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Abstract

Since its origins nearly thirty years ago, the IS'97 model curriculum has been periodically revised in a process that has involved hundreds of information systems (IS) faculty and industry participants. Despite a high rate of participation in the formulation process—participation that has resulted in feedback being continuously incorporated over the years—there still exists no empirical verification that IS'97 is well-accepted and effectively used for curriculum development. This paper examines the question of IS'97's acceptance within the academic community, viewing the issue from an individual innovation adoption and use perspective. We surveyed 134 faculty members on the extent of their use of IS'97, their perceptions of IS'97's usefulness, and reasons for non-use. The results show that although 85% of the respondents sampled were aware of IS'97, only 12% were committed to using IS'97 on a regular basis. Generally, the respondents perceived IS'97 to be useful.

Keywords: Curriculum development, diffusion, innovation

Introduction

The IS'97 Information Systems (IS) model curriculum has been developed, periodically revised, published, and disseminated through journals, conferences, the Web and the literature (Table 1). Over time, hundreds of individuals and numerous academic and professional societies have participated in its development and revision. Still, despite this impressive history of development and dissemination activity, there is no credible evidence to suggest that IS'97 is a well-accepted, used, and effective model for undergraduate IS education. With IS accreditation criteria being established for the first time, it would be important to know whether IS'97, a basis for accreditation criteria, was generally accepted and used within IS academe.

Therefore, this paper seeks to establish whether the current IS model curriculum, IS'97, is being used and is effective. With the diffusion of innovations literature (Rogers 1995) as a basis, this study examines the following major questions:

- *What is the extent of use of IS'97 among IS faculty?*
- *To what extent is IS'97 perceived by IS faculty as useful for curriculum development?*
- *What are the reasons for non-use of IS'97, according to IS faculty?*

This study has implications for the IS curriculum evaluation and accreditation process, and for the continued dissemination of IS'97. Currently, the IS field is experiencing a period of rapid growth that has resulted in a need for more well educated IT professionals. If this model curriculum has not been widely accepted, then its developers and potential adopters could benefit from knowing why not.

Table 1. IS Model Curriculum at a Glance

Development Activity	Detail
origins	ACM curriculum for IS (1973-81), DPMA curriculum for IS (1981-1985), IS'90
periodic updates	1995, 1997, 200x?
published document	Davis et al. 1997, *IS'97 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems*
major publications	*MIS Quarterly*, the *Journal of IS Education*, and *Data Base for Advances in Information Systems* (Couger et al. 1995, Longenecker et al. 1999, Longenecker et al. 1995)
dissemination at conferences	AMCIS, IACIS, ISECON, DSI, IAIM, ICIS, and SIGSCE
Web site	http://www.is-97.org/rev/Review1.asp
participation/sponsorship	CSAB/ABET, ACM, AIS, AITP, IACIS, INFORMS-CIS, SIM

Background

Innovation-diffusion theory (Rogers 1995) is used as a basis for understanding the adoption and use issues with respect to IS'97. Acceptance and use of IS'97, along with the factors that influence acceptance and use, is viewed as an individual innovation adoption process issue. To answer the first research question, this study attempts to assess an individual's stage in the adoption process, and then aggregate the responses to assess the extent of IS'97 across the population of IS faculty. The second question is concerned with the overall assessment of IS'97's usefulness to individual IS faculty instructors. In answering the third question on reasons for non-use of IS'97, innovation characteristics (Rogers 1995, p. 212; Tornatsky and Klein 1995; Leonard-Barton 1988) are used as the basis for non-use.

Methodology

This study uses a field survey to assess the extent of adoption of IS'97 across the population of potential adopting units. This is fundamentally an innovation diffusion question. Studying diffusion, or the spread of an innovation within a population of interest over time, requires a sample from the population of potential adopters. The survey design enabled us to gather a large, varied sample of adopters so that we could reasonably generalize results.

Unit of Analysis—The Individual Adopter

The unit of analysis for this study is the individual adopter—the instructor of a course who is using IS'97 as a model for courses taught. We considered the institution as a possible unit of analysis, because it is reasonable to believe that an IS department chair or college dean could mandate the *adoption* of a curriculum model. We decided, though, based partially on our own experience, that it is ultimately the duty of individual course instructors to *implement* IS'97 at the course level. We believe that course instructors play a critical role for successful institutional adoption of IS'97. The course instructors are most familiar with a course's goals and objectives, content knowledge, and evaluation criteria for student learning. The understanding of one's course is critical to being able to use IS'97 in order to compare one's course to the model curriculum guidelines. Therefore, the appropriate unit of analysis is the individual course instructor.

