	78.6
E-Mail	8	57.1	5	35.7
Newsgroups	5	35.1	4	28.6
Internet Relay Chat (IRC)	1	7.1	0	0.0
Listservs	0	0.0	0	0.0
FTP	0	0.0	0	0.0

EA= Early Adopters, LA= Late Adopters

The responses of the early adopters from the interview data further indicate ways in which they are directing their students to use Internet applications. The qualitative analyses provide the evidence that some of the early adopters have to make these directives compulsory as they feel that the students would not use the Internet otherwise.

"Things like this, (use of WWW) you have to make it compulsory. If not, only those who are keen are the ladies from Kuala Lumpur. I notice only a few of them, like four or five students who use, and it is because of their parents and computers in their homes." EA5

Other early adopters cite ways in which they are making it compulsory for their students to use the WWW. One of them is including Internet requirements into the evaluation forms of the students' coursework. Hence if the students use the Internet, they are awarded extra marks.

"I find the Internet especially useful for the Psychology syllabus. I am also the coordinator for Semester 3 KKB (Coursework Portfolios), *and I have already*

put it down in the coursework guidelines that is compulsory for students to use the WWW in their portfolios. " EA9

Eleven of the fourteen late adopters find that they have to make it compulsory for their students to use the Internet.

"We give them presentation seminars, they have to find from the Internet because we insist. Because they have a lot of work, if we do not insist, they will not do." LA13

However, there are also early adopters among the teacher trainers who are just encouraging their students to use the Internet and are not making it compulsory for their students.

"Well, I always encourage my students to refer to the websites that I have bookmarked." EA12

Another early adopter encourages her students to read some of the articles that she finds on the Internet.

"If they are related and appropriate to the subject that I am teaching, I will download and print the articles out (from the WWW) *and give to my students to read." EA9*

While in most cases, the early and late adopters are directing their students to use the Internet via printed guidelines, the findings in the interview data revealed that more of the early adopters are making it compulsory for their students to use the Internet than the late adopters. The early adopters rationalized that if not for this compulsion, most of the trainee teachers would not make concerted efforts to integrate the Internet into their coursework, even with the incentives of higher marks.

An important finding of this study is that there are no specific instructional guidelines by the administrators in the teacher training colleges pertaining to the direct use of the Internet in classroom settings. Thus, the late adopters do not feel the need to integrate the Internet directly into the education syllabus nor do they feel pressured to

attain higher levels of competencies in the different Internet applications for the purposes of teaching and learning.

On the contrary, the quantitative analyses of the study indicated that three of the early adopters were already integrating Internet directly into their teaching by bringing in their own wired computers into the classrooms. The findings of the study also revealed that early adopters having high intrinsic motivations in learning new technologies indicated their desire to learn more Internet-based pedagogies if given more direct Internet access in the teacher training colleges.

About seventy-nine percent of the late adopters have also started directing their students to use the WWW application. However one of the late adopters complained that even after directing her students, there is no assurance that they will use the WWW application.

"Even if I ask them to download things from the WWW, I see nothing there (in the coursework portfolios), *I put a zero. They don't bother, very bad attitude, you know." LA2*

This finding indicates that although the late adopters are trying to make their students use the Internet, they are not sure if their students are following their directives. Provisions have already been made in the teacher-training curriculum for students to have access to the Internet as well as for acquiring skills in the use of this innovation.

Thus, the benefits that the teacher trainers associate with using the Internet for learning do not appear to be universally available to all their students. There are probably a number of reasons why some teacher trainees are still not able to exploit the potential of the Internet. Besides lacking the knowledge and skills and not having access to computers at home, some of the early adopters feel that not all students perceive the Internet useful for learning.

This is evident from the responses of the early adopters who find that despite directing all their students to use the WWW, only certain groups of students are more inclined to use this application than others. As one of the early adopters says,

> "*The KDPM* (Diploma Teacher Programme) students *seldom use the WWW,*
> *unless you ask them. The KDPM here is like that, only the PKPG* (Graduate
> Teacher Programme) *group will use." EA13*

These findings indicate that early adopters are concerned about student evaluations on their teaching and student access and equity issues, but may continue to integrate new technologies because of their enduring beliefs about the relative advantages and the potential benefits of Internet innovation for their students.

Not only are the teacher trainers asking their students to make use of the WWW application, they are also directing them to use the e-mail application. With regards to the use of the e-mail, more of the early adopters (57.1%) are directing their students to use this Internet service as compared to 35.7% of the late adopters.

The data in Table 4.42 also show that fewer of the early and late adopters are directing their students to use the e-mail application as compared to the WWW application. Only half of the early adopters and about a third of the late adopters are directing their students to use the e-mail as students may have restricted access to this Internet application and the fact that teacher trainees still lack the skills of utilizing this technology.

This is evident from the responses of the early adopters who find that their students still have limited knowledge of e-mail operations. Consequently, some of them are very willing to spend their own time to enhance their students' knowledge in using this technology.

The literature review in this area suggests that faculty members who are early adopters of instructional technology for teaching and learning are self-directed in nature. Thus, they are most willing to spend their own time and resources to the extent

of giving individual tutoring in order to enhance to use of instructional technology (Wertheimer & Zinga, 1997).

There are also early adopters who find that directing students to use the e-mail is not that important as directing them to use the WWW because most of the students in the teacher training colleges live in hostels and due to the close proximity, there is less need for them to use the e-mail to communicate with students.

> *"Until now, students send their assignments to my house* (the early adopter is a hostel warden). *As the students stay in the hostel, they do not need to use the e-mail."EA3*

Among the late adopters, five of them (35.7%) are already directing their students to use the e-mail application. However, this usage among the students is not so regular. Some of the late adopters explained that they are not using the e-mail application because their students lack access to computers and the Internet in the college.

> *"No, because the trainees do no have their own pc's (personal computers) and there is limited access to the Internet in the college." LA8*

Thus, directing students to use the e-mail application is still a new development in the teacher training colleges in the Klang Valley. Similarly, Mckenzie (1999) reported that even though the e-mail application could be utilized for collaborative projects among educational institutions, many schools had yet to initiate these kinds of efforts.

Currently, more of the early adopters perceive the e-mail to be beneficial for professional communication with their students as an avenue to further improve their teaching practices. Although half of the early adopters can already envision the use of the e-mail for instructional purposes, about sixty four percent of the late adopters still lack this foresight. This could be attributed to the fact in the quantitative analyses,

which showed that late adopters significantly perceived their Internet competency as lower than that of the early adopters.

A related study in the area of Internet integration by Fusayil (2000) investigated the extent to which faculty members in six campuses in Ohio University used Internet applications in the teaching and learning process. Fusayil's study found that 98.8% of faculty members used e-mail and 86.8% of them used the WWW for instructional purposes. Comparatively, the findings of this study indicate that the Malaysian teacher trainers' use of the WWW for instructional purposes is high, but their use of the e-mail for similar purposes is relatively low.

In addition, the use of newsgroups for instructional purposes is still very limited among the early and late adopters. With regards to newsgroups, the data in Table 4.47 show that more early adopters (35.7%) are directing their students to use newsgroups as compared to 28.6 percent of the late adopters.

The finding indicates that more early adopters than late adopters realize the importance of newsgroups for the purposes of instruction. However, both groups of teacher trainers realize the potential of newsgroups as a source for locating additional information on selected topics.

In a study on computer integration by Jacobsen (1998), respondents from North American universities reported using listservs and newsgroups to participate in international discussions with colleagues about integrating technology into their teaching, collaborating with peers at other institutions for their course development and delivery using a wider array of media, and also sharing more of their work with students. Related studies have indicated that there is a lot of potential for these applications for professional and instructional purposes (Page, 1999). Similarly, Partee (1997) reported that newsgroups aid in facilitating discussions among introverted students.

However, the usage of newsgroups and file transfer protocol (ftp) were rarely mentioned by Alberta school teachers in a study of integration of computer technology by Gibson & Oberg (1997). A similar scenario also applies to the teacher training colleges in the Klang Valley, as the early and late adopters are yet to integrate ftp and listserv applications into the teacher-training curricula. As such, Wallace (1998) in his study recommended that there is a need to investigate specific educational uses of the different Internet applications.

