ISSN: 1545-679X

Information Systems Education Journal

Volume 8, Number 61 http://isedj.org/8/61/ July 29, 2010

In this issue:

The Object Oriented Approach in Systems Analysis and Design Texts: Consistency Within the IS Curriculum

David F. Wood
Robert Morris University
Pittsburgh, PA 15219 USA

Frederick G. Kohun
Robert Morris University
Pittsburgh, PA 15219 USA

Joseph Packy Laverty
Robert Morris University
Pittsburgh, PA 15219 USA

Abstract: This paper reports on a study of systems analysis textbooks in terms of topics covered and academic background of the authors. It addresses the consistency within IS curricula with respect to the content of a systems analysis and design course using the object-oriented approach. The research questions addressed were 1: Is there a consistency among Object-Oriented Systems Analysis and Design Texts. 2: If there is not consistency, are the books technology-oriented, or business process oriented? 3: Is there a relationship between the authors' academic background and the focus of the text? It appears that the author's background is an important consideration—as much as the title and contents—in the selection of an appropriate object oriented textbook for an object oriented systems analysis course. One focus is the application of object oriented systems analysis tools and techniques in conjunction with business process, while the technical focus is on programming technique and process.

Keywords: IS Curriculum, Object-Oriented Systems Development Life Cycle, Systems Analysis and Design, textbook selection

---

Recommended Citation: Wood, Kohun, and Laverty (2010). The Object Oriented Approach in Systems Analysis and Design Texts: Consistency Within the IS Curriculum. *Information Systems Education Journal, 8* (61). http://isedj.org/8/61/. ISSN: 1545-679X. (A preliminary version appears in *The Proceedings of ISECON 2008:* §3155. ISSN: 1542-7382.)

This issue is on the Internet at **http://isedj.org/8/61/**

The **Information Systems Education Journal** (ISEDJ) is a peer-reviewed academic journal published by the Education Special Interest Group (EDSIG) of the Association of Information Technology Professionals (AITP, Chicago, Illinois). • ISSN: 1545-679X. • First issue: 8 Sep 2003. • Title: Information Systems Education Journal. Variants: IS Education Journal; ISEDJ. • Physical format: online. • Publishing frequency: irregular; as each article is approved, it is published immediately and constitutes a complete separate issue of the current volume. • Single issue price: free. • Subscription address: subscribe@isedj.org. • Subscription price: free. • Electronic access: http://isedj.org/ • Contact person: Don Colton (editor@isedj.org)

EDSIG activities include the publication of ISEDJ and JISAR, the organization and execution of the annual ISECON and CONISAR conferences held each fall, the publication of the Journal of Information Systems Education (JISE), and the designation and honoring of an IS Educator of the Year. • The Foundation for Information Technology Education has been the key sponsor of ISECON over the years. • The Association for Information Technology Professionals (AITP) provides the corporate umbrella under which EDSIG operates.

The Object-Oriented Approach in Systems Analysis and Design Texts: Consistency Within the IS Curriculum

David Wood
wood@rmu.edu

Frederick Kohun
kohun@rmu.edu

Joseph Packy Laverty
laverty@rmu.edu

CIS Department, Robert Morris University
Moon Township, Pennsylvania 15108 USA

Abstract

This paper reports on a study of systems analysis textbooks in terms of topics covered and academic background of the authors. It addresses the consistency within IS curricula with respect to the content of a systems analysis and design course using the object-oriented approach. The research questions addressed were 1: Is there a consistency among Object-Oriented Systems Analysis and Design Texts. 2: If there is not consistency, are the books technology-oriented, or business process oriented? 3: Is there a relationship between the authors' academic background and the focus of the text? It appears that the author's background is an important consideration—as much as the title and contents—in the selection of an appropriate object oriented textbook for an object oriented systems analysis course. One focus is the application of object oriented systems analysis tools and techniques in conjunction with business process, while the technical focus is on programming technique and process.

