# Analysis of Virtual and Traditional Teaching Assistants Used in Introductory to Animal Science Courses

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## Abstract

The purpose of this study was to evaluate the discussion, interaction, comfort level, perspectives, motivation, and overall satisfaction between students in Virtual Introduction to Animal Science 101 (ANSC101V) versus a traditional face-to-face Introduction to Animal Science 102 (ANSC102) utilizing traditional and virtual teaching assistants. Even though the content was identical between the two courses, demographically, the students were very different; that is, 92% of the students in ANSC101V were over 22-years of age, while 84% of the students were under 22-years of age in ANSC102. In general, students in ANSC101V rated questions pertaining to discussion, comfort level, student perspectives, and motivation higher ($P < 0.05$) when compared to students in ANSC102. However, the level of satisfaction was determined to be not different between the two classes. Because of the high rating and responses by online students, it was determined that virtual teaching assistants contributed greatly to the level of comfort and outcome in the ANSC101V course.

## Introduction

Through advancements in technologies, the popularity of distance education has risen. Distance education was once rooted in correspondence courses sent through mail, but now uses a wide variety of multimedia technologies to communicate at an entirely new level. Today, learners have the opportunity to take a single course online or earn their entire degree or certificate through distance education methods (College Blue Book, 2003). The term "Distance Education" can be broadly defined. In the simplest definition, education takes place when the instructor and learner are separated by physical distance and must communicate through some means, e.g., phone, e-mail, traditional mailing, etc.; the way this material is passed back and forth between the learner and instructor is quite vast, e.g., teleconferencing, e-mail, written materials, video-tapes, computer satellites, and the Internet (College Blue Book, 2003). Even though the mechanism of delivery varies widely to accommodate individuals, the retention rate and/or acceptance of distance learning courses has disappointed many instructors. King et al. (2002) commented on the high course "dropout" rate in online courses when compared to traditional courses as one of the most troubling concerns of distance education. The author notes that a feeling of isolation, frustration with technology, confusion, and anxiety are all factors that contribute to the non-completion of online courses, suggests the need for virtual assistants to facilitate discussion between students and the professor so the environment becomes close to what students experience in traditionally taught courses.

Information specifically for virtual teaching assistants is limited (Stockley and Rossner, 1996). Due to the lack of research about virtual teaching assistants, the available information comes from personal anecdotes, case studies, and suggested tips (Stockley and Rossner, 1996). Therefore, the purpose of this study was to evaluate how teaching assistants facilitated student perception in the two courses, ANSC101V and ANSC102; more specifically, the study utilized a questionnaire to assess the level of discussion, interaction, comfort level, perspectives, motivation, and overall satisfaction between students in ANSC101V versus a traditional face-to-face ANSC102 using teaching assistants.

## Materials and Methods

The target courses for this study were Virtual Introduction to Animal Science 101 (ANSC101V) and traditional campus based instruction for Introduction to Animal Science 102 (ANSC102). ANSC101V is a completely Internet-based course taught asynchronously using text web pages, video clips, and interactive multimedia; furthermore, the course uses e-mail, chat rooms, and listservs for discussion between students and the instructors. In

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addition to the professor, the course had two virtual teaching assistants. ANSC102 is the Introduction to Animal Science taught on the main campus at Purdue University using traditional techniques, i.e., black board lectures, PowerPoint, video clips, etc., and utilizes two teaching assistants. Both courses, ANSC101V and ANSC102 were created and taught by the same professor. All four female teaching assistants (two virtual and two on campus) assisted the professor with instruction. The study was conducted during the Spring 2003 semester.

Students in both courses were asked to complete a questionnaire during midterm. The questionnaire was developed and adopted from the following studies (Beaudoin, 2002; Driver, 2002; Halsne, 2002; Hong, 2002; Noban et al., 2002; Stayrook and Majer, 1973; and Wheeler, 2002). The questionnaire investigated student perceptions of teaching assistants and the professor according to following six factors: discussion, interaction, comfort level, student perspectives, motivation, and overall satisfaction. Perceptions were measured using a continuous Likert-type scale (Brown, 1988). The Likert-type scale used in the study is considered continuous, with each point treated equally along a continuum. For each question, students were instructed to mark on a ten millimeter line between one and ten, where one was considered very poor and ten was excellent. A box marked (Does Not Apply) was provided for each Likert-type question in the event students did not feel the question was applicable to their classroom experience. Open-ended questions were included in the questionnaire to collect data from students who felt questions were not applicable to their current classroom situation. The present study was approved by Purdue University's Committee on the Use of Human Subjects.