The findings of the study indicate that the use of newsgroups for instructional purposes is already evident in the teacher-training curriculum. However, more than half of the early and late adopters are still unaware of the instructional benefits of this application.

Thus, it can be seen that directing students to use Internet applications such as newsgroups, listservs and file transfer protocol is still not so popular among the education lecturers in the teacher training colleges in the Klang Valley. On the other hand, the teacher trainers perceive the WWW and the e-mail applications as most useful for their students.

The findings of the interview data also showed that the respondents in the study are aware of the various benefits their students can derive from these Internet applications. About 21.4% of the early adopters find the Internet useful as a research tool for student reference. However, none of the late adopters stated this benefit. On the other hand, an equal number of early and late adopters (14.3%) find it useful as an additional source of accurate information for their students. Both groups of teacher trainers also perceive it to be a useful source for professional discourse (14.3%) and a tool to encourage higher order thinking skills among their students (14.3%).

Hence, it can be seen that early adopters have higher rates of integrating the WWW and e-mail applications into the teaching and learning process because they are convinced about the potential benefits and value of these technologies for their

students. Subsequently, these perceived benefits would be indirectly reflected in the frequency in which the teacher trainers are directing their students to use these applications.

4.11.4. Directing Students' Frequency of Usage of Internet Applications by Early Adopters and Late Adopters

In the open-ended questionnaire, the teacher trainers were asked about the frequency in which they are directing their students to use the different types of Internet applications, as it would reflect the rate of incorporation of the Internet into the teacher-training curriculum.

Table 4.43 shows the frequency in which the early and late adopters are directing their students to use the WWW and e-mail applications in the teacher training colleges in the Klang Valley in a typical academic semester.

The data in Table 4.43 shows that more of the early adopters (28.6%) are directing their students to use the WWW at least once in a semester as compared to only one of the late adopters doing so. This late adopter admits that although she realizes the importance of the WWW application for research, she is doing it on a very intermittent basis.

"Recently, I was teaching on Multiple Intelligence, so I told them to get articles on Multiple Intelligence (from the WWW). I want the latest. This was only once."LA4

Table 4.43
Directing Students' Frequency of Usage of Internet Applications by Early
Adopters and Late Adopters in a Typical Academic Semester

| Frequency of Use | Early Adopters | | | | Late Adopters | | | |
| | WWW | | E-Mail | | WWW | | E-Mail | |
	N	%	N	%	N	%	N	%
Once a semester	4	28.6	2	14.3	1	7.1	0	0.0
More than once a semester	2	14.3	2	14.3	0	0.0	0	0.0
Few times a semester	6	42.9	3	21.4	5	35.7	1	7.1
Many times a semester	1	7.1	1	7.1	1	7.1	0	0.0
Seldom used	1	7.1	2	14.3	3	21.4	6	42.9
Never used	0	0.0	4	28.6	4	28.6	7	50.0

There are also more early adopters (14.3 %) who are directing their students to use the WWW more than once a semester. However, none of the late adopters are directing their students to do this. On the other hand, only one early and one late adopter (7.1%) are directing their students to use the WWW many times in one semester.

More of the early adopters (42.9%) are also asking their students to use the WWW a few times in one semester as compared to 35.7% of the late adopters.

One of the late adopters who is in this category commented,

"Only for the coursework portfolios because some of the students get the stuff from the Internet. Apart from that, hardly, because we have to do other things, not really with the Internet. We hardly have enough time to finish the syllabus."

LA14

Thus, the data imply that more of the early adopters realize the importance for the teacher trainees to utilize this application in the teaching and learning process on a frequent basis.

In the use of the e-mail application, more of the early adopters (14.3%) are also directing their students to use the e-mail once a semester and more than once a semester as compared to the late adopters. None of them are doing so.

Similarly, more of the early adopters (21.4%) are directing their students to use the e-mail applications a few times in one semester as compared to only 7.1% of the late adopters. So far, only one early adopter is directing his students to use the e-mail many times in a typical academic semester.

The data analyses in Table 4.43 also indicate that 7.1% of the early adopters seldom direct their students to use the e-mail as compared to 42.9 % of the late adopters during the academic semester. It also shows that 28.6% of the early adopters are still not directing their students to use the e-mail as compared to 50.0% of the late adopters in the same period. This is related to the fact that these early adopters are currently directing their students to use only the WWW application, as they perceive it to be more useful for their coursework portfolios and assignments.

The implication of these findings is that both the early and late adopters are already directing their students to use the WWW application on a regular basis, although more of the early adopters are doing this. On the other hand, more of the early adopters are directing their students to make use of the e-mail application in the teaching and learning process. However, its use is not as frequent as the WWW application. So far, only one late adopter has directed his students to use the e-mail a few times for instruction in this particular academic semester.

Thus, the findings of the study provide further evidence that more early adopters have realized the perceived benefits of using the different Internet applications on a regular basis and want to extend these to their students. This could also be related to the findings about early adopters among faculty members in two North American universities in Jacobsen's (1999) study. Jacobsen found that early adopters, besides having the self-confidence in using technology for teaching and learning on a regular

basis, also have high intrinsic motivation and a belief structure that integrating new technologies into their teaching is the right thing to do.

Hence, the teacher trainers have already taken the initiatives of directing their students to use the WWW and e-mail applications. They have also gone a step further by designing Internet-based activities utilizing these applications in the teaching of the education syllabus in the teacher-training curriculum.

4.11.5 Ways in which Early and Late Adopters are Designing Internet-based Activities with the WWW and E-Mail Applications

In many studies in the area of Internet integration, teachers have had students use the Internet for research or information-gathering activities more than for any other purpose (Gibson & Oberg, 1997, Becker and Anderson, 1998). One of the main findings of this study is that more early adopters are utilizing the WWW application for professional purposes compared to the late adopters. Similarly, Jacobsen (1998) found that ninety percent of the early adopters in her study used the WWW application more for research and professional tasks compared to the late adopters.

The findings of this study indicated that the early and late adopters are basically designing activities for research work via the WWW application. About half of the early adopters are also designing instructional and academic exchange activities via the e-mail application for their students. Only the early adopters are currently designing Internet-integrated projects for their students in extra-curricular activities in the teacher-training curriculum. These teacher-directed activities are explained in greater detail in the following sections.

4.11.5.1 Designing Research Activities via the WWW Application

In a study on Internet use in schools in Alberta, Canada by Gibson and Oberg (1997), students were using the Internet for the completion of class projects, such as

researching for information, building homepages, game-playing, accessing chat lines and surfing for fun on topics of personal interests. Similarly, in a study on Internet use in fifty-two national schools in America, Becker and Anderson (1998) found that one of the main instructional uses of the Internet was to get students to use it as an alternative source of information and for research.

Likewise, all the early adopters in the teacher training colleges in the Klang Valley are already directing their students to use the Internet for research (Table 4.44). In addition, 85.7% of the late adopters are also directing their students to use the Internet for similar tasks.

Table 4.44
Directing Students to do Research via the WWW
by Early Adopters and Late Adopters

	EA		LA	
Research via the WWW	N	%	N	%
Directing students	14	100	12	85.7
Not directing students	-	-	2	14.3

EA= Early Adopters, LA= Late Adopters

Thus, it can be seen that all the early adopters and a high number of late adopters are currently directing their students to incorporate articles from the Internet into their assignments especially into their coursework portfolios. The high number of teacher trainers directing their students to do research activities via the Internet is related to the fact that the college authorities have drawn up a work schedule relating to coursework portfolios that encourage this initiative (Appendix K).

Appendix K shows the work-schedule that encourages teacher trainees to access articles from the Internet as a source of reference and to identify key facts and present these facts as mind-maps in their portfolios. This is indicated in Item One under the 'Strategy and Activity Column.' However, this directive is not compulsory. Students

are also encouraged to collect articles from books, magazines, journals and other academic sources in this work-schedule.