Keywords: IS Curriculum, Object-Oriented Systems Development Life Cycle, Systems Analysis and Design, Textbook Selection

1. INTRODUCTION

Courses in systems analysis and development (SA&D) have been an integral part of every model IS curriculum since their inception. Traditionally, SA&D courses have integrated business and industrial process requirements in the context of the Waterfall Systems Design Life Cycle. In recent years, technological shifts to the Object–Oriented Approach (OOA) and increased emphasis of Project Management have forced a change in SA&D curricula and associated textbooks.

These technological changes and systems life cycle management changes have encouraged the introduction of Object-Oriented SA&D courses within IS curriculum. While traditional SA&D courses have evolved over the years from a business process context and perspective, OOA evolved from an engineering and computer science technical programming origin. As a result, the current OOA applies to both engineering and computer science environments as well as to graphics and web based business process applications. The two different OOA focuses—one a technical programming orientation and the other a business process orientation are each appropriate for different curricular contexts (i.e. CS/Engineering, MIS). Textbooks on OOA SA&D, while having the same titles and similar topics can and do reflect

these different focuses. This paper discusses the lack of consensus in IS curricular textbook conformity with respect to IS programs. In other words, OOA SA&D courses in IS curriculums may have two disparate and distinct subject areas while using the same titles in textbooks and topics discussed. A conclusion derived is that the determination of the appropriate textbook for an OOA SA&D course should include the author's background and environment. The research questions addressed were

1. Is there a consistency between Object-Oriented Systems Analysis and Design Texts?
2. If there is not consistency, are the books technology-oriented or business process oriented?
3. Is there a relationship between the authors' academic background and the focus o the text?

2. BACKGROUND OF THE STUDY

Tastle and Russell's (2003) survey of topics taught in system analysis and design courses found that there is little agreement in the amount of emphasis on object-oriented concepts. However, for those educators who teach OOA courses there is greater emphasis on various UML modeling tools, such as Class Diagrams, Sequence Diagrams, and State-transition Diagrams. In spite of their findings it was concluded that OOA was "not yet mainstream; it is reasonable to expect that as the discipline matures, the level of agreement will increase"[2003 p84].

Further Analysis of the Tastle and Russell 2003 study reported that "skills in data collection, surveying, and interviewing" remained somewhat important, yet there was no direct question on the survey instrument concerning Use Cases, a popular UML requirement analysis tool. This omission seems very logical considering the lack of agreement of object-oriented technology topics inclusion in either SA&D or OOA course curricula.

Furthermore Wood, Kohun, and Laverty (2007 and 2008) have documented the change in programming approaches in software development over recent years, including the influence of Object- Oriented Paradigms.

3. RESEARCH METHODOLOGY

It appears that as SA&D has moved towards an Object-Oriented Approach (OOA), there has been a shift towards non-business applications and less emphasis on business requirement analysis. As a result, this paper will use a different method of analysis to confirm that Tastle and Russell's prediction that OOA integration into the SA&D and OOA would increase. Content in course textbooks have historically reflected many changes in course content. Some textbook changes are superficial. Other textbook changes have resulted in the addition or elimination of chapters. But, other textbook changes may be more informative. For example, the background of the authors may have a significant impact of the applications presented in the text and the relative emphasis on various topics. These differences may affect the types of topics covered in SA&D and OOA courses. While the majority of SA&D textbooks may have been authored by IS academic and professionals in the past, a study was conducted to review the authorship of current SA&D and OOA textbooks and to assess the impact on topics of the textbook.

4. DATA GATHERING

Keyword searches were conducted at barnesandnoble.com and amazon.com to obtain a list of textbooks. Two keyword search phrases were used "Object Oriented System Analysis" and "System Analysis and Design" for a more detailed review. Based on the results of the keyword search results 32 texts were selected. Five of the 32 texts were published before 2001. These five texts represent historical classics in SA&D and are still used in IS curricula. The remaining 27 texts published after 2001 better reflect the technical shift to the integration of an OOA emphasis.

For each text, the author(s) were analyzed to determine their academic or professional background. Using textbook information, Google searches and email contacts, each author was assigned to one of two author background categories: MIS/Business or Computer Science/Software Engineering. The criteria used to assign authors to academic background categories were: a) Aca-

demic Degrees, b) Academic Assignment, c) Professional Certifications, and d) Professional Experience. Recent background status was weighted more heavily, i.e., business consulting career with a computer science degree. Many texts had more than one author. A simple numerical percentage based on the count and background of each author was presented. No attempt was made to weight the relative contribution of each author.

