

Metrics, Mapping, and Modeling for Masterful Management in Higher Education

Metrics, Mapping, and Modeling for Masterful Management in Higher Education offers a comprehensive exploration of strategies and tools essential for effective management in the complex landscape of higher education. Authored by Dr Graham Glynn, a leading expert in the field, the book provides a forward-thinking perspective, encouraging readers to think critically in order to adapt their management strategies to meet evolving demands. The book delves into the intricacies of utilizing the Sentient approach to measure performance, mapping techniques to visualize institutional dynamics, and sophisticated modeling approaches to inform decision-making processes. This seminal work equips administrators and educators with the necessary framework to navigate the ever-evolving landscape of higher education management with confidence and proficiency. This is a brilliant piece of scholarship that will make a significant impact in higher education.

—*Mirta M. Martin*,
PhD President, Ferrum College, Virginia, USA

Metrics, Mapping, and Modeling for Masterful Management in Higher Education

BY

GRAHAM GLYNN

Radford University, USA



United Kingdom – North America – Japan – India – Malaysia – China

Emerald Publishing Limited
Emerald Publishing, Floor 5, Northspring, 21-23 Wellington Street, Leeds LS1 4DL.

First edition 2025

Copyright © 2025 Graham Glynn
Published under exclusive licence by Emerald Publishing Limited.

Reprints and permissions service

Contact: www.copyright.com

No part of this book may be reproduced, stored in a retrieval system, transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise without either the prior written permission of the publisher or a licence permitting restricted copying issued in the UK by The Copyright Licensing Agency and in the USA by The Copyright Clearance Center. Any opinions expressed in the chapters are those of the authors. Whilst Emerald makes every effort to ensure the quality and accuracy of its content, Emerald makes no representation implied or otherwise, as to the chapters' suitability and application and disclaims any warranties, express or implied, to their use.

British Library Cataloguing in Publication Data

A catalog record for this book is available from the British Library

ISBN: 978-1-83662-211-6 (Print)

ISBN: 978-1-83662-210-9 (Online)

ISBN: 978-1-83662-212-3 (Epub)



INVESTOR IN PEOPLE

This book is dedicated to my parents, Brendan and Phyllis, for their steadfast belief in the value of a good education and to my wife Alicia and my friend Mirta Martin for their unwavering encouragement and support.

This page intentionally left blank

Contents

List of Figures	<i>xvii</i>
List of Tables	<i>xxv</i>
List of Acronyms	<i>xxvii</i>
About the Author	<i>xxix</i>
Preface	<i>xxxi</i>
Abstract	<i>xxxv</i>
Document Conventions	<i>xxxvii</i>

Part One: The Big Picture

Chapter 1 Introduction, Vision, Goals, and Benefits	3
1.1. Goal 1: Improve the Management of Complex Institutions	5
1.2. Goal 2: Speed Up the Rate of Evolution of an Institution	10
1.3. Goal 3: Provide a Better Way to Share Knowledge and Resources Across Institutions and, thus, Reduce Duplication of Effort	10
1.4. The Sentient Initiative’s Vision and the Benefits of Its Realization	10
Chapter 2 Learn the Science Behind the Sentient Initiative’s Innovative Approach to Management	13
2.1. Knowledge Terminology and Interrelationships	14
2.2. Well-defined and Structured Information Is Easier to Understand	16
2.3. Connected Information Becomes Knowledge	20
2.4. Organized Information Is Easier to Use and Find	20
2.5. Organizing the Organizers	21
2.6. A Primer on Concept Mapping	23

Part Two: Support Broad Stakeholder Comprehension for Better Performance and Management

Chapter 3 Provide a One-stop Shopping Location for All Information and Data About the Institution	39
3.1. Transform as Much Institutional Knowledge as Possible from Implicit/Tacit to Explicit	39
3.2. Provide an Intuitive Visual Interface to Complex Information	40
3.3. Overview of the Model Structure	44
3.4. The SKM's Community Shared Resource Libraries	46
3.5. Use the SKM's Intuitive Interface as a Portal to Other Institutional Systems	47
Chapter 4 Make It Easy to Find Information and Resources and to Get Help from the Right Person or Office	53
4.1. Search, Reverse Lookup, and the Use of Tags and Types to Find and Filter Content	53
4.2. Intuitive Search – Take a Voyage of Discovery Through the SKM	62
4.3. Quickly Learn and Use the SKM's Interface to Navigate to and View Information	63
4.4. Reduce Information Overload	63
Chapter 5 Empower All Stakeholders with an Understanding of the Nature of and with the Ability to Conceptualize and Understand the Complex, Intertwined Operations of the Institution	67
5.1. Clearly Define the Identity and Purpose of the Institution	68
5.2. Constituents Should Understand the Value-add Contribution of the Institution	73
5.3. Help Constituents Understand the Institution with a Library of Crucial Institutional Documents	74
5.4. Understanding the Core Product – Academic Credentials	76
5.5. Follow the Money – Ensure that Stakeholders Understand Their Unit's Revenue Sources, Expenses, and the Impact of Their Behavior on Financial Health	86