Use of IS'97—Single Course

We were interested in studying the extent to which IS faculty used IS'97 at the course level. Course level, in other words, means adopting the curriculum model to either evaluate one's existing courses or to design new courses. The specific uses of IS'97, for a course, may include developing goals and objectives, determining specific content, defining the depth of coverage of material,

and formulating the relationship among topics. We did not consider uses of IS'97 at the curriculum level, such as using IS'97 to identify topics that are missing or need to be covered in greater depth somewhere in the curriculum.

The Instrument

A Web-based survey was developed to assess the extent of adoption and use of IS'97. Items were developed to assess the extent of use of IS'97 among IS faculty. Based on the diffusion of innovations literature (Rogers 1995), a stage model of adoption was used as the basis for the items measuring the extent of adoption of IS'97. As information about an innovation is communicated through a user community, potential adopters pass through various stages, such as knowledge, persuasion, decision, implementation and confirmation (Rogers 1995, p. 20). Items were developed and conceived of as a Guttman scale similar to a measure of organizational adoption stage (Fichman and Kemerer 1997). See the Appendix for a list of survey questions.

Table 2. IS'97 Adoption and Use Factors

Factor	Description	Items
Stage of adoption of IS'97	An instructor's point in the innovation-decision process with respect to IS'97: awareness, interest, evaluation/trial, commitment, rejection	4
Perceived usefulness of IS'97	The extent to which an instructor believes that IS'97 is effective for course development activities and student learning and preparation	5a-e
Perceived usefulness of IS'97 learning units	The extent to which the learning units, IS'97's structured set of culminating educational goals and objectives, are considered useful or useless to the instructor	9
Reasons for non-use	The extent to which instructor believes each of a number of innovation and individual characteristics contributed to underutilization of IS'97	6a-g
Facilitators of IS'97	Extent to which respondent believes each of a number of proposed initiatives would encourage their own use of IS'97	7a-d
Accreditation's impact	Degree to which IS accreditation is perceived to impact the respondent's use of IS'97	8
Institutional adoption of IS'97	Extent to which the respondent's institution has adopted IS'97	10

The Sample

In March of 2001, a survey of IS faculty members was conducted. A brief e-mail message requesting participation in the survey was sent to more than 7,000 faculty members in colleges and departments housing programs with various titles, such as information systems, information technology, and computer science. The respondents were asked to supply their discipline as a means of filtering out faculty in potentially non-IS (i.e. computer science/library science) programs. A total of 134 responses were obtained for a response rate of less than 2%. At the time of this writing, however, a follow-up e-mail had not been sent, the total number of invalid e-mail addresses was not known. Because of the low response rate, caution must be taken in generalizing results.

Data Analysis and Results

Of the 134 responses received, approximately 85% had been aware of IS'97, with 35% currently in the awareness stage. Approximately 15% of the sample had been unaware of IS'97. Another 16% were at the interest stage; 14% were at the evaluation/trial stage; and 12% were at the commitment stage. A total of 7% of respondents discontinued use of IS'97 after an earlier use, and 18% of respondents believed that their institutions had adopted IS'97 (strongly agree or agree), while 47% had not (disagree and strongly disagree). See Table 3 for a summary of the adoption data.

Table 3. IS'97 Adoption Stage

Stage of Adoption	Number	Percentage	Cumulative
Not aware	20	15%	15%
Aware	48	35%	85%
Interest	22	16%	43%
Evaluation/Trial	19	14%	26%
Commitment	16	12%	12%
Rejection/Discontinuance	9	7%	7%
Total	134	99%	100%

A mean usefulness score for IS'97 was computed based on the mean of the five usefulness item scores. The mean of all five items was used to compute the total mean usefulness of IS'97 after performing construct validity tests. A principal components analysis yielded a single-factor solution, as expected, and reliability analysis on the five items yielded a coefficient of .91, which indicates a high degree of reliability for a new construct (Nunnally 1978). On a scale of 1-5, the mean usefulness score for this sample was 3.69 (N=101, std. dev=.74), which translates into the mean being between the "neutral" and "agree" categories, but closer to "agree." We believe the data indicate that the sample somewhat agreed that IS'97 was useful. The respondents believed that IS'97 was more-useful-than-not for the purpose of evaluating and writing course objectives by almost identical margins.