In relation to this initiative, the early adopters are getting the pre-service teachers to locate subject-specific information on the Internet for the various topics outlined in the coursework portfolios such as on drug abuse. One early adopter said,

> "For *Semester 4 KDPM* (Pre-Service Teacher Programme*) yes, specifically for the National Drug Agency."* EA3 (Appendix L)

Appendix L shows a sample page of the bibliography of a coursework portfolio on drug abuse that provides the evidence that this early adopter's student has incorporated materials from the Internet into his work. For example, a Malaysian website that this student has incorporated into his portfolio can be found at http://www.laman.map.com/khidmat/dadah/dadah.html.

Some of the early adopters envision futuristic gains for their students when they direct their students to use the Internet.

> *"I encourage my students to use the Internet in their KKB (coursework portfolios) because the methodology and techniques in preparing the KKB and presenting the seminars can be used by trainees when they go to school."* EA12

The early adopters have also realized that by directing their students to use the Internet for research activities, they are paving the way to make their students more self-reliant.

> *"Okay, the courses that I am teaching is professionalism and students are very concerned about issues like classroom management. So I encourage them to get materials from the Internet. I expect them to be independent learners."* EA7

Besides that, the early adopters are directing their students to find accurate information on a particular topic of interest.

> *"For the PKPG* (Graduate Teacher Programme) *students, I also give them certain aspects to surf the Internet. This was also in the area of Eastern*

Philosophy. My students have to find materials and documents in this topic and

they have to present the web addresses in their assignments. " EA12

About eighty-six percent of the late adopters have also directed their students to

use the Internet for research activities especially in finding alternative sources of

information for their coursework portfolios.

"Yes, I am asking them to use the Internet. Normally, for their KKB portfolio, I

think about 30% of my students are already using the Internet to find

information on Micro-Teaching. " LA14

Thus, a high majority of the late adopters have directed their students to use the

WWW for research. The late adopters, especially those who are more competent in the

use of the Internet, provide the evidence of how they are directing their students to

incorporate this innovation into the teacher-training curriculum.

"Yes sometimes, like certain materials, I sort of give them the web address

where they can get it, then sometimes I give them an exercise to get certain

kinds of materials and they make an effort to look for it. What I do is when I

give them an assignment; I sort of get appendixes, which are being attached to

their work. That indicates that they have actually browsed through the WWW

and got the relevant information. "LA6

Thus, it can be seen that both the early and late adopters have initiated the use

of Internet resources into classroom teaching situations by directing their students to

use the Internet.

However, some of the late adopters call for the use of the WWW application for

specific purposes in the education syllabus but do not follow-up on their students'

progress.

"I have been telling them in the evaluation, the number of sources that are

available, however, I wouldn't know if they take the trouble or not. "LA9

Other late adopters are directing the students to use the Internet to source materials that that are not available in college textbooks. However, they do not monitor their students' use of the Internet.

"The last semester, there were no portfolios, only assignments and tests and all the topics in subject of Guidance and Counseling, can get from any source. Except for the topic of Multiple Intelligence, I ask them to find from the Internet. But not all of them did it." LA4

Although the late adopters are directing their students to use the WWW application, there appears to be a lack of supervision by them as to how far their students have actually utilized this innovation in the teaching and learning process.

On the other hand, the early adopters monitor and check on the extent of Internet integration carried out by their students. Statements made by education department members provide proof that as a result of the directives such as the above, they are starting to see for themselves the evidence of the integration of the Internet in the teacher-training curriculum. As one of the early adopters says,

"That was what I did for my first group yesterday, I flip back to the bibliography and I can see a significant number (students who have integrated the Internet into their assignments). *First, I see the number of them in the class. There were about twenty of them in the class. I saw at least seven or eight consciously using websites in their bibliography. I said okay, that is a start." EA4* (Appendix M)

Appendix M shows a sample page of an assignment of this early adopter's student on the ability of the National Language to foster unity in Malaysia. It provides the evidence as to how this teacher-trainee has incorporated findings from the Internet and how he acknowledges this source in his assignment. The quotation that this student has referred to in the sample page is sourced from the following website: ittp://www.a.tech.ac.jp/~itesli/links/TESL/Articles/z_Other/p4.html.

Likewise, he quoted various sources from the Internet in other parts of his assignment.

The early adopters also make an extra effort to ensure that with these directives, their students are also being given the proper guidance in using the Internet for instructional purposes, as mentioned by one of them.

"In the process for example, I tell them how to write the bibliography for the various types of websites. I want the APA style. So now, they have given me the exact way to write."EA4

An individual among the early adopters is also checking on the authenticity of the web-addresses that her students submit for their assignments.

"Once in a while, the students are assigned, to send in the different web sites that they have found in the form of attachments. I also make sure the students send in authentic stuff by checking on their web addresses at random just to make sure they are authentic." EA12

Comments made by the early adopters provide the evidence that more of them (14.2%) are checking on some of the web addresses that their students submit in their assignments.

"Also, when I have the free time I take the trouble to check on their web addresses at random, just to make sure they are authentic and if they are relevant and useful, I will bookmark them into my own computer."EA12

Thus, it can be seen that although both the early and late adopters are directing their students to use the WWW application, they seem to have different approaches to the instructional integration of the Internet. This is based on the fact that more of the early adopters are already directing their students to use the WWW and have also initiated the efforts of making periodical checks on Internet integrated work to ensure the authenticity and reliability of the WWW references that are cited by the students in their college coursework and assignments.

The early adopters were also more consistent and systematic in their directives to their students on the use the Internet. They also make extra effort to monitor the reliability of Internet-based materials that are being sent in by their students. One of them has even gone one step further by guiding his students to write Internet-based bibliography accurately.

On the other hand, although there are quite a high number of late adopters who are carrying out this initiative, the late adopters tend to be inconsistent in their directives to their students on how to use the Internet. In addition, they do not monitor the rate and quality of the Internet-integrated work. This is also in line with the findings of McKenzie (1999b) who found that late adopters are teachers who have not yet blended these tools into their daily classroom learning activities.

The main implication of these finding is that differences do exist between the early and late adopters in their efforts to incorporate the Internet in the teacher-training curriculum. This can be attributed to the fact that early and late adopters differ in their characteristics towards the adoption of Internet innovation. This is also supported in the quantitative findings of the study, which indicated that early and late adopters differ significantly in their methodologies of integrating the Internet into the teacher-training curriculum.

In line with this, the qualitative data confirmed that the intention of providing enriched learning opportunities for their students motivated more of the early adopters to direct them to utilize the WWW application in the education syllabus. The motivation for early adopters to integrate technology into their teaching tends to be located in their beliefs about professional teaching.

On the other hand, although the late adopters believe that the instructional integration of the Internet is less important, this did not necessarily result in a lower rate of integration into the teacher education syllabus. Hence, despite perceiving the Internet as less important and having significantly less computer and Internet experiences and

self-perceived Internet competencies, more than three-quarters of the late adopters are still able to integrate the Internet into the instructional process as evidenced by the manner in which they are integrating the WWW application into the education syllabus. Another way is which the teacher trainers are designing Internet-based activities is by using the e-mail application for academic exchange and instruction.

4.11.5.2 Designing E-Mail Activities for Instruction and Academic Exchange

In a study on Internet use by Becker and Anderson (1998), they reported that very few teachers have had students use e-mail to contact other individuals for their research projects. He also reported that with a limited number of computer stations in the classrooms, teachers have difficulty in getting students to collaborate with individuals outside of the classroom walls.

Similarly, the data in Table 4.45 indicate that few early adopters (21.4%) have started to direct their students to use the e-mail application to make enqueries regarding their assignments while only one late adopter (7.1%) has done so.

Three out of the fourteen early adopters are already directing their students to contact them via the e-mail regarding their queries about assignments. They encourage these initiatives by giving students their e-mail addresses as well as teaching them how to use the e-mail.

"Trainees contacted me regarding teaching and learning, they make enquiries. I reply their e-mails, although there are not so many." EA8

So far, only one out of the fourteen late adopters is directing his students to use the e-mail to contact him if they have any problems regarding their assignments. However, he finds that they are not doing it regularly.