## Results

There were no significant ($P > 0.85$) differences in student assessment of teaching assistants for overall satisfaction between ANSC101V and ANSC102; that is, regardless of teaching assistant, students were equally pleased with the level of overall satisfaction. The demographic data, however, would suggest the students were very different; that is, 92% of the students in ANSC101V were above the age of 22, where as 84% were below the age of 22 in ANSC102 (Table 1). ANSC101V contained 80% females and 20% males, while ANSC102 had 64% females and 36% males (Table 1).

Students in ANSC101V felt encouraged ($P < 0.01$) to ask questions, express their ideas, and responsible to initiate discussion when compared to students in ANSC102 (Table 2). Students in ANSC102 felt they were more active within the discussion ($P<0.01$) compared to students in ANSC101V (Table 2). There were differences in overall ratings of questions by students between the two courses, ANSC101V vs. ANSC102; more specifically, students in ANSC101V ($P < 0.04$) perceived the teaching assistants made a major contribution to their feeling towards the class, received more attention, and perceived the assistants were more avail-

**Table 1: Demographic Data for Subjects Enrolled in Virtual Introduction to Animal Sciences (ANSC101V) and campus based Introduction to Animal Science (ANSC102)**

| | ANSC101V | | ANSC102 | |
|---|---|---|---|---|
| Age Group | Frequency | Percentage | Frequency | Percentage |
| 18-21 | 2 | 8.0 | 27 | 84.4 |
| 22-25 | 7 | 28.0 | 5 | 15.6 |
| 26 and Over | 16 | 64.0 | 0 | 0.0 |
| Total | 25 | 100.0 | 32 | 100.0 |
| Males | | 20 | | 36 |
| Female | | 80 | | 64 |

**Table 2: Response to Discussion Type Questions for Subjects Enrolled in Virtual Introduction to Animal Sciences (ANSC101V) and campus based Introduction to Animal Science (ANSC102).**

| Questions | ANSC101V | ANSC102 | Significance |
|---|---|---|---|
| 1.  My Teaching Assistant encourages questions and expression of ideas. | $8.41 \pm 0.49$ § | $6.38 \pm 0.34$ | $P \leq 0.0013$ |
| 2.  I was very active with the discussions. | $2.57 \pm 0.77$ | $5.57 \pm 0.41$ | $P \leq 0.0017$ |
| 3.  It is my responsibility to initiate discussion within the classroom. | $7.62 \pm 0.93$ | $4.58 \pm 0.41$ | $P \leq 0.0048$ |
| §Standard error of mean is based on a pooled estimate of variance. | | | |

### Statistical Analysis

A continuous Likert-type scale was chosen for this study (Brown, 1988). The Likert-type scale consists of a series of declarative statements to measure participants' perceptions on an attitudinal scale. Quantitative data were analyzed by ANOVA using SAS? system (SAS, 2002). Means were partitioned using a student t-test. Significant differences were determined at $P <0.05$ unless otherwise noted.

able than the professor (Table 3). Students in ANSC102 felt ($P < 0.01$) their course encouraged more interaction with teaching assistants when compared to ANSC101V (Table 3). Student comfort level as well as motivation were influenced by course; that is, students in ANSC101V felt ($P < 0.05$) more comfortable approaching the teaching assistant, asking questions and more motivated by assistants making material clear and creating a learning environment when compared to students in ANSC102 (Table 4). Students in ANSC101V felt ($P <$

0.01) that teaching assistants responded to questions with greater consideration (8.48 + 0.45 versus 6.78 + 0.33, mean and standard error), when compared to students in ANSC102, respectively.

**Table 3: Response to Interaction Type Questions for Subjects Enrolled in Virtual Introduction to Animal Sciences (ANSC101V) and campus based Introduction to Animal Science (ANSC102)**

| Questions | ANSC101V | ANSC102 | Significance |
|---|---|---|---|
| 1. The interaction I had with the Teaching Assistant made a significant difference on how I feel about this class. | $7.48 \pm 0.56$ § | $5.84 \pm 0.41$ | $P \leq 0.0222$ |
| 2. The course encourages interaction with the Teaching Assistants. | $6.94 \pm 0.56$ | $7.13 \pm 0.42$ | $P \leq 0.0064$ |
| 3. I am able to get more personal attention in class with the use of Teaching Assistants. | $7.95 \pm 0.60$ | $5.90 \pm 0.40$ | $P \leq 0.0065$ |
| 4. Teaching Assistants are more available than the Professor. | $7.05 \pm 0.71$ | $5.24 \pm 0.48$ | $P \leq 0.0398$ |

§Standard error of mean is based on a pooled estimate of variance.

