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REVIEW ARTICLE

DESIGN INITIAL CATEGORIZATION OF IT ISSUES FOR DATABASE

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Design Initial Categorization of IT Issues for Database

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INTRODUCTION

At its most fundamental level this is a cross-sectional study designed to collect descriptive data on the issues surrounding IT implementation. Public and private sector organizations across the country are involved in improving or changing their IT implementation strategies. This study uses the perceptions of a distinct group of respondents who are part of a limited geographic area to identify and flesh out a series of issues. A cross sectional study was determined to be especially useful since the purpose was to gather pertinent information on individual attitudes and explore areas for further research. The data produced in this study is essentially a screening for variables, which may prove to be worthy of further study.

This study was conducted in three stages and involved an in-depth analysis and review of the issues which exist for local government administrators with regard to the IT implementation process in their organizations. In stage one—a literature review was conducted to identify the prevalent issues surrounding the development of information technology since the early days of computerization and automation. These issues were extremely important in that they provide a foundation for current issues. The initial research conducted in the first stage of the study also included the identification and observation of current trends relating to IT implementation. Specific attention was placed on the public sector and IT applications in local government organizations. The information garnered from this portion of stage one is reflected in the literature review, description of the issues, and the issues database.

Possibly the most crucial portion of stage one involved the creation of an IT issues database which was originally designed to accommodate the information derived from a series of interviews conducted with government executives from Federal, state, and local government agencies. Another large portion of the data derived for this database was made up of pertinent literature on information technologies and the review and analysis of IT discussion forums on the World Wide Web. The issues derived from this portion of the study were categorized in the database for ease of use and updated throughout the process of the study. This stage also provided the necessary background information to develop a basic set of definitions and concepts which were then reviewed and updated based primarily on responses from the initial interviews with respondents for description of the stages).

The second stage consisted of interviews with eight local government administrators and a number of IT professionals to aid in developing shared meanings and terminology, as well as to determine additional concepts, factors, and ideas for the research. In this stage information was also derived from selected SMLG IT professionals and administrators about general IT needs and implementation plans. The information garnered was used to enhance the database created in stage one as well as to serve as a framework for the design of the descriptive survey in stage three.

From the information derived in stages one and two a comprehensive survey was developed which was then sent to the target survey group: SMLG executives in the state of Virginia. Following data provides a representation of the stages used in this study.

Stage 1 Stage 2 Stage 3

- Design “Issues Database”.
- Design initial categorization of IT issues for database.
- Identify as many of the problems and factors which affect IT planning and implementation as possible from the literature, general interviews, observation, and content analysis of world wide web discussions (and other sources as applicable).
- Define terms and design initial interviews.
- Interview SMLG administrators and IT professionals to determine shared meanings, definitions, measures, and variables.

- Reevaluation of database categorizations, definitions, and issues based on interviews.
- Develop a comprehensive survey to be sent to all SMLG administrators and IT professionals
- Identify crucial variables (issues) which impact SMLG IT implementation.
- Second reevaluation of database categorizations, definitions, and issues based on survey information.
- Collect, analyze, and create reports from the data gathered in the survey and interview process.

RESEARCH METHODOLOGY

The overall research design for this study was descriptive in that it made use of interviews and surveys to solicit "expert" and practitioner opinion. The survey research sought to identify the most problematic issues with regard to the implementation of information technology in small and medium sized local governments. After some common issues, descriptions, and definitions were identified, a survey instrument was developed to help describe the most problematic of these issues for local government administrators in the Commonwealth of Virginia.

STAGE ONE

The first stage of this study consisted mainly of the design of an "issues database". This database serves, throughout the course of the research, not only as an evaluation tool by which to categorize the issues discussed specifically in this study, but also as a continuous working foundation for more extensive research on a broader range of IT issues. The issues database was created in FileMaker Pro™ due to the program's ease of use, convertibility to a variety of platforms, and data exportability. The initial categorizations for the issues were derived primarily from a review of the literature pertaining to a number of areas crucial to information technology management, including but not limited to the following: general management theory, management of information systems, information systems theory, strategic planning, and systems design. A representative look at this literature can be found in chapter two of this study. The original categorization system was made up of seven issue areas based on interview responses and the initial literature review, these were: ethics and legal issues (those issues related to ethical conduct, professional responsibility, and legal mandates/rules); architecture--hardware (hardware specific issues like compatability, standards, and platforms); architecture--software (software specific issues like program standardization, data export, year 2000); government records (those issues related to federal, state, and local records requirements); management issues (issues relating to management styles, contracting, budgets, and strategic planning); personnel issues (those issues pertaining to staffing, training, internal organizational politics, modernization, and expertise or skill levels); and value issues (those relating to internal and external value systems, competition and effectiveness).