5. DATA ANALYSIS

An analysis of each text to determine those topics that had "significant" coverage was conducted. Many topics are presented in each text. The level of significance of coverage can vary between definition-level, section-level, chapter-level, and multi-chapter level. It was assumed that while instructors may not provide a detailed review of all definition-level or section level text material, they would rarely miss academic attention to an entire chapter.

6. DATA ORGANIZATION

Table 1 presents a list and description of the Major Content Category Description used by many System Analysis and Design Texts (SA&D) and Object-Oriented System Analysis (OOA) and Design texts. Based on a review of Chapter Titles, Author Introduction and Comments, and Book Reviews, each text was rated to determine whether there was significant coverage of the content category or not significant/no coverage. Significant coverage of a topic is defined as at least one chapter being devoted to that topic. In situations where chapter titles were unclear or ambiguous, attempts were made to further review the text for significant content.

These categories may be further understood as follows:

Application examples and case studies are useful to demonstrate SA&D and OOA concepts and tools. An analysis of the context of the application examples and case studies was conducted to determine whether the majority application examples could be classified as business/enterprise or scientific/engineering. Based on a review of Chapter Titles, Author Introduction and Comments, and Book Reviews each text was rated to determine whether business/enterprise or scientific/engineering application examples were more significant. While a few textbooks provided applications for both contexts, the context that was most significant was assigned.

A preliminary review of the application examples and case studies from the texts analyzed indicated that the development of an ordinal or rank scale to rate application examples would provide little additional information to this study. A simple binary value was used. Therefore, texts with significant Business/Enterprise Application examples or case studies were assigned a "Yes" Value. Texts with significant Scientific/Engineering application or case studies were assigned a "No" Value.

OOA, UML concepts and tools may be presented with or without a required object-oriented programming background. Some texts provided application program examples beyond pseudo code. Each text was evaluated to determine whether or not a background in an object-oriented or other programming language was highly recommended. Those texts which directly recommended a programming language prerequisite or significantly used program language examples, e.g., Java, was assigned a value of "Yes". Those texts which did not recommend a programming language prerequisite or did not significantly use program language examples was assigned a value of "No".

The details of this analysis are presented in Table 2. Citations appear at the end of the paper. The results of the analysis are in the Appendix.

7. SUMMARY OF THE ANALYSIS

The following table, Table 3, provides a summary of Tables 1 and 2: Citations of the individual texts are at the end of this paper.

The rating of depth of traditional systems analysis coverage was based on significant inclusion of the traditional systems development life cycle, project management concepts, and detailed requirements analysis. The rating of depth of OOA was based on the inclusion of alternative life cycle methods, introductory UML, Intermediate UML, Quality Assurance and Control, and the Impact of

Service Oriented Architecture. The details of these attributes are found in Table 2.

8. DISCUSSION AND CONCLUSION

Table 3 is summarized in Tables 4 and 5 (see Appendix) as follows: We used a crosstab table, as it was apparent that there are insufficient degrees of freedom for any Chi-square or other independence tests.

This paper identified two distinct approaches to Object-Oriented Systems Analysis and Design—business process and technical programming focus. The distinction was determined through a search and analysis of available OOA SA&D textbooks on author's backgrounds and topics covered. The above two crosstab tables derived from Table 3 confirm from our sample that those authors with a background and /or work environment in engineering and computer science focused on programming technique. Those with a background and/or work environment in MIS or business likewise focused on business process. In either case—the titles of textbooks were similar with little or no indication of the content beyond a generic OOA label.

The evolution of the IS curriculum is a continual process. The findings of this study reconfirm the results found by Tastle and Russell's 2003 Study of Systems Analysis course content that indicated a lack of agreement. Furthermore, changes in technology and the increased emphasis on OO&A since 2003 may have even accelerated the departure of the SDLC from a business process focus. The results of this study suggest that SD&A may be losing its identify in the IS model curriculum. The authors of this study are concerned that SA&D in the curriculum may be sacrificing its traditional core strength, business process analysis, in order to accommodate changes in OOA and Project Management constructs.