Table 4. IS'97 Perceptions of Usefulness

I believe IS'97 is useful for …	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
evaluating existing course objectives	20	49	15	3	1	14
writing new course objectives	18	49	15	5	1	13
improving my course(s)	13	39	26	8	2	13
producing students who are well-prepared for industry	12	39	27	3	5	13
improving student learning	8	31	36	10	1	15

A total of 68% of respondents either agreed or strongly agreed that IS'97 was useful for "evaluating existing course objectives," while only 4% disagree or strongly agreed with same. Similarly, 67% of respondents either agreed or strongly agreed that IS'97 was useful for "writing new course objectives." On the item "improving my course(s)," instructors agreed or strongly agreed 52% of the time, while disagreeing or strongly disagreeing only 9% of the time. A total of 51% of the faculty respondents believed IS'97 was useful for "producing students who are well-prepared for industry," while only 9% disagreed with that statement.

Table 5. Reasons for Non-Use of IS'97

I have not used IS'97 as much as I could have because …	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
the benefits of using IS'97 are not clearly visible	12	17	27	18	10	16
IS'97 provides little or no advantage for me	12	16	22	24	8	18
using IS'97 on a trial/experimental basis is difficult	6	22	29	17	4	22
IS'97 is not compatible with the way I like to design and evaluate my courses	6	21	27	20	6	19
I lack the expertise to use IS'97 effectively.	6	14	21	29	15	16
IS '97 is too difficult to use effectively	4	11	36	22	7	20
it is too time-consuming to use IS'97 effectively.	3	15	35	20	8	19

Finally, the perception that IS'97 was useful for "improving student learning" was held by 39% percent of the respondents, who either agreed or strongly agreed with the statement. This was the only one of five items in which a majority did not agree or strongly agree. A total of 19% disagree or strongly disagree that IS'97 was useful for improving student learning. This amount of disagreement was the most of any item in the set. See Table 4 for a summary of perceived usefulness items. The respondents believed the IS'97 learning units, the stated educational goals and objectives for key content areas of knowledge that form the basis of IS'97's model courses, were useful. The average score for learning unit usefulness was a 3.9 on a 1-5 scale.

Data on reasons for non-use of IS'97 were collected and analyzed. Seven items were constructed based on the innovation characteristics literature. The results are shown in Table 5. The top two reasons for non-use of IS'97 were "the benefits of using IS'97 are not clearly visible," and "IS'97 provides little or no advantage for me," with 12% strongly agreeing with each statement and 29% and 28%, respectively, agreeing or strongly agreeing. Fewer respondents believed IS'97 to be "too difficult to use effectively," or "too time-consuming to use effectively."

Respondents were also surveyed with respect to several proposed initiatives designed to encourage the adoption and use of IS'97. See Table 6 for a complete listing of the initiatives. Instructors tended to respond favorably to all four proposed initiatives with between 51% and 62% agreement and between 8% and 17% disagreement across all cases.

Table 6. Incentives for IS'97 Use

I would be encouraged to increase my use of IS'97 if …	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
I received funds to attend a workshop at a conference to learn how to map IS'97 learning units to my course(s)	22	29	20	12	5	13
Web-based tools were available to support/automate the mapping of IS'97 learning units	21	37	20	6	5	11
the IS'97 document included a step-by-step guide for mapping IS'97 learning units to my course(s)	16	46	18	4	4	12
there was visible evidence of the educational value of mapping IS'97 learning units to my courses.	16	42	20	4	4	13

With IS'97 chosen as a basis for IS curriculum accreditation criteria, we thought it would be interesting to see what impact, if any, accreditation would have on use of the model curriculum. About 61% of faculty surveyed thought that accreditation would encourage more use (agree and strongly agree), while only 14% disagreed.

Conclusions

The overall results indicate that IS'97 has high awareness among faculty members sampled (85%), but suffers from a low level of committed use (12%). These results, however, need to be taken with caution due to the low response rate. If one were to assume that users were more likely to respond to the survey than non-users, then the level of awareness of IS'97 would be lower than 85% and the commitment level would be even lower than 12%.

Although the respondents tended to believe that IS'97, including the learning units, was useful, they also provided reasons for non-use. Non-use of IS'97 has more to do with low perceived relative advantage and low observability than it has to do with a lack of expertise, high complexity (difficulty of use), and high labor-intensiveness.

Table 7. Accreditation's Impact

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
Now that IS'97 is a basis for IS curriculum accreditation criteria, I would be more likely to adopt IS'97 for use in evaluating my courses/curricula	17	44	17	10	4	8

The low level of commitment to the model, the belief that it is nevertheless useful, and the expectation that accreditation will increase their interest in the model suggest that future work is needed. In particular, the possible benefits of specific initiatives to foster increased use of the model should be examined. All of the proposed initiatives for encouraging the adoption and use of IS'97 were rated favorably by the respondents. Scientific studies could be undertaken to assess the effectiveness of the proposed approaches. Future directions also include looking at this issue from an institutional perspective, analyzing the uses of IS'97 among collaborative faculty for improving an entire curriculum.

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