"The e-mails that they sent me is usually assignment-related, but not many."
LA6

Table 4.45
Directing Students to Communicate via the E-Mail
By Early Adopters and Late Adopters

	EA		LA	
Directing students to use E-Mail	N	%	N	%
Directing students to make queries for assignments	3	21.4	1	7.1
Directing students to send in assignments	2	14.3	0	0.0
Directing students to send in web addresses	2	14.3	0	0.0

EA= Early Adopters, LA= Late Adopters

Another way in which the teacher trainers can utilize the e-mail is by directing their students to use it as a medium to send in their assignments. Only two early adopters among all the education teacher trainers have adopted the use of e-mail for this higher level of Internet use in the instructional process.

"*I am asking my students to e-mail their assignments* (via attachments) *to my hotmail account. They also need to send their PowerPoint presentations via the e-mail.*" *EA1* (Appendix N)

In relation to this directive, Appendix N shows a sample page of the hotmail account of the early adopter, which provides the evidence of some of the text and PowerPoint assignments that have been sent in by her students via attachment files.

To get her students to do this, this early adopter has prepared an evaluation form that specifically directs her students to send in their completed assignments via the e-mail. An example of this form is shown in Appendix 0.

The interview data also revealed the students of this early adopter are required to send in their uncompleted assignments by e-mail when they are out of the college premises or if they are out on their practicum experience. However, the early adopter finds that this kind of integration is quite difficult to implement, as there are basic

problems to solve because her students still lack the fundamental skills of using the attachment feature in the e-mail application.

Further response by another early adopter indicates how she was directing her students to use the e-mail application in her students' assignments.

"I am also asking the Semester 2 students to send in articles that they have retrieved via the Internet, and send it to me via attachments on the e-mail. My purpose here is so that they will learn how to use the e-mail and attachments. This is because I want them to know what the e-mail is all about and see their level of IT literacy." EA12

This is in line with the descriptions in the literature which suggest that faculty members who are innovators or early adopters of instructional technology for teaching and learning are very eager to try out an innovation and are willing to spend their own time and resources to enhance their students' technology literacy (Roblyer, Edwards & Havriluk, 1997).

Another evidence in which the e-mail application is being integrated into the teacher-training curriculum is that 14.2% of the early adopters were asking their students to e-mail them the web addresses that they have accessed from the Internet.

"Once in a while, my students are also assigned to send me different website addresses that they have accessed for their assignments, via attachments in the e-mail." EA12

Thus, utilizing the e-mail for instructional purposes still appears to be at a very infant level among the education teacher trainers. So far, only late adopter was using the e-mail for instructional purposes in the teacher training colleges in the Klang Valley.

One of the late adopters commented that the lack of usage of the e-mail in instruction is most probably due to the lack of computer ownership and Internet access among the trainee teachers in the college.

"How to use the e-mail in the college when the computer facilities are not open

to the lecturers and the students, cannot use e-mail in the department. Even a

computer for normal word processing is not there. " LA9

It can also be seen that directing students to contact the lecturers for queries and

questions about assignments via the e-mail application is a relatively new development

in the teacher training colleges in the Klang Valley. Early adopters are already using

the e-mail for instructional exchanges by directing their students via written

instructions. On the other hand, the late adopters are hardly carrying out this type of

academic exchange.

In a recent study by Jacobsen (2000) at two major American universities, the

applications that were being used by more than 50% of the faculty members in their

teaching were word processing; (60.5%), e-mail; (67.1%) and the WWW for browsing

and searching (56.6%).

Comparatively, the use of e-mail for teaching and learning purposes among the

Malaysian teacher trainers is relatively low. Although half of the early adopters have

started the trend of using the e-mail application for instructional purposes, this is a very

new use of Internet technology in the teacher-training curriculum.

One likely explanation for this finding may reside in the ability of early

adopters to take risks (Rogers, 1995). They have the willingness to try out new

information technology. Early adopters are likely to be impulsive by nature and may

not think through the reasons and implications for their actions. According to Agarwal

et. al, (1998) they may dive in and try the technology due to their curious and risk-

taking nature, and not necessarily base their decisions on the concrete advantages for

doing so. However, late adopters may carefully consider the reasons and consequences

for adopting new technologies.

Currently, it can be seen that the late adopters among the teacher trainers still do not perceive the e-mail application as a very useful Internet technology as they cannot perceive the relative advantages of utilizing it in the teaching and learning process.

Thus, if the perceived relative advantages of using the e-mail application increases and its complexities are reduced, more of the late adopters will adopt this innovation for instructional purposes. Brown's (1999) study indicated that usage of the Internet applications among teacher educators increased over time. In her study, 66% of the respondents reported frequent use of the Internet or e-mail to locate information about the teaching profession. The study also indicated that compatibility between the WWW and e-mail applications and teacher educators is increasing as Internet tools are being developed specifically for educational and educational-related uses.

4.11.5.3 Designing Internet-based Activities for Students in Extra-Curricular Activities

The final assessment for every student in the teacher training college encompasses marks for the three main components in the teacher-education curriculum namely: (a) academic, (b) practicum and (c) Gerko (extra-curricular activities). Thus, these last two components have also to be taken into consideration in the aspect of integration of the Internet in the teacher-training curriculum.

Table 4.46
Directing Students to use the Internet for 'Gerko' and E-Practicum
by Early Adopters and Late Adopters

	Early Adopters		Late Adopters	
Gerko and E- Practicum Activities	N	%	N	%
Use in 'Gerko' Portfolios	2	14.3	0	0.0
Use for 'Gerko' Management	2	14.3	0	0.0
Use in E-practicum	1	7.1	0	0.0

Currently, all teacher trainers are required to manage at least one Gerko activity in the teacher-training curriculum such as Girl Guides Society, Red Cross Society, Athletics and so forth. The data in Table 4.46 show that only 35.7% of the early adopters are integrating Internet into the various Gerko activities in the teacher-training curriculum as compared to the fact that none of the late adopters are doing so.

One of the early adopters has started utilizing the WWW to source a wide variety of materials and ideas for the delivery of the theoretical part of the Gerko course. This is evident from the response of this early adopter, who says that,

"*I am also involved in Gerko like Athletics and Gerko Management, so I have managed to get a lot of materials for lecturers on these two areas. I get from the Internet, but not necessarily under Sports. Sometimes I get materials like '100 Tips for Runners' and 'How to Take Care of Your Heart'.*"EA3

Another early adopter has also found the Internet to be extremely useful for Tennis, one of the extra-curricular activities, which she is in charge of in the teacher training college. She finds that with the availability of the Internet in the college library, she can direct her students to incorporate sources from the Internet for their tennis coursework portfolio, which her students are required to produce as part of the evaluation exercise for extra-curricular activities.

"*I find it* (the Internet) *useful for Gerko because I am involved in tennis and have interest in it and have asked my students to use it in their portfolios.*"
EA13 (Appendix P)

Appendix P shows a sample page of the bibliography of a tennis portfolio of this early adopter's student on the life of 'Andre Agassi.' It provides evidence that this early adopter is already directing her students to integrate various resources from the Internet into the extra-curricular component in the teacher-training curriculum. This early adopter finds that by using resources from the Internet, the quality as well as the

creativity of the students' portfolios have improved tremendously as compared to tennis portfolios that were done by her students using traditional methods.

On the other hand, none of the late adopters are using the Internet for Gerko-related activities in the five teacher training colleges. However, one of the late adopters perceives that the Internet could be useful for the PBSM (Red Cross Society), a uniformed society that is run under the Gerko program.

Another new use of the Internet for non-academic activities is e-practicum. Only one of the early adopters was involved in this project whereby she collaborated with her students by checking on their lesson plans via the e-mail application prior to the actual teaching observations. Currently, this early adopter is also supervising two teacher trainees who have to e-mail their lesson plans via attachment files to her on a regular basis (Appendix Q).

Appendix Q illustrates a sample page of a lesson plan that has been sent in by a teacher trainee via the e-mail to the early adopter for evaluation.