Several questions need to be considered for the future role of Systems Analysis and Design courses in the IS model curriculum.

1. What should be the application focus for SA&D curricula in the IS model curriculum: business process or technology?
2. What should be the relative emphasis between traditional SA&D tools, e.g. flowcharts, data flow diagrams, structure charts, and OOAD UML tools, e.g. Use Cases, Class Diagrams, Activity and State Diagrams, etc.?
3. What should be the relative emphasis between traditional Waterfall Systems Design Life Cycle Models and Alternative SDLC models, e.g. Agile, Unified Process, Test Driven etc.?
4. Should the traditional SD&A curriculum be separated into two courses: Business-Process SD&A, and OOD&A in the IS model curriculum?
5. What should be the course content overlap among courses in SDA&D, OOA&D, and Project Management?

The results of this study show that there is little or no consistency in the use of appropriate subject matter textbooks in programs using IS model curricula. The content of the textbooks reviewed already indicate the need for two separate courses, SD&A and OOA&D. It is suggested that the curriculum explicitly differentiate the two foci to alleviate any misuse and to promote standardization.

9. REFERENCES

Booch, G. (1993). Object-Oriented Analysis and Design With Applications. Addison-Wesley.

Booch, G., Conallen, J., Houston, K., Maksimchuk, R., Engel, M., and Young. (2007). Object-Oriented Analysis and Design with Applications 3/e. Addison-Wesley.

Brown, D. (2001). An Introduction to Object-Oriented Analysis: Objects and UML in Plain English 2/e. Wiley.

Carlson, D. (2001). Modeling XML Applications with UML: Practical e-Business Applications. Addison-Wesley.

Coad, P. and Yourdon, E. (1991). Object Oriented Design. Prentice Hall.

Dennis, A., and Wixom, B. (1999). Systems Analysis and Design. Wiley.

Dennis, A., Wixom, B., and Tegarden, D. (2004). Systems Analysis and Design. Wiley.

Dennis, A., Wixom, B., and Roth. (2005). Systems Analysis and Design 3/e. Wiley.

Dennis, A., Wixom, B., and Tegarden, D. (2004). Systems Analysis and Design with UML. Wiley.

Fowler, M., and Rumbaugh, J. (2003). UML Distilled : A Brief Guide to the Standard Object Modeling Language 3rd Edition. Pearson Education.

George, J., Batia, D., Valacich, J., and Hoffer, J. (2007). Object-Oriented Systems Analysis and Design 2/e. Prentice Hall.

Hoffer, J., Valachich, J., and George, J. (2007). Modern Systems Analysis and Design. Prentice Hall.

Kendall, K., and Kendall, J. (1998). Systems Analysis and Design. Pearson Education.

Kendall, K., and Kendall, J. (2007). Systems Analysis and Design (7/e 2008). Prentice Hall.

Kohun, F, Wood, D., Laverty, J. (2007). "Systems Oriented Architecture, Unified Process Life Cycle, and IS Model Curriculum Compatability: Meeting Industry Needs". Information Systems Education Journal, 5(1).

Larman, C. (2005). Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development 3/e. Pearson Education.

McLaughlin, B., West, D., and Pollice, G. (2006). Head First Object-Oriented Analysis and Design : A Brain Friendly Guide to OOA&D. O'Reilly Media.

Odell, J. (1998). Advanced Object-Oriented Analysis and Design Using UML. Cambridge University Press.

O'Docherty, M. (2005). Object-Oriented Analysis and Design: Understanding System Development with UML. Wiley.

Podeswa, H. (2005). UML for the IT Business Analyst: A Practical Guide to Object-Oriented Requirements Gathering. Course Technology.

Satzinger, J., Burd, S., and Jackson, R. (2006). Systems Analysis & Design in a Changing World 4/e. Course Technology.

Satzinger, J., Jackson, R., and Burd, S. (2004). Object-Oriented Analysis and Design with the Unified Process 3/e. Course Technology.

Schach, S. (2003). Introduction to Object-Oriented Systems Analysis and Design. McGraw-Hill.

Shelly, G., Cashman, T., and Rosenblatt, H. (2007). Systems Analysis and Design. Cengage Delmar Learning.