**Table 4: Response to Comfort (RC) and Motivation (RM) type Questions for Subjects Enrolled in Virtual Introduction to Animal Sciences (ANSC101V) and campus based Introduction to Animal Science (ANSC102).**

| Questions | ANSC101V | ANSC102 | Significance |
|---|---|---|---|
| 1. My Teaching Assistant encourages questions and expression of ideas (RC). | $8.99 \pm 0.53$ § | $6.62 \pm 0.39$ | $P \leq 0.0006$ |
| 2. I was very active with the discussions (RC). | $8.98 \pm 0.56$ | $6.67 \pm 0.42$ | $P \leq 0.0017$ |
| 3. Teaching Assistants make clear what material is important (what you should know) (RM). | $8.77 \pm 0.50$ | $6.04 \pm 0.36$ | $P \leq 0.0001$ |
| 4. Teaching Assistants create the same learning atmosphere (interest, motivation) that Professors do (RM). | $8.22 \pm 0.53$ | $5.76 \pm 0.40$ | $P \leq 0.0005$ |

§Standard error of mean is based on a pooled estimate of variance.

## Discussion

In this study, students were exposed to two separate learning environments, one from a distance and one from a traditional classroom. Student scoring for teaching assistants were similar between courses, and found not to be different in the questions proposed and the primary differences noted were those between questions. As evidenced in the results section, student responses between ANSC101V and ANSC102 were significantly different for five of the six sections of questions, with the last section, to test overall satisfaction, being statistically similar.

Three of the five questions related to discussion were found to be significant. One question referred to the teaching assistant encouraging questions and expressions of ideas. Online students rated this question much higher than traditional campus students; thereby, suggesting that online students were perhaps encouraged to ask questions and feel freedom to express ideas. This result may be due to the number of contacts teaching assistants had with the online students; that is, online students as observed in the administrative portion of WebCT, the software program used for online instruction demon- strated daily interaction between students and assistants and this is not the case for on campus instruction. Traditional students felt they were much more active with discussion than the online subjects. This was an expected response, due to the traditional campus students experiencing a campus classroom environment each week. Fulford and Zhang (1993) suggested that in a distance course the lack of face-to-face interaction may cause the learner to drift away and lose focus on the learning and discussion that is taking place. It was assumed that the higher face-to-face interaction between the traditional campus students would result in a feeling of more active discussion and participation. Latour and Collodi (2003) showed that maturity level has a great influence on "acceptance" as well as retention of distance learning materials.

In this study, the students in ANSC101V were considerably older which suggest they are more willing to accept the technology and demanded more interaction of course material when compared to on campus students who were much younger. For instance, when students were asked to rate their feeling of responsibility to initiate discussion within the classroom, online subjects rated this nearly two-fold higher than campus students and might suggest, the online students felt more responsible for discussion. This finding supports the idea of teaching effectiveness through the "centrality" of power (Richmond and McCroskey, 1984). The former authors identify the role of teacher to be function of influence, power, and communication. For the online learners, there is no physical classroom where the professor and teaching assistants can play this role. Therefore, the online learner feels a greater responsibility in assisting with these roles that are unable to be filled in a distance classroom.

Online students felt the interaction they had with the teaching assistant made a significant difference on how they felt about the class. Possibly, having a teaching assistant available for online courses encourages interaction within the distance

learning environment. Teaching assistants have generally been known to play a beneficial role in creating interaction and therefore affect the student's satisfaction with the course. This finding concurs with a study by Fulford and Zhang (1993), who found that a key factor in student satisfaction is not based on their active participation, but on their perception that interaction was occurring.

Both the online and traditional campus students identified the course as encouraging interaction with the teaching assistant. The professor felt as though he was equally available to assist subjects and did not encourage the students in either direction. However, the majority of subjects in both groups felt as though the interaction with the teaching assistant was encouraged. More specifically, online students felt they were able to get more personal attention in the class using the teaching assistant. Online students felt teaching assistants were more available than the professor. Interestingly, online students contacted both the teaching assistant and the professor through email; moreover, in a number of cases, teaching assistants would have to pass information to the professor for an answer and then the assistant would then resend that information back to the student. Students approaching teaching assistants before the professor are quite normal or often observed. Apparently this trend to interact with the assistant before the professor is similar or follows a similar pattern for online students. Comfort level was greatly influenced for online students and they enjoyed the interaction with teaching assistants. In conclusion, the use of the teaching assistant in an online course benefits the distance learners by encouraging a comfortable environment even from a distance.

## Summary

In summary, one of the most troubling concerns of distance education courses is the higher course "dropout" rate in online courses when compared to traditional courses. The feeling of isolation and frustration with technology are factors that contribute to the non-completion of online courses. Even though drop rate was not measured, there were no issues in the present study. The authors believe the course in this study was greatly enhanced through the use of virtual teaching assistants and this was reflected in the data. Teaching assistants greatly influenced their level of discussion, interaction, comfort level, student perceptions, motivation, and overall satisfaction. Distance learning is no longer a "new topic," but the addition of "virtual teaching assistants" is relatively new and in this particular study, the authors believe it contributed significantly to the overall quality of education for distance students. The area of virtual teaching assistants needs to be further researched to expand the training for a new era.

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