This early adopter has also further adapted Internet innovation by getting her students to send in their reflections about their teaching experience via the e-mail (Appendix R).

Appendix R shows a sample page of a reflective activity, which has been sent in by the early adopter's trainee after an observation of her actual teaching in the classroom. The early adopter reads the reflections about the practicum experience and makes the necessary comments and then e-mails it back to her trainees, which she does on a regular basis. Appendix S provides the evidence of the frequency in which she carries out e-practicum and e-evaluation with her trainees.

Thus, this kind of collaboration via the e-mail is mutually beneficial to both parties as the teacher trainees are aware of their mistakes prior to implementing their lesson plans and are able to rectify their mistakes before being observed by the teacher trainers.

As for the early adopter, she is able to see the relative advantages of this arrangement as it saves her the time of checking lesson plans in school settings. Moreover, as a result of the regular professional exchange, the lesson plans of her students have become more structured, thus ensuring more efficient and quality teaching experiences. This is also in line with the findings of Hadley and Sheingold (1993), which indicated that significant changes take place as teachers integrate computers into instruction.

Thus, it can be seen that four out of the fourteen early adopters have been able to adapt the use of the Internet for extra-curricular activities. However, none of the late adopters are using the Internet in extra-curricular activities. Thus, it is apparent that the late adopters are still unaware of the great gains that can be derived from the investment of time and resources of integrating the Internet and its applications into the non-academic components of the education syllabus.

Another implication of this finding is that early adopters are willing to experiment with instructional technology and are ready to experiment with innovative ways of using the Internet and its applications in the teacher-training curriculum. This is also a new development specific to the teacher-education sector in Malaysia.

According to Rogers (1998) and Agarwal *et al.,* (1998), early adopters use innovations even when the uncertainty surrounding its potential is high and the benefits of the innovation have not become visible and accepted. Similarly, Jacobsen (2000) found that early adopters who were interviewed in her study, seem to be frequently changing teaching and learning processes, reformulating and pushing the edges of problems, creating and designing alternative solutions and are more at ease with risk taking than the status quo.

This would also explain why the early adopters are able to integrate the Internet and its applications in teaching in a more innovative and creative manner. The study showed that although the early adopters have developed personal expertise and have

adopted the Internet in the education syllabus in more ways than the late adopters. all

department members experience barriers when attempting to integrate computers and

Internet technologies in the teaching and learning process.

4.12 Problems and Needs of the Early Adopters and Late Adopters in the Integration of the Internet in the Teacher-Training Curriculum

In order to answer the seventh research question with regards to the integration

of the Internet in the teacher-training curriculum: In what ways do early and late

adopters differ in terms of: a) problems faced in achieving this aim, b) perceived needs

to achieve this aim; the data in the open-ended questions and interviews were analyzed

by coding the important themes and frequency of responses for these categories in the

IUQ. In-depth and line-by-line scrutiny analyses of the responses were also carried out

to seek answers to this research question.

4.12.1 Problems faced by Early and Late Adopters in the Integration of the Internet in the Teacher-Training Curriculum

As the Internet is a relatively new innovation, educators face a lot of barriers

when integrating it into the instructional process. Becker & Anderson (1998) reported

that even though a majority of teachers have still not used the Internet in their teaching,

and even fewer have used it in a major way, there may be many reasons for this.

Among them are the recent development of Internet tools and resources, the rapidity

with which technologies are changing, the limited opportunity that teachers have had to

see how the Internet can be used in their practice and the rarity of fast and convenient

Internet access.

Similarly, integrating the Internet into the teacher-training curriculum may

create problems for the education lecturers who prefer a more traditional approach in

the teaching and learning process. In the interviews conducted, the teacher trainers

described some of the fundamental problems they faced in the instructional integration of the Internet into the teacher-training curriculum.

Table 4.47 summarizes the problems that are faced by both the early and late adopters in the instructional use of the Internet. The data analysis shows that the major problems for both the early (85.7%) and late adopters (64.3%) are the lack of computer hardware and Internet accessibility in the teacher training colleges in the Klang Valley. However, more of the early adopters were concerned about this problem compared to the late adopters.

This finding indicates that even though there is Internet availability in the teacher training colleges in the Klang Valley, the education lecturers are apparently not getting access to it.

Some of the concerns relating to this problem were expressed by most of the early adopters.

"First of all there are not enough pc's (personal computers) *for all the lecturers, the limitation of the hardware is the hindrance to the usage of the Internet in the college. Moreover, the education department itself does not have Internet access. "EA1*

"Limited computers, even in the library. To use the computers in the library is not practical, because many students use the library and the lack of time due to other workload. " EA6

Table 4.47
Problems faced by Early Adopters and Late Adopters
in the Integration of the Internet in the Teacher-Training Curriculum

	EA		LA	
Problems Faced by Education Lecturers	N	%	N	%
Lack of Internet connection	12	85.7	9	64.3
Lack of computer hardware for lecturers	10	71.4	8	57.1
Low literacy rate of lecturers	3	21.3	2	14.2
No time during office hours	3	21.3	5	35.7
Lack of Internet hardware for students	3	21.3	2	14.2
Low literacy rate of students	3	21.3	1	7.1
Reliability of sources of from the Internet	2	14.2	1	7.1
Maintenance of computers	2	14.2	1	7.1
No printing facilities	2	14.2	0	0.0
Pay for Internet service	2	14.2	1	7.1
Virus corruption	2	14.2	0	0.0
Translating Internet materials from English to Malay	0	0.0	3	21.3
Lack of materials in National language	0	0.0	2	14.2

EA= Early Adopters, LA= Late Adopters

Department members among the late adopters who advocate the integration of

the Internet in the teacher-training curriculum cite similar problems, that is, the lack of

computer hardware and Internet accessibility as well as the lack of Internet training for the teacher trainers.

"It starts with the facilities, if you have the facilities, and they (the lecturers) *don't want to access, it is different. But, now basically you can't use the Internet. Moreover, there is not much training."LA13*

This finding is also substantiated by the quantitative data, which showed that it is the home Internet access and not the Internet access at the workplace, which is contributing significantly to the integration of the Internet in the teacher-training curriculum.

This is also related to the fact that the teacher trainers have to share Internet access with the teacher trainees. As such, they do not have privacy or comfort in utilising the Internet access that is provided in the teacher training colleges in the Klang Valley.

Another important implication of this finding for the Teacher Training Division is that the current Internet access in the teacher training colleges in the Klang Valley is not accessible to all the education teacher trainers as it is primarily located in computer laboratories and libraries.

According to Honey and Moeller (1990), there is less collaboration and peer tutoring in a computer laboratory setting. Further to this, Bredekamp and Rosegrant (1994) found that if computers were placed in the classrooms, there were more chances of teachers creating an environment for exploration and both parties being engaged in the learning process.

This is also supported in the studies of Fisher (1991) and Honey and Moeller (1990) who found that children's developmental gains resulting from using appropriate software were significantly greater when computers were placed in classroom settings than in computer laboratories.

Another problem cited by the early and late adopters in the teacher training colleges in the Klang Valley is time constraints. About 21% of the early adopters and 35.7% of the late adopters lack the time to utilize the Internet in the workplace due to their heavy workload.

Similarly, another finding on barriers faced by teachers in Internet use indicated that time is a major constraint (York, 1998). Bowman (2001) and Matthew (1998) also found that the lack of time in utilizing the Internet as a significant obstacle for integrating the Internet into the teaching and learning process. The fact that more of the late adopters had time constraint problems can also be explained by the finding of Jacobsen (2000) who found that mainstream faculty members and late adopters take a longer time to integrate technology into teaching and learning than early adopters.

Another problem faced by the education lecturers is the lack of skills in utilizing the Internet for instructional purposes; 21.3% of the early adopters and 14.3% of the late adopters have this problem.

Similarly, Hogan (1999) found cultural complexities and administrative as well as technical hurdles as significant obstacles that were faced by educators during the implementation of Internet-based instruction.