Shlaer, S., Mellor, S. (1988). Object-Oriented Systems Analysis: Modeling the World in Data. Yourdon Press.

Shoval, P. (2006). Functional and Object Oriented Analysis and Design: An Integrated Methodology. IGI Global.

Tastle, W., and Russell, J. (2003). "Analysis and Design: Assessing Actual and Desired Course Content" Journal of Information Systems Education, Vol 14(1).

Teague, Stumpf (2005). Object-Oriented Systems Analysis and Design with Uml. Prentice Hall.

Valacich, J., Hoffer, J., and George, J. (2003). Essentials of System Analysis and Design. Pearson Education.

Valacich, J., Hoffer, J., and George, J. (2005). Essentials of System Analysis and Design. Prentice Hall.

Wasson, C. (2005). System Analysis. Wiley.

Weilkiens, T. (2008). Systems Engineering with SysML/UML : Modeling. Morgan Kaufmann.

Whitten, J., and Bentley, L. (2005). Systems Analysis and Design Methods. McGraw-Hill.

Wood, D., Kohun, F., and Laverty, J. (2008), "SOA in the Context of a Comparison of a Distributed Computing Architectures and the IS Curriculum", Issues in Information Systems 9(1).

Yeates, D., and Wakefield, T. (2004). Systems Analysis and Design. Prentice Hall.

APPENDIX: RESULTS OF ANALYSIS

TABLE 1: SA&D AND OOA CONTENT CATEGORIES

Content Category	Category Description
Traditional SDLC	Overview of the Waterfall System Development Life Cycle, Structured Analysis and non-object oriented tools, e.g., data flow diagrams
Detailed Requirement Analysis	Overview of techniques used in project initiation and data collections with some emphasis on business or enterprise process analysis
Intermediate System Design Concepts	Significant coverage of one or more of the following topics: interface design, file and database design, or ERD diagrams
Project Management	Overview of Project Management: Roles, Project Management Plan, work breakdown structure, resource, time and cost estimation, project management tools, i.e., Gantt Charts and PERT/CPM
Alternative Analysis and Design Life Cycle Models	Unified Process, Agile Programming, Extreme Programming, SCRUM, Test Driven Design, etc.
Introduction to Object Orientation	Overview of Classes/Subclasses, Objects, Methods, Attributes, Encapsulation, Inheritance, Polymorphism (no programming background needed)
Introductory UML concepts and tools	Emphasis on Requirement Analysis and Design UML Tools: Problem Domain Classes, Events (triggers), Use Cases, Class Diagrams, and Activity Diagrams
Intermediate UML concept and tools	Significant coverage of one or more of the following topics: Emphasis on Development and Implementation UML Tools: Sequence Diagrams, State Diagrams, Interaction Diagrams, Package, or Frameworks and Components
Quality Assurance and Control through System and Software Testing	Significant coverage of one or more of the following topics: Testing Process (Levels and Cycle), Testing Methodologies, Testing Tools, Testing Scripts, or Release Management
Impact of SOA/Web Service	Overview of Service Oriented Architectures and Web Services and its effects on SA&D and OOA

Table 2 appears in landscape at the end.

