

USING DISTANCE EDUCATION TO ENHANCE TECHNOLOGY TRANSFER

J.R. Peters and G.W. Hass¹

Abstract

There is an increasing need for farmers to be well educated in order to successfully manage today's complex farm businesses. At the same time farmers are unable to attend regular institutionally based programs. In many cases both farm spouses need and desire more education. Accordingly, the School of Agriculture and the Extension Division developed a Certificate in Agriculture program which resulted in regular, on-campus Diploma in Agriculture courses to be delivered off-campus throughout the province in an enhanced correspondence mode. Four were delivered for the first time in 1990-91 to the homes of 124 adult learners who had an average age of 35.5 years and of which 20.2 percent were female. In 1991-92 101 additional students, with an average age of 34.5 and of which 16.0 percent were female, started to take Crop Production courses from a choice of seven. In 1990-91 nearly 90 percent of the students completed the courses. Off-campus students out performed first year on-campus students by a considerable margin and performed on par with second and third year on-campus students. Course evaluations by students indicated that courses were interesting and applicable. A feeling of isolation, a common problem of distance learners, was successfully overcome by regular telephone contact and by periodic group sessions at regional centres, interconnected by telephone and satellite television with a University based tutor.

Introduction

The economic crisis in agriculture in the past five years has, without a doubt been a major concern for people both rural and urban. Indeed, there are times when one wonders if the agriculture industry will survive another day! Unfortunately the "crises" side receives most of the attention and usually overshadows positive activities which contribute to stability within the industry.

Fortunately, there still are many farmers who through good management practices, are operating financially stable businesses. Why is this so? One could answer this question by glibly saying "They are better farmers." But to truly define a "better farmer" requires more thought. When one reviews the literature, the one common trait of a "better farmer" that emerges is education, not necessarily in the formal sense but rather in terms of being able to acquire knowledge and successfully applying it to the farm business.

At this point it is important to make a distinction between information and knowledge. In his book "Megatrends" Naisbitt (1982) states "We are drowning in information and starved for knowledge." This statement is particularly appropriate to farmers. The number of product names alone is mind-boggling not to mention their specific uses.

¹ J. R. Peters, Associate Professor and Director, School of Agriculture, University of Saskatchewan
G. W. Hass, Associate Professor and Director, Professional Development and Community Education, Extension Division, University of Saskatchewan

However, the seriousness of the farm crises should not be made light of. Indeed, not since the 1930's have so many farmers faced the agony of losing their farm. The point is that education can and does play an important role in farm viability. The Task Force Report to Canadian Ministers of Agriculture relating to Farm Finance and Management (1991), states that "Several knowledgeable sources, including Farm Debt Review Board members, commercial lenders and provincial extension staff, have consistently identified improved management capability as an important part of the longer-term solution for farmers in financial difficulty." This makes it imperative that farmers have the opportunity to participate in education programs.

In recent years the number of young people obtaining this vital knowledge through education has declined significantly. A study of first year enrollment trends in agriculture production programs offered by post-secondary institutions in Ontario and the three prairie provinces shows a decline of 48.8 percent from 1983 to 1987 (Peters, 1989). The number of established farmers who have the pre-requisite training and education is also discouraging. Nineteen eighty six Statistics Canada data reveals that a large number of Saskatchewan farmers do not have any post-secondary schooling (Burrows, 1991). Although the percentage of farmers having university or post-secondary schooling increased from 7.9% in 1971 to 28.3% in 1986, 71.7% of 63,435 farmers in Saskatchewan still did not have schooling at this level. Included in this total were 14,590 farmers who had obtained schooling at the Grades 11 and 12 level, ideal candidates for educational programs in applied agricultural science.

The Challenge

The Challenge then is to provide educational opportunities which will empower the farm manager to successfully manage the farm business. This implies that the distinction between information and knowledge rests with the elements of structure and design which are inherent in sound educational activities. Without knowledge, information may be of little value. Or as Naisbitt puts it, "Without a structure, a frame of reference, the vast amount of data that comes your way each day will probably whiz right by you." (Naisbitt, 1990).