On further analyses, the response from the interviews indicated that the early adopters are more concerned about the lack of Internet competencies among their colleagues than that of their own.

"The level of Internet expertise of lecturers is still low, especially for the

lecturers from the non-IT departments." I1

The early adopters are also worried about their lack of pedagogical know-how in integrating the Internet and its applications into the teacher-training curriculum.

" I still do not know the correct pedagogical methods of integrating Internet

and its applications into the teaching of the education syllabus." EA7

Similarly, Witfelt and Hansen (1999) advocated that teachers faced the problem of lack pedagogical competencies in relation to Internet use in schools. These included lack of knowledge of self-paced, project-oriented and problem-based work that could be implemented with the various Internet technologies. Gold (1999) also found that lack of pedagogical training among faculty members attributed to the problem of widening of Internet skills gap among educators.

Early adopters appear to regard Internet knowledge and skills as one type of expertise, and the pedagogical skills as another type of expertise (Jacobsen, 1998). Thus, there is a need for the early adopters to acquire more pedagogical skills for the successful integration of the Internet in the teacher-training curriculum as they already have basic Internet knowledge and skills. On the other hand, the late adopters did not show much concern for their lack of pedagogical skills in relation to their Internet use.

This is evident by the fact that the responses of the late adopters indicated that they are more worried about their own Internet skills in the utilsation of the various Internet applications.

"To communicate via the e-mail I cannot. I am only able to download and print materials from the Internet." LA1

Jacobsen (2000) also found that early and late adopters faced different sets of problems in the instructional use of the Internet. Early adopters described the impediments of equipment and software failures, poorly designed classrooms and slow and clumsy Internet connections as their main barriers. On the other hand, late adopters complained of the lack of time to develop instruction that uses computers; problems of scheduling enough computer time and resources for different students; too few computers for the number of students; and inadequate financial support for computer integration from the administration.

Similarly, the data analyses from the interviews showed that more of the early adopters are worried about the lack of Internet hardware (21.3%) for their students as

compared to 14.2% of late adopters. In addition, more of early adopters (21.3%) as compared 7.1% of the late adopters are concerned about the lack of skills among their trainees in utilizing the Internet. This is evident from comments made by an early adopter.

"The main problem is that the students' level of expertise is low and there are

not enough computers. Teacher-trainees do not have the skills although they

have gone for Information Technology classes. "EA1

Slightly more of the early adopters (14.2%) are troubled by problems of maintenance of computers and get upset by problems of virus corruption and breakdowns in the server connection as compared to 7.1% of the late adopters. About 14.2% of the early adopters also get agitated if printing facilities are not provided together with computers with Internet connection and a similar number are troubled by the fact that they sometimes have to pay for Internet access.

A problem which is related to the maintenance of computers is that the teacher trainers have to repair the computers themselves and this is troublesome as most of them do not have the time nor the skills to carry out this type of work and have to depend heavily on a few personnel who have trouble-shooting skills.

The other problem that is more prominently faced by 21.3% of the late adopters is the cumbersome task of translating materials from the Internet into the National language as their students' lack proficiency in the English Language. About 14.2% of them are also worried about the lack of availability of materials in the National Language on the Internet. However, none of the early adopters faced these problems.

The late adopters find the translating process of Internet articles from the English language to the National language both time-consuming and tedious.

" As the materials are English, that is a problem as the teacher trainees seldom

refer to the materials because of the language. And there is a lot of work in the

college and time is a problem. Moreover, the environment is not conducive for

me to use the Internet." LA1

Other studies have reported on the barriers faced by educators in the instructional integration of the Internet. In a study on 400 faculty members from two northern American education universities, Kelly (1998) mentioned the three primary reasons that were given by faculty members for the lack of use of the Internet for instructional purposes. These are limited availability of relevant resources, the lack of technical assistance, and the lack of institutional incentives.

It seems clear from the nature of the responses that early and late adopters basically faced similar problems in the instructional use of the Internet in the teacher-training colleges in the Klang Valley. However, more of the early adopters faced problems that are related to the lack of access to the Internet at the workplace, lack of knowledge of pedagogical methodologies of integrating Internet into instruction, maintenance of existing hardware and trouble-shooting support from the college authorities. More of the early adopters are also worried about the lack of access for the teacher trainees as well as the low Internet literacy rate among their students.

On the other hand, more of the late adopters are worried about the lack of proficiency of their students in the English Language and lack of materials in the National Language for their students. Thus, the problems faced by both the early and late adopters should be taken into consideration when the teacher training colleges plan for future instructional integration of the Internet.

4.12.2 Needs of Early and Late Adopters for the Integration of the Internet into the Teacher-Training Curriculum

The data in Table 4.48 summarizes the needs of the early and late adopters that may enhance the instructional integration of the Internet in the five teacher training colleges in the Klang Valley.

Table 4.48

Needs of Early Adopters and Late Adopters for the Integration of the Internet into the Teacher-Training Curriculum

	EA		LA	
Needs of Education Lecturers	N	%	N	%
Computers with Internet access in the education department	12	85.7	10	71.4
Computers with Internet access in a special room	3	21.4	-	-
Courses on pedagogical methodologies of integrating the Internet.	4	28.6	-	-
More training to enhance Internet literacy	3	21.4	8	57.1
Curriculum with assessment based on the Internet	3	21.4	3	21.4
Addresses of relevant websites to be incorporated into the education syllabus	2	14.2	-	-
Post lecture notes on the WWW	2	14.2	-	-
Electronic maintenance officers	2	14.2	-	-
Discussion forums on the use of the Internet	2	14.2	2	14.2
More online facilities for educational topics	2	14.2	1	7.1
More computers for students	-	-	3	21.4
Internet literacy for students	-	-	3	21.4

EA= Early Adopters, LA= Late Adopters

It can be seen that the education lecturers who advocate the integration of the Internet cite a variety of needs for continued and future integration of the Internet in the teacher-education sector. Among them are; 1) computers with Internet connection in the education department, (2) computers with Internet connection in a special room, (3) more training in Internet use, (4) pedagogical methodologies of integrating the Internet into instruction and (5) a curriculum where the assessment is based on the Internet.

A high number of the early adopters (85.7%) and late adopters (71.4%) have indicated that they want to have Internet access in the education department, as it will provide them with ease of use.

> *"We need to have computers with Internet access in our own department and if you only have one computer on line, it would be good enough, we can use it straight away." EA2*

Another 21.4% of the early adopters specified that if the Internet access could not be provided in the education departments, computers with Internet links could be placed in special rooms where they could have access to it at all times. However, none of the late adopters indicated this need.

However, many of the late adopters expressed the need to have Internet access in their own departments as some of them have to go to other departments to get access to a computer.

> *"Look at me, I have high skills but I have no chance to use, there are a lot of things you can find on the Internet, but there is no opportunity to use the Internet, even in our own departments." LA8*

Thus, it can be seen that the most urgent need of the education teacher trainers is to increase the accessibility of computers with Internet connections in all the teacher-training colleges in the Klang Valley. More Internet access should be made available in the education departments or in special rooms as the teacher trainers have indicated

that this is their most immediate need for further instructional integration of the Internet.

The data analyses indicate that there is also a pressing need for the enhancement of the Internet competencies of the early (21.4%) and late adopters (57.1%). However, both groups of teacher trainers require different sets of Internet skills. This was also proven in the quantitative section of the study, where *t*-test analyses revealed that there were significant differences between early and late adopters in their self-perceived Internet competencies.

The data analyses from the interviews indicate that the early adopters are keen in mastering more advanced Internet skills. This is also related to the fact that more of the early adopters (28.6%) are interested in acquiring more knowledge on the correct pedagogical methods of integrating the Internet in the teacher-training curriculum. However, none of the late adopters indicated a similar need at this juncture.

This is evident from the response of an early adopter who commented,

"I feel all the lecturers in the education department can already use the Internet, there are none who cannot use. All are clever, so we need much higher Internet skills." EA3

Thus, the early adopters indicate that they need more training in the utilization of the latest Internet applications and instructional uses of the Internet.