TABLE 3 – SUMMARY OF AUTHOR'S BACKGROUNDS AND FOCUS OF TEXTS

Table 3 – Summary of Author's Backgrounds and Focus of Texts					
Authors	**Title**	**CS/SE Back**	**MIS/BUS Back**	**Depth of Traditional Systems Analysis**	**Depth of OOA**
Booch	Object-Oriented Analysis and Design With Applications, Addison-Wesley, (1993)	100%	0%	None	Medium
Booch, Conallen, Houston, Maksimchuk, Engel & Young	Object-Oriented Analysis and Design with Applications, 3/e, Addison-Wesley, (2007)	16%	84%	Elementary	Advanced
Brown	An Introduction to Object-Oriented Analysis: Objects and UML in Plain English, 2/e, Wiley, (2001)	100%	0%	Elementary	Advanced
Carlson	Modeling XML Applications with UML: Practical e-Business Applications , Addison-Wesley, (2001)	100%	0%	Elementary	Medium
Coad and Yourdon	Object Oriented Design, Prentice Hall , (1991)	100%	0%	Minimal	Medium
Dennis, Wixom	Systems Analysis and Design, Wiley, (1999)	0%	100%	Advanced	None
Dennis, Wixom, and Tegarden	Systems Analysis and Design, Wiley, (2004)	0%	100%	Minimal	Advanced
Dennis, Wixom, Roth	Systems Analysis and Design 3/e, Wiley, (2005)	0%	100%	Advanced	Advanced
Dennis, Wixom, Tegarden	Systems Analysis and Design with UML, Wiley, (2004)	0%	100%	Advanced	Medium
Fowler and Rumbaugh	UML Distilled : A Brief Guide to the Standard Object Modeling Language, 3rd Edition, Pearson Education, (2003)	0%	100%	None	Advanced
George, Batia, D. Valacich, Hoffer	Object-Oriented Systems Analysis and Design 2/e), Prentice Hall, (2007)	0%	100%	Elementary	Advanced

Table 3 – Summary of Author's Backgrounds and Focus of Texts

Authors	Title	CS/SE Back	MIS/BUS Back	Depth of Traditional Systems Analysis	Depth of OOA
Hoffer, Valacich, and George	Modern Systems Analysis and Design , Prentice Hall, (2007)	0%	100%	Advanced	Advanced
Kendall and Kendall	Systems Analysis and Design, Pearson Education, (1998)	0%	100%	Advanced	None
Kendall and Kendall	Systems Analysis and Design (7/e 2008), Prentice Hall, (2007)	0%	100%	Advanced	Medium
Larman	Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, 3/e , Pearson Education, (2005)	100%	0%	None	Advanced
McLaughlin, West, and Pollice	Head First Object-Oriented Analysis and Design : A Brain Friendly Guide to OOA&D, O'Reilly Media, (2006)	100%	0%	None	Medium
Odell	Advanced Object-Oriented Analysis and Design Using UML, Cambridge University Press, (1998)	0%	100%	Elementary	Medium
O'Docherty	Object-Oriented Analysis and Design: Understanding System Development with UML , Wiley, (2005)	0%	100%	Elementary	Medium
Podeswa	UML for the IT Business Analyst: A Practical Guide to Object-Oriented Requirements Gathering , Course Technology, (2005)	0%	100%	Elementary	Advanced
Satzinger, Burd, Jackson	Systems Analysis & Design in a Changing World, Course Technology 4/e, (2006)	0%	100%	Advanced	Advanced

Table 3 – Summary of Author's Backgrounds and Focus of Texts

Authors	Title	CS/SE Back	MIS/BUS Back	Depth of Traditional Systems Analysis	Depth of OOA
Satzinger, Jackson, Burd	Object-Oriented Analysis and Design with the Unified Process 3/e, Course Technology, (2004)	0%	100%	Elementary	Advanced
Schach	Introduction to Object-Oriented Systems Analysis and Design , McGraw-Hill, (2003)	100%	0%	Elementary	Advanced
Shelly, Cashman, and Rosenblatt	Systems Analysis and Design, Cengage Delmar Learning, (2007)	0%	100%	Advanced	Advanced
Shlaer, Mellor	Object- Oriented Systems Analysis: Modeling the World in Data , Yourdon Press, (1988)	100%	0%	None	Medium
Shoval	Functional and Object Oriented Analysis and Design: An Integrated Methodology , IGI Global, (2006)	0%	100%	None	Advanced
Teague, Stumpf	Object-Oriented Systems Analysis and Design with Uml, Prentice Hall, (2005)	100%	0%	Elementary	Advanced
Valacich, Hoffer, George	Essentials of System Analysis and Design , Pearson Education, (2003)	0%	100%	Advanced	None
Valacich, Hoffer, George	Essentials of System Analysis and Design , Prentice Hall, (2005)	0%	100%	Elementary	Introductory
Wasson	System Analysis, Design, and Development: Concepts, Principles, and Practices, Wiley, (2005)	0%	100%	Elementary	None
Weilkiens	Systems Engineering with SysML/UML : Modeling, Analysis, Design, Morgan Kaufmann , (2008)	100%	0%	None	Medium