The challenge for educational institutions then is to provide a framework to facilitate the use of knowledge by farmers.

Meeting The Challenge

The University of Saskatchewan has a long history of agriculture extension. When the University was first chartered, the College of Agriculture assumed the three-fold role of teaching, research and extension; modelled after the Cooperative Extension system of the Land Grant Colleges in the United States. Even with the formation of the Agriculture Representative Branch by Saskatchewan Agriculture in 1947, the University continued to play a major role in the technology transfer process. This role is supported in the report to Ministers of Agriculture on Canadian Agricultural Research and Technology Transfer (July 1990) which concluded that Universities should play an expanding role to meet the needs of students who are not able to enrol in regular credit programs.

A 1989 survey of Saskatchewan farmers indicated that 85% of respondents supported a proposal to offer agriculture diploma courses throughout the province. Respondents also indicated a preference for courses which would enable them to have the advantage of

enrolling in university credit courses while continuing to be actively involved in their farm business, off-farm employment, or community activities.

This finding concurs with the following Farm Management Task Force statement "Training must be available to the farm family at times and locations that are easily accessible. While acknowledging the social benefits of group training, the practical benefits of decentralization, home study and self-teaching modules may better meet the needs of some clients."

The 1989 survey also clearly indicated that interest for off-campus courses in agriculture would come from individuals who were older and had considerable farm experience. According to Darkenwald and Merriam (1982) adult learners face barriers to learning of time, cost, busy schedules, home responsibilities, job responsibilities and apprehension to learning. All of these barriers were identified by respondents to the survey.

The challenge then for the School of Agriculture and the Extension Division of the University of Saskatchewan was to develop a suitable delivery system that would satisfy the needs of the individuals in the agriculture sector who wished to enroll in agriculture diploma courses. In short, meeting the challenge would require the development of programs which would cater to those who are farmers first and students second.

When developing programs for individuals who are farmers first and students second one must remember that "... learning is a conscious effort to acquire new knowledge and skills that lead to a personal goal of some sort. The distance educator's mission is to provide a learning environment that allows individual adults to interact with appropriate objects, people, and events in order to acquire relevant new behaviours (knowledge and skills)," (Verdium and Clark, 1991). One must also remember the problems frequently encountered by distance learners as listed by Wong (1991):

1. Little or no face-to-face contact with the instructor.
2. Isolation from contact with other students.
3. Frequently have less access to library and other learning resources.
4. May be unaccustomed to the role of a student.
5. May not have the requisite knowledge and skills.

The Response

In response to this challenge the School of Agriculture and the Extension Division, both of the University of Saskatchewan, agreed to cooperate in the development of a Certificates in Agriculture program. By definition a Certificate in Agriculture program consists of University (in the initial instance Agriculture Diploma) courses which when combined focus sharply on a clearly identifiable subject matter area to which a common set of scientific and/or economic principles can be applied.

All courses included in a Certificate program are equivalent to regular, on-campus Agriculture Diploma courses. The key difference is that most of the Certificate courses are

or will be delivered to students via enhanced correspondence delivery mechanisms. In this way individuals in the 25 to 45 age bracket who, because of farm, family or employment reasons, are unable to attend the regular on-campus Diploma in Agriculture program can access contained in this program at home.

The development of courses for off-campus delivery required that a subject matter expert work closely with an instructional designer. This "team", assisted by the necessary administrative and support staff, produced courses which were appealing to the learner. The final product was primarily in print form but carefully designed to contain useful graphics, tables, charts, etc. Additional support was provided to the student with the use of other forms of media. The Saskatchewan Communication Network (SCN), which consists of a satellite delivery system, allowed for live interactive group sessions at 10 centers throughout the province. This system proved to be invaluable for the delivery of the courses.

The first SCN session was used to orientate students to the program and to introduce them to instructors and University personnel involved in the delivery. Students in turn were able to satisfy concerns relating to course work, administrative matters and questions in relation to university programs via telephone hook-up.