In its original format the database identified approximately 240 issues as being key to information technology implementation and management in an organization. Each of these was reviewed, categorized, and defined to fit appropriately into the database. Over the course of this study the database was adjusted with new, more appropriate categorizations based on subsequent findings. In addition, duplicate records (and any information not related to IT implementation) were removed to make future content analysis less cumbersome. The information accumulated in the issues database will be further discussed in chapter four.

STAGE TWO

The second stage of this project provided a key bridge between the initial gathering of general information with regard to information technology management and the final description of the most problematic and fundamental issues to the specific process of IT implementation. Stage two involved the design and conduct of a general interview. Much of the design for this interview was garnered from the review of the literature, preliminary interviews with interested professionals/practitioners, and issue identifications from stage one. The interviews conducted for the study were, by design, structured and the questions were open-ended. The interviews were addressed to a small, select group of 8 local government administrators who were contacted not just because of their geographical location in the State of Virginia, but also due to the size of their municipality, and its particular nature (e.g. rural or urban).

A portion of the initial design and issue research which made up the foundation of this database was conducted by students in Dr. John Dickey's "Government Administration II Class" Summer Session 1996 at Virginia Tech Universities Center for Public Administration and Policy. Students conducted interviews with federal, state, and local administrators with regard to general information technology issues as well as reviewing some of the more prominent information systems literature.

These interviews were used to determine a common ground and basis for communication of terminologies. For example: is the understanding of what IT implementation means the same for Virginia SMLG administrators as it is for the study's researcher?; or, are the definitions of ITs and information systems similar and translatable

regardless of the municipality or its executive? This set of interviews was to be informal and conducted in person or via telephone or e-mail. Each respondent's answers were entered into a database for content analysis and review.

INTERVIEW QUESTIONS

Interview

1. I am defining "information technology" as any equipment, services, applications, and basic technologies related to information access, dissemination, collection, and storage. ITs are commonly grouped as computers, multimedia, and telecommunications. Would you agree with this definition, would you add to it or redefine it in any way?

2. What do you perceive as the "role" of information technology in your organization?

3. I am defining "IT implementation" as a process (via a definite plan or procedure) employed in getting a new or significantly changed system in use for those for whom it was intended. Would you agree with this definition, would you add to it or redefine it in any way?

4. I am breaking down the IT implementation process into 3 parts: IT planning, IT procurement, and IT implementation. Would you agree with this categorization, would you add to it or redefine it in any way?

5. I am dividing information technology implementation planning into two opposite categories: (1) coordinated and comprehensive—which refers to a plan that includes more than two departments in an organization, involves most of the functions of local government, and is written down and agreed upon by planning participants, (2) insular- -which is any IT implementation plan made by a single department or individual within a department written or otherwise. Would you agree with these definitions? Would you redefine them in any way?

6. Have you developed a comprehensive plan to develop and implement ITs?

7. Do you have a comprehensive plan with regard to IT in your capital improvements program or plan?

8. What are some of the written procedures and guidelines that you have to follow when implementing ITs in your organization?

9. Do you see your organization as using more (1) coordinated and comprehensive or (2) insular planning methods with regard to IT implementation?

10. Do you perceive your planning approach as being sufficient and effective with regard to IT implementation? If not, what additions do you think would enhance your planning process?

11. Have you done a comprehensive study of your IT needs and desires with the ultimate intention being the development of a plan specific to IT implementation?

12. I am defining IT implementation deficiencies (failure issue) as any instances where problematic situations arise—anything from ineffectiveness and inefficiency to complete and catastrophic systems failure. What kinds of instances or situations would make you consider a particular IT implementation not completely successful or deficient?

13. What is the most recent instance of IT planning and implementation you have undertaken?

14. I am defining a formal IT implementation model as well defined guidelines which provide for continuous, comprehensive, and coordinated planning and implementation with regard to IT. The model should be duplicable and provide specific directives (similar to a handbook). Would you agree with this definition or would you change it in any way?