"Also Internet courses, hardware courses, courses for the lecturers need to be updated especially, in programming and the knowledge of looking for stuff on the Internet, because if you have the skills, you should be able to locate the websites and use them in your teaching." EA1

Another early adopter also indicated that she needed to go for more advanced Internet courses pertaining to the education syllabus.

"I should also go for more courses on the search skills, like how to look for stuff

in the education syllabus and how to find educational sites first. I need courses

on more advanced skills of the Internet." EA9

Another 14.2% of the early adopters have also indicated the need to have

electronic maintenance officers to handle computer and Internet connection breakdown

problems as they rather spend their time on enhancing their existing Internet skills.

On the other hand, the late adopters have indicated the need for more training in

basic skills of using the Internet.

"Courses on how to access the Internet, and courses to build simple websites

and basic skills, in the use of the Internet and its different applications. I think

all of us need more basic skills in the Internet"LA6

"We need courses on how to use the Internet to find articles faster and how to

be selective and how to use the search engines more effectively."LA11

Thus, both groups of teacher trainers show a keen interest in upgrading their

present level of Internet use. However, the late adopters are interested in enhancing

their basic Internet competencies whilst the early adopters indicate the need to acquire

more skills in advanced Internet competencies and instructional methodologies of

utilizing the Internet.

The interview data revealed that the education teacher trainers wanted to

acquire higher levels of Internet-related competencies relating to more advanced search

skills and higher levels of knowledge in the various Internet applications such as

newsgroups, listservs and file transfer protocol. Carroll (1999) suggests that successful

information retrieval from the Internet is systematic and that there may be strategies

that can be taught to teachers. Thus, there is a need for teacher trainers to develop the

appropriate competencies to select and navigate appropriate databases on the Internet.

At the same time, the early adopters and the late adopters who have a higher

level of Internet use are aware of the fact that Internet integration into the education

syllabus has not reached its highest potential. About 21.4% of both the early adopters and late adopters indicated that one of the ways to increase this rate of integration would be to make provisions for assessment based procedures in the teacher-training curriculum that include Internet-integrated activities.

Initiatives such as these may ensure that students use the Internet in the education syllabus in the teacher-training curriculum. Thus, the Teacher Education Division needs to use evaluation as a tool to enhance the instructional use of the Internet in the teacher-training colleges in the Klang Valley. As commented by an early adopter,

> "I always see the evaluation as a tool to encourage certain things to bring about certain changes. At the macro level, I would think that it is important to create a need for lecturers, for the teachers and for the learner. That would help much in increasing the literacy, accessibility of training and accessibility of hardware, all these help in the integration of IT." EA5

The findings of the study also indicated that both groups of teacher trainers are determined to upgrade their existing levels of Internet knowledge and are thinking of ways in which they can enhance the use of the Internet in their teaching. This is attributed to the fact that an equal number of early and late adopters (14.3%) expressed the need for discussion forums on the use of the Internet among teacher trainers.

In relation to this, one of the needs that was expressed by the early adopters (14.2%) related to enhancing the rate of integration of the Internet into the education syllabus in the teacher-training curriculum The early adopters want the web addresses that are relevant to the topics that they are teaching to be incorporated into the education syllabus handbook, as this will hasten the search processes for these websites for the purposes of teaching and learning. It can also be seen that the early adopters feel that the time has come for lecture notes to be posted on the WWW as a source for student reference and for more online facilities for educational topics on the Internet.

Another issue that must be considered by the Teacher Training Division is that teacher trainers are not really clear about what Internet competencies are expected of them for the instructional use of the Internet. As such, the current pattern of integration of the Internet into the teacher-training curriculum is rather haphazard. This is evident from the findings of the study which proved that more of the early adopters were making it compulsory for their students to carry out Internet-integrated activities while more of the late adopters were merely encouraging their students to do likewise.

Hence, the relevant authorities must realize that providing Internet training programmes, which are not structured to suit the needs of the early and late adopters, will drastically reduce the efficiency of such training programmes. This will also result in wastage of time and resources of the personnel in the IT unit who are in-charge of conducting these courses.

Thus, systematic Internet training will ensure higher rates of integration of the Internet into the teacher-training curriculum. Hogan (1999) and Ropp (1998) advocated that systematic computer and Internet training are crucial for enhancing the integration of the Internet into teacher-preparation programs. Their studies revealed that significant correlations in technology proficiency and computer-coping strategies were found at the end of well-structured Internet training programs.

Thus, this study provides the evidence that integration of the Internet in the teacher-education sector needs to be an integral part of the education syllabus and has to be conducted in a more systematic and planned manner. This will ensure more direct and varied forms of Internet-integrated activities in the teaching of the education syllabus.

4.13 Conclusion for the Qualitative Section of the Study

The qualitative section of the study confirmed the quantitative findings that the early adopters had higher rates of adoption of Internet innovation than the late adopters

in the personal and professional use of newsgroups and listservs, professional use of the WWW, as well as in the personal and professional use of the e-mail.

In addition, the early adopters perceived the Internet to be more important for the teaching of the education syllabus compared to the late adopters. They were also directing their students to utilize more Internet applications on a more regular basis.

The diffusion of Internet innovation was also higher among the early adopters than the late adopters in the following ways; a) using the WWW application for research, b) using the e-mail for instructional purposes, c) extending the use of the WWW and e-mail applications to extra curricular activities in the teacher-training curriculum.

The only aspects where the late adopters were using the Internet more than the early adopters were in the aspects of utilizing the WWW for personal purposes and for conducting professional research projects via this application. However, these differences are marginal. Thus, the qualitative analyses substantiated the quantititative findings of the study, which revealed that the early adopters were statistically higher in the variables of computer and Internet experience, home access to the Internet, self-perceived Internet competencies, refocusing concerns and in the professional and instructional gratifications derived from their use of the Internet. The evidence from the quantitative part of the study, which divided the adopters into the different stages of integration, is reflected in the case studies where the individual profiles further justify the differences among department members who readily adopt the Internet for their teaching tasks and those who seem hesitant or reluctant to adopt the Internet for similar tasks.

4.14 Case Studies

The qualitative analyses of the study indicated that the education teacher-trainers are currently engaging in teacher-directed and self-directed modes of

integration of the Internet into the teacher-training curriculum. Based on the interview data, both teacher-directed use and self-directed modes of integrating the Internet have enhanced the quality of the instructional process in the teacher training colleges in the Klang Valley.

These findings are in line with Falvo's (2000) study, which found that Internet-supported instruction helped to build a functional educational community and enhanced the teaching profession. In the same light, Carr and Bromley (1997) found that the Internet made schools more interesting and improved student achievement.

Thus, profiles of teacher trainers who are already integrating the Internet into the teacher-training curriculum can give further insights into ways in which the teacher trainers are integrating the Internet in academic areas and extending it to extra-curricular activities in the teacher training-curriculum. Two case studies provide some insights into the decision-making for Internet integration efforts of early and late adopters among the education teacher trainers in the Klang Valley.

These cases are meant to be useful accounts of the individual experiences with Internet integration, as well as to provide insights into the beliefs and values of individual education teacher trainers, their expectations for outcomes and benefits from using technology for teaching and learning, problems and needs for integration of the Internet into the teacher-training curriculum, and a variety of instructional strategies they use to support the educational processes.

The case studies further contribute to the understanding of the differences that occur between early and late adopters in the diffusion of Internet innovation among teacher trainers. This is also in line with Rogers' (1995) recommendation that calls for more diffusion research into the motivations for adopting an innovation. Wallace (1998) who carried out a study on the relationship between innovativeness and attitudes of teachers towards the Internet in his study recommended that Internet adoption

patterns of teachers be studied to ensure successful integration of the Internet and its technologies.

Similarly, Jacobsen (1998) in her study, which dealt only with early adopters, also recommended that future research in this area should also deal with late adopters to provide a more comprehensive picture of Internet adoption in an educational organization. Thus, a profile of a teacher trainer who is just starting to incorporate Internet innovation into the teacher-training curriculum is also presented to facilitate a comparison with the early adopter.