Two additional SCN sessions during the duration of the course provided instructors and students opportunities to discuss course material. During these sessions students were not only able to clarify questions relating to the course material, but were also able to get to know the instructor and hear from other students.

One soils course of the inaugural Crop Production Certificate program included an on-campus laboratory session. The students spent a Friday evening and all day Saturday with the faculty member in Saskatoon which proved to be a very positive experience for students and instructor alike.

Throughout the duration of the course students were able to telephone the instructor for information or to clarify course material. Finally, each of the 10 SCN centers had a course proctor who was responsible for the on site coordination of the course delivery.

As Brookfield (1986), Hiemstra (1990) and Merriam (1982) all poignantly emphasize, adult education programs that are provided through distance education must be carefully designed and expertly delivered if the needs of the adult learner are to be met.

Demographic Data

It should be noted that during the 1990-91 inaugural year of the Crop Production Certificate program only 4 courses were available for off-campus delivery. Of 157 applications received 124 individuals registered for one or more courses. The 124 students registered for a total of 266 courses, for an average of 2.1 courses per student.

In 1991-92 seven CAP courses were available. Of 131 applications received 101 students registered for one or more courses. In total, the 171 students registered in the CAP program in 1991-92 registered for 337 courses, for an average of 2 courses each.

The average age of the first year off-campus certificate students was 35.5 and 34.4 years for 1990-91 and 1991-92 respectively, compared to a four year average age of on-campus

Diploma students of 20.9, ranging from 20.4 to 21.0 years (Table 1). The percent of year one female students in the Certificate program was 20.2 and 15.8 in the two years respectively, compared to a four year average of only 9.7% for the on-campus Diploma program. The average percent of diploma students less than 25 years of age increased from 81.9 in 1987 to 95.0 in 1990. This compared to only 10.5 and 12.9 percent of first year certificate students in this age bracket. On the other hand first year diploma students 25 years of age or older decreased from 18.1% in 1987 to 5.0% in 1990 as compared to 89.5 and 87.1 percent of certificate students falling into this category in the first two years of the CAP program.

Table 1 Age and Gender Characteristics of Year One Diploma and Certificate Students

	Year One Diploma 1987 to 1990 Ave.	Year One Certificate		Total 1991-92
		1990-91	1991-92	
Number of Students	77.3	124	101	171
Average Age	20.9	35.5	34.4	34.7
Age Distribution (%)				
<20	56.9	0.8	2.0	1.2
20-24	30.7	9.7	10.9	9.4
25-34	9.8	36.3	42.6	39.2
>34	2.6	35-44 43.5	31.7	38.6
		>44 9.7	12.9	11.7
Female Students (%)	9.7	20.2	15.8	16.4

Geographic Distribution of Students

Each student was asked to identify one of the 10 Saskatchewan Communications Centres at which he or she would participate in the periodic group discussions explained earlier. In 1990-91 the overall geographic distribution of students was reasonably good (Table 2) except for the drought plagued western part of the province (Kindersley) and the Prince Albert and Wynyard centres. Saskatoon and Moose Jaw probably attracted students for other reasons than the course itself, such as shopping opportunities, sporting and other social events.

In 1991-92 substantially more first year students were attracted to Kindersley but noticeably fewer students were attracted to Moose Jaw, North Battleford, Tisdale and Weyburn. In total Prince Albert has drawn the fewest number of students and Saskatoon by far the greatest number.

Table 2 Geographic Distribution of Crop Production Certificate Students

SCN Centre ²	1990-91	1991-92 Year One	1991-92 Total
Kindersley	2	13	15
Moose Jaw	22	5	16
N. Battleford	13	6	13
Prince Albert	5	3	8
Saskatoon	28	30	45
Swift Current	10	12	17
Tisdale	11	5	11
Weyburn	13	6	14
Wynyard	6	7	11
Yorkton	14	14	21

Student Performance

The four courses offered off-campus during the first year of the crop production certificate program were simultaneously offered on-campus. The individuals developing the courses for off-campus delivery were in three instances those who had for some time also instructed them on-campus. Accordingly, direct performance comparisons could be made between the certificate (off-campus) and diploma (on-campus) students. Certificate students out-performed first year diploma students by a considerable margin (Figure 1, SL SC 11 and SL SC 12). The two crop science courses on-campus were taken by second and third year diploma students. In this case there was no substantial performance difference between the two groups.