Table 3 – Summary of Author's Backgrounds and Focus of Texts					
Authors	**Title**	**CS/SE Back**	**MIS/BUS Back**	**Depth of Traditional Systems Analysis**	**Depth of OOA**
Whitten and Bentley	Systems Analysis and Design Methods, McGraw-Hill, (2005)	0%	100%	Advanced	Medium
Yeates and Wakefield	Systems Analysis and Design, Prentice Hall, (2004)	0%	100%	Advanced	None

TABLE 4: AUTHOR BACKGROUND VS DEPTH OF O-O ANALYSIS

Count of Authors	Depth of OOA				
Background	Advanced	Introductory	Medium	None	Grand Total
CS / CE	4		6		10
Mixed	1				1
MIS / BUS	10	1	5	5	21
Grand Total	15	1	11	5	32

TABLE 5: AUTHOR BACKGROUND VS DEPTH OF TRADITIONAL ANALYSIS

Count of Authors	Depth of Traditional Systems Analysis				
Background	Advanced	Elementary	Minimal	None	Grand Total
CS / CE		4	1	5	10
Mixed		1			1
MIS / BUS	11	7	1	2	21
Grand Total	11	12	2	7	32

TABLE 2 – DETAILED ANALYSIS OF TEXTS

Text	Trad SDLC	De-tailed Req Anal	Interm SD Con-cepts	Proj Mgmt	Altern. SDLC	Intro OO	Intro UML	Inter UML	QAC/ Testing	SOA/W S	Bus/ Entpr Apps	Pro-gram Lan-guage
Booch, 1993	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No	Yes
Booch, Conallen, Hou-ston, Maksimchuk, En-gel & Young, 2007	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brown, 2001	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No
Carlson, 2001	No	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
Coad and Yourdon, 1991	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
Dennis, Wixom, 1999	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No
Dennis, Wixom, and Tegarden, 2004	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	No
Dennis, Wixom, Roth, 2005	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No
Dennis, Wixom, Tegar-den, 2004	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
Fowler and Rumbaugh, 2003	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No
George, Batia, Valacich, Hoffer, 2007	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No
Hoffer, Valacich, and George, 2007	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No
Kendall and Kendall, 1998	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No

TABLE 2 – DETAILED ANALYSIS OF TEXTS

Text	Trad SDLC	De-tailed Req Anal	Interm SD Con-cepts	Proj Mgmt	Altern. SDLC	Intro OO	Intro UML	Inter UML	QAC/ Testing	SOA/W S	Bus/ Entpr Apps	Pro-gram Lan-guage
Kendall and Kendall, 2007	Yes	Yes	Yes	No	No	No	Yes	No	No	No	Yes	No
Larman , 2005	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes
McLaughlin, West, and Pollice, 2006	No	No	No	No	No	Yes	Yes	No	No	No	No	Yes
Odell, 1998	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No
O'Docherty, 2005	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes	No
Podeswa, 2005	No	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	No
Satzinger, Burd, Jack-son, 2006	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	Yes	No
Satzinger, Jackson, Burd, 2004	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	No
Schach, 2003	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Shelly, Cashman, and Rosenblatt, 2007	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No
Shlaer, Mellor, 1988	No	No	No	No	No	Yes	Yes	No	No	No	No	No
Shoval, 2006	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No
Teague, Stumpf, 2005	No	Yes	No	No	No	Yes	Yes	Yes	No	No	Yes	No
Valacich, Hoffer, George, 2003	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No
Valacich, Hoffer, George, 2005	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	No

TABLE 2 – DETAILED ANALYSIS OF TEXTS

Text	Trad SDLC	De-tailed Req Anal	Interm SD Con-cepts	Proj Mgmt	Altern. SDLC	Intro OO	Intro UML	Inter UML	QAC/ Testing	SOA/W S	Bus/ Entpr Apps	Pro-gram Lan-guage
Wasson, 2005	Yes	Yes	No	Yes	No	Yes	Yes		Yes	No	Yes	No
Weilkiens, 2008	No	No	No	No	No	Yes	Yes	No	No	No	No	No
Whitten and Bentley, 2005	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	No
Yeates and Wakefield, 2004	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No