The reasons presented by the two case studies for their use of the Internet are important because they may impact the design of future inclusions of the Internet into the teacher education sector. This will also lead to a better understanding of late adopters and their lack of Internet usage in the teacher-training curriculum. According to Glaser and Strauss (1967), using comparison groups can strengthen a research study. In addition, they suggest that cases should be selected for their power to both maximize and minimize differences in a particular situation.

Hence, two cases: the early adopter (who is in the creative applications to new contexts stage as identified from the IIC) and the late adopter (who is in the understanding and application stage from the IIC) are presented from the same teacher training college (Appendix I).

The summary of the two detailed case studies are presented below to show the differences that exist between the early and late adopters of Internet innovation for teaching and learning purposes. Basically, the purpose of the summary is to highlight the main discrepancies that exist between the two detailed case studies.

4.15 Differences found between Early Adopter and Late Adopter in Detailed Case
Studies

The analyses of the two-adopter types in the detailed case studies (Appendix I)

prove that the early adopter is very passionate about Internet technology and the ways

of incorporating it into her teaching whereas the late adopter has a more lackadaisical

approach in embracing new technologies. Thus, the case studies further confirm the

quantitative and qualitative findings of the study that early adopters embraced Internet

innovation much earlier and adapted it in more creative and innovative ways in the

teacher-training curriculum than the late adopters. This is in line with Rogers (1995)

finding that the late adopter groups have a longer innovation decision period than the

early adopters in the adoption of an innovation.

The detailed case studies also reveal new data pertaining to the professional

development attitudes of both groups of teacher trainers. The data in the case studies

show that the early adopter is very interested in pursuing professional courses on the

latest computer and Internet technologies while the late adopter feels that these courses

are just a waste of time. However, the early adopter regards these courses as learning

opportunities and strongly believes that the lecturers and teacher trainees must use

computer and Internet applications regularly to enhance their knowledge of IT,

otherwise IT integration efforts would remain futile.

The early adopter is also very concerned about computer courses that are

organized in an unstructured manner and the lack of follow-up on these courses by the

relevant parties in the teacher training college. She also felt that some of these

computer courses are not effective as they are too basic and rather short.

Geoghegan (1994) describes early adopters as those who are more concerned

than the mainstream faculty members about using technology to address teaching

content and learning problems. They also want to use proven technology applications

with low risk of failure and view ease of use as critical.

On the other hand, the late adopter is less interested in pursuing professional development courses, as she believes that the computer is user-friendly and one can learn on one's own. The data in the case studies also indicates that she is quite convinced that she has not learnt much from her colleagues. Thus, it is quite obvious that this late adopter does not seek the subjective opinion of her peers in the use of the Internet. Although she has learnt to handle the Internet on a basic level from her counterparts, she has not been influenced to use the Internet and its applications in her teaching and learning process.

The case studies data also reveals new findings about the intrinsic motivations of the early and the late adopter. As it can be seen from the data in the case studies, the intrinsic motivation of the early adopter is very high. She is willing to share her time and her personal IT resources with her colleagues and students. She is also very eager to try out new ways of using Internet innovation in the education syllabus. One way that she does this is by taking the initiative to write her own directives to her students especially the in-service teachers to utilize the WWW and e-mail applications in the teaching and learning process.

On the other hand, the intrinsic motivation of the late adopter to adopt the Internet innovation is very low. This is related to the fact that she has a very set mind about the use of the Internet and is quite convinced that Internet innovation is not for her. The case studies data also reveal that the late adopter is not interested in exploring the many uses of the Internet for instructional purposes, as she believes strongly in traditional-driven pedagogies. In addition, she is not too disturbed about her students' lack of use of the Internet as she admits that only one-third of her students are using the Internet in their assignments.

Thus, the data in the case studies confirm the fact that the late adopter has a lackadaisical attitude towards the Internet and is not interested in novel ideas about teaching to enhance her own standards of professionalism. This is also related to the

fact that she has only done the minimum in complying with the requirements of the college authorities in the use of the Internet in the education syllabus.

The case studies further confirm the findings in the quantitative, open-ended questionnaires and interview data that the attributes of early and late adopters are different. This is also reflected in the attitudes of the early and late adopter towards Internet innovation, which are completely conflicting in nature.

The case studies also shed light into the reasons given by the late adopter for resisting the use of the Internet. A combination of reasons confirmed the late adopter's decision to reject Internet innovation in the teaching and learning process. This could be attributed to her lack of intrinsic motivation as well as the fact that she is going to retire soon. Although, the subject is well aware of the importance of the Internet, her argument for not embracing this technology stems from the fact that Internet innovation is more important for the younger generation. Besides that, she is not deriving much professional and instructional gratifications from her use of the Internet.

Another new finding revealed by the data in the detailed case studies is that the early adopter is very annoyed by the fact that some of her colleagues are not utilizing computers and the Internet but are still using handwriting for their professional work. The case studies data also gave further insights in how the early adopter played her role in increasing the observability and trialability of Internet innovation in the education department.

Whenever she had the time, she teaches her colleagues who show an interest in integrating the computer and Internet into their teaching how to use Microsoft Word, PowerPoint and e-mail applications. She is also helping the head of the department carry out administrative and professional work via the various Internet applications.

Her colleagues are aware that she is delivering her lessons on a daily basis via Microsoft Power Point program with notes incorporated from the Internet and the fact that she has initiated the e-practicum project and 'paperless evaluation' via the e-mail

application. They are also cognizant of the fact that she is helping the head of department send learning modules for the education psychology syllabus via the e-mail to teacher trainers in other states.

According to Geoghegan (1994), by making the adoption look relatively easy, early adopters disguise the extensive knowledge and skills that other faculty members will need in order to adopt a particular innovation. Similarly, Hamilton and Thompson (1992) suggested that educators should seek out early adopters who will enhance the diffusion process of any innovation. The facts presented in the case studies also infer that it is important for the early adopter to spread the word about Internet applications and strategies that work reliably, as this may generate more enthusiasm and widespread adoption by the late adopters in her organization.

However, the late adopter in the case study is not capitalizing on the Internet knowledge of the early adopter who is in the same organization as her. Thus, the new finding of the case study is in contradiction with Roger's (1995) theory that advocates that when an early adopter who is someone like us, shares a positive evaluation of an innovation, mainstream faculty members and late adopters will be more motivated to adopt it.

Another new finding in the case study data is that the early adopter feels frustrated by the fact that her students lack basic Internet skills. This is related to the fact that the early adopter was very conscious of the specific types of Internet searching skills that her students lack. She was also aware that many of her students still do not know how to use the attachment feature on the e-mail application.

On the other hand, the late adopter is not too concerned about the students' competencies in using the various Internet applications, as she is not going to change her style of teaching. Thus, based on her submission, it is quite evident that the subject is reluctant to embrace new innovations, as she clearly resists any kind of major change in the teaching approach.

Thus, this subject is least concerned about her responsibility to the teaching organization that she represents. According to Rogers (1995), resources and confidence of late adopters may be limited, as they are cautious and have less favorable attitudes in embracing any change.

In the confirmation process, it can be seen that after the process of stimulating awareness in the knowledge stage and having had the pertinent Internet skills and access, both domestically and at the workplace, and, being fully cognizant of the digital age, this late adopter has made the decision to adopt the Internet in a very marginal way, thus closing herself to the plethora of possibilities of adopting Internet innovation. On the other hand, the early adopter has made the decision to adapt and use the Internet in more creative and innovative ways in the teaching of the education syllabus.

4.16 Conclusion

The case studies presented in this study give insights into adoption patterns and characteristics of teacher trainers who integrate Internet technology into teacher-education. A goal that was accomplished with the two case studies was the generation of descriptive accounts that provide a means for drawing parallels and contrasts between the early adopter and late adopter profiles. The case studies revealed that there is very little consistency in what the two-adopter types regard as important and valuable instructional goals for the teacher education sector. On the other hand, there is diversity in the characteristics of the early and late adopters among the teacher trainers and their specific methods of integrating the Internet into the teacher-training curriculum.