Of particular note is the high percentage of students completing the courses by way of writing the final examinations (Table 3). On average 88.6% wrote the final examination on the regular date or on the deferred examination date. Of the 215 students who wrote the final examination at the initial sitting only five failed to get a mark of 50 percent or higher; a remarkable achievement in comparison with failure rates in on-campus courses frequently well above 10%.

² Saskatchewan Communications Network Centres

**Figure 1 Mark Comparisons 1990-91
Certificate vs. Diploma Students**

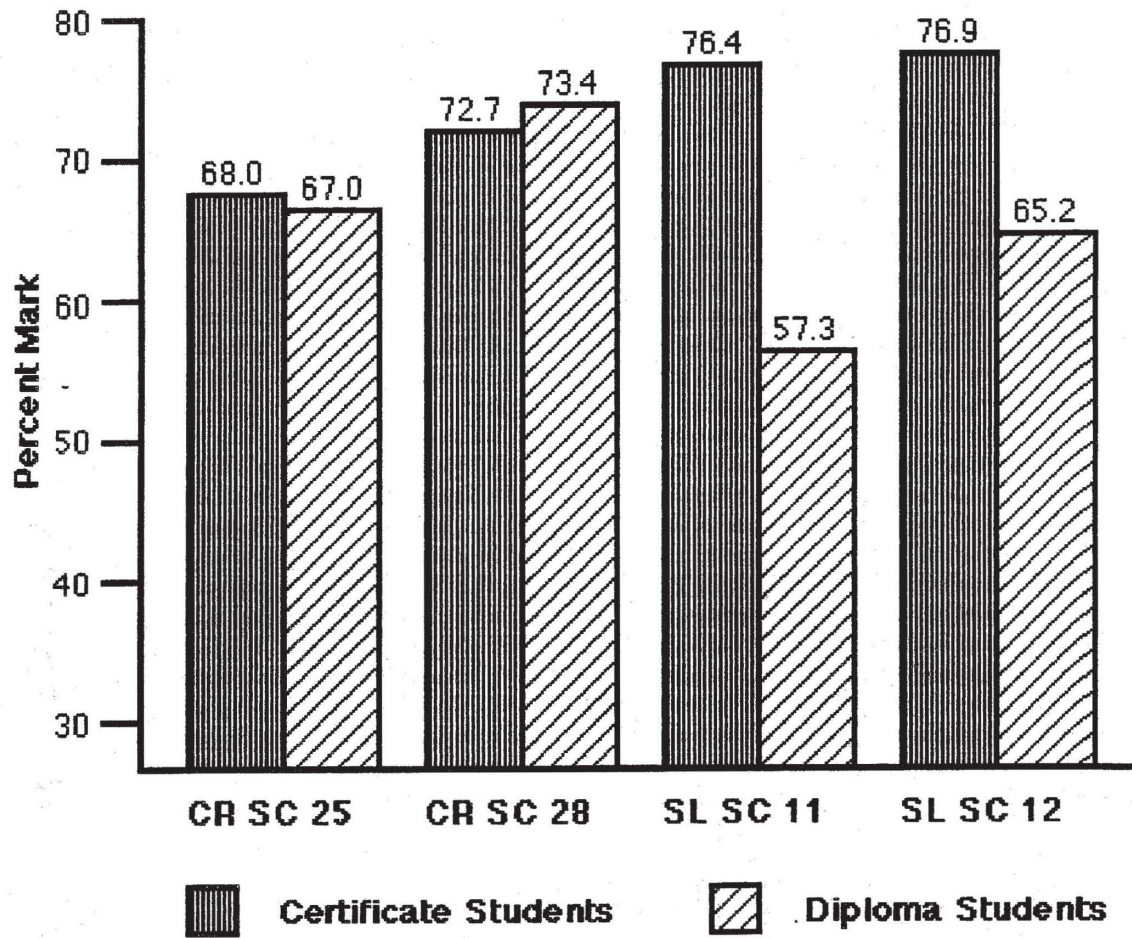


Table 3 Record of Off-Campus Certificate Students, 1990-91

Number of Students	Weed Control		Basic Soil Sci.		Oilseed and Pulse Crops		Soil Fertility	
	No.	%	No.	%	No.	%	No.	%
Starting	59		80		66		61	
Withdrawing	3	5.1	6	7.5	2	3.0	6	9.8
Not Writing Exams	2	3.4	3	3.8	5	7.6	4	6.6
Writing Deferred	0	0.0	8	10.0	6	9.1	6	9.8
Number Writing	54	91.5	63	78.8	53	80.3	45	73.8
Successful Completions*	51	94.4	62	98.4	53	100.0	44	97.8

* Number passing as a percent of number writing

Student Evaluations of the CAP Courses and Program

Student evaluations of the courses revealed that not only did they perform well but they also found the courses very interesting and applicable. To the question "Did the course maintain your interest" 88.5 to 100 percent of respondents said that it did. To the question "Was the course (or course manual) very or extremely applicable?", 61.5 to 94.4 percent responded positively. The relatively low rating of 61.5% was for the Oilseed and Pulse Crops course where many crops covered are not adapted equally in all areas of the province. The high rating of 94.4% was, not surprisingly, for the Weed Control course.

Distance Education courses run the risk of creating a feeling of isolation within the student, often resulting in the student not completing the course. As indicated earlier various group sessions and contact opportunities were included in the program to minimize such a feeling of isolation. Respondents to evaluation questionnaires indicated that peer group sessions (73.1 and 84.9%), instructor contact (64.0 and 94.3%) and a televised orientation session (88.5 and 83.8%) all were useful in reducing the feeling of isolation. The 94.3% rating of instructor contact in one course with respect to this matter was no doubt a direct result of a very successful weekend laboratory session conducted by this instructor. This laboratory session was indicated to be essential by 90.9 percent of the respondents even though for some it meant traveling long distances to Saskatoon.