15. Does your organization make use of any model (formal or otherwise) when planning or implementing ITs? What made you choose this particular model?

16. Were there any particular examples that you followed when planning for or implementing ITs? What were the sources of the models of planning and/or implementation that you used?

17. How did you decide on your implementation process?

18. Does your organization make use of any consultants or consulting firms to aid in your IT planning and implementation? What kinds of consultants are you using, are they from private sector firms? What made you choose a particular consultant?

19. Did you look to any other governments or public organizations for examples of IT implementation and planning? Did you use examples from the private sector?

20. What are some of the biggest problems you face when planning for IT implementation?

21. What are some of the biggest problems you face with actual implementation of ITs?

22. What things do you see as setting you apart from other small and medium sized local governments and other organizations in general, with regard to ITs and IT implementation?

STAGE THREE

The third and final stage of this study consisted of the development and conduct of a survey instrument. The survey was designed to be more specific and detailed than the interview conducted in stage two. The responses and issue information garnered from both of the first two stages were used in the production of this survey. This instrument was designed to provide a descriptive view of the perceptions of local government administrators with regard to information technology implementation in their municipality-- specifically the problematic nature of certain issues in each of the three pre-defined stages of the IT implementation process. The content validity of the questions used for this survey was initially established by ensuring that the definitions and concepts addressed were grounded in fact or established theory as well as verifying through the stage two interviews that there was a common understanding among this particular respondent group.

The survey was broken into two parts--general descriptive information, and process specific issue information. In the first part of the survey respondents were asked to identify the kinds of ITs of which their municipality makes use. In addition they were to respond to general questions about IT expertise levels and their IT implementation process.

In the second part of the survey each respondent was asked to rank how problematic an issue was with regard to its place in the IT implementation process. The survey was mailed to each respondent, with a memo addressed specifically in the individuals name, each respondent was asked to return the completed survey in a selfaddressed, stamped envelope. After two weeks a postcard reminder to encourage participation was sent to the respondents who had not returned their survey. Finally, after one month, a phone call (or email when available) was made to the remaining respondents.

LIMITATIONS AND ASSUMPTIONS

One of the inherent limitations in survey research is the subjectivity of each respondent. No matter how carefully written or completely tested, each survey is Issac, Stephen, and Michael, William B. (1981) Handbook in Research and Evaluation. 2nd ed. San Diego, CA: Edits Publishers. P.46. vulnerable to differing interpretations of the questions. Because of the descriptive purpose of this survey and because the main focus of this research was not to statistically prove relationships between issues but to determine the most problematic ones, this particular limitation is recognized and accepted in this study. In addition, it is possible that some responses were the result of defensiveness, apathy, or ignorance of a particular respondent.

Another limitation may be derived from distortion of the perceptions of individuals about information technologies and their relationship to the given municipality. In this particular study it was impossible to assess the influences of organizational environments, the personalities of the administrators, and any external factors.

In addition, the utility of the process of IT implementation does not lend itself to specific or accurate measures of effectiveness. Individuals and their closeness or buy-in to the process may bias the responses with regard to the perceptions of effectiveness in terms of IT implementation in a given municipality. The stage two interviews consisted mainly of open-ended questions, which in one sense offers valuable insight into why individuals believe the things they do, but the interpretation of those beliefs is at best problematic.

This survey is very small and there is a lack of validation of survey responses from a broader sampling across the municipality. In any event, this study is diverse enough to derive some significant conclusions with regard to IT implementation issues at the SMLG level. However, this will not permit the generalization of outcomes to larger municipalities within the Commonwealth of Virginia. Generalizations extended to SMLG's across the country would also be suspect at best and this question would best be left to future research in IT implementation. The survey instruments themselves suffer from measurement and sampling problems which may include: criteria, content, construct validity, and reliability of the instruments themselves. Although there is some data to show that a causal relationship exists between some of the variables, with a study of this size and nature it is impossible to show full elimination of any rival independent variables.

CONCLUSIONS

The primary focus of this study was to determine what issues SMLG administrators perceived as being the most problematic with regard to IT planning, procurement, and implementation. Each stage in the development and deployment process was viewed individually with regard to its fundamental issues in order to better ascertain the singular impact of each one on the process. Following is a brief discussion of the findings of this study with regard to the three main research questions.