In written comments many students commented very favorably about the group sessions at the SCN Centres and the soils laboratory session in Saskatoon. On the other hand a number of students indicated a desire to participate in strictly "correspondence" courses where no activities away from home would be required. The challenge for the developers and administrators of the Certificates program is to balance these two conflicting requests.

Conclusions

Adult learners proved to be highly motivated, persistent, and academically successful. Student-instructor contact via telephone, and to some extent via satellite television or audio-conferencing, was successful in maintaining a group feeling within the scattered off-campus student body. Careful attention to design elements of enhanced correspondence courses were considered applicable to and successfully held the attention of individuals who by circumstance were forced to be farmers first and students second. The initial success of the crop Production Certificate program and the strong interest shown by many in the area of farm business management makes it imperative that a certificate program in that field of study be initiated as soon as possible.

References

- Brookfield, S.D. *Understanding and Facilitating Adult Learning*
Jossey-Bass, San Francisco: 1986
- Burrows, R. "Operators by Level of Schooling and Age Groups In the Prairie Provinces"
Statistics Canada, Agriculture Division
Ottawa, Canada. 1991 Information available upon request
- Darkenwald, G.C. and Merriam, S.D. *Adult Education, Foundations of Practice*
Harper Row Publishers, New York: 1982
- Himestra, R. *Individualizing Instruction*
Jossey-Bass, San Francisco: 1990
- Naisbitt, J. and Aburdene, P. *Megatrends 2000*
Avon Books, New York: 1990
- Peters, J.R. "Enrollment Trends, Canadian Diploma in Agriculture Programs 1983-87"
NACTA Journal, March 1989, pp. 19-22.
- Report to Ministers of Agriculture, Farm Finance and Management Task Force
June 30, 1990
- Report to Minister of Agriculture, Canadian Agricultural Research and Technology
Transfer
July, 1990
- Verdium, J.R. and Cook, T.A. *Distance Education*
Jossey-Bass, San Francisco: 1990