Part Three: Empower Existing and Enable New Management Strategies

Chapter 6 Apply Integrative Thinking and Backward Design to Create a Functionally Unified Institution That Operates More Cohesively	101
6.1. Integrated Thinking Defined	101
6.2. Strategies for Implementing Integrated Thinking	103
6.3. A Different Perspective – Backward Design	103
Chapter 7 Make Knowledge-informed and Justifiable Decisions and Resource Allocations	107
7.1. Why Metric Informed Decision Making Is Important – A Case Study	108
7.2. Use Metrics More Effectively by Clarifying What They Are and What the Institution Needs to Know About Them	109
7.3. Focus Effort, Increase Impact, and Reduce Costs by Being Strategic About Metric Adoption	118
7.4. Sources of Metrics to Consider	120
7.5. Balance Knowledge-informed Decisions with Humanistic Values	121
7.6. Establish and Maintain a Knowledge-based Culture	122
Chapter 8 Use Transparency and Active Information Sharing to Generate Trust and Confidence in the Institution's Leadership	127
8.1. When and Why Information Should Be Shared and When It Should Not	128
8.2. Governance to Ensure Confidentiality, Appropriate Collection, and Usage of Data	128
8.3. Transform Discussions from Emotion-, Assumption-, and Intuition-based, to Fact-based	129
8.4. Stifle the Rumor Mill – Aggressively Push Information to Stakeholders	130
8.5. Improve Shared Governance and Stakeholder Participation in Decision Making	131

Part Four: Optimize Operational Effectiveness and Efficiency

Chapter 9 Explore Options While Modeling the Organization's Group Structure	137
9.1. Overall Group Structure Design	138
9.2. Organizational Groups – The Organizational Hierarchy	138
9.3. Command Groups – Committees	141
9.4. Understand the Groups of People that Interact Within and with the Organization	144
9.5. Other Group Types	146
Chapter 10 Create a Curriculum That Is Optimized for Maximal Student Learning	149
10.1. Explicitly Defining Learning Expectations	150
10.2. Curriculum Mapping – Course Content and Sequencing	161
Chapter 11 Plan and Clearly Communicate Information About Courses and Their Sections	173
11.1. Integrating Courses into the SKM with Connections and Tags	173
11.2. Integrating Sections into the SKM with Connections and Tags	179
Chapter 12 Manage Curricular Offerings and Their Evolution	185
12.1. Quantifying the Size and Institutional Curricular Capacity	185
12.2. Evolving the Curriculum	187
12.3. Increase Student Throughput and Graduation Rates	189
Chapter 13 Manage Space Allocation and Leverage Facilities to Support Teaching	193
13.1. Empower Pedagogies That Improve Learning by Assigning Faculty to Supportive Learning Spaces	193
13.2. Integrating Rooms into the SKM with Connections and Tags	194
13.3. Improve Overall Management of Facilities	197
Chapter 14 Optimize Enrollment	203
14.1. Modeling Enrollment	203
14.2. Metrics Assigned to and Derived Responsibilities for the Enrollment Management Unit	208

14.3.	Clearly Understand the Impacts That Student Enrollment Decisions Have on Their Paths and Progress Toward Graduation, and on Program Enrollments	210
14.4.	Inter and Intra-institutional Partnerships That Can Help with Enrollment	210

Chapter 15 Increase the Efficiency and Effectiveness of all Processes and Services, Through Streamlining, and by Clearly Communicating their Nature, Providers, and Consumers 215

15.1.	Defining and Optimizing a Process	216
15.2.	Integrating Processes into the SKM with Connections and Tags	217
15.3.	Integrating Services into the SKM with Connections and Tags	220

Chapter 16 Multifunctional Tools Provided by the SKM 225

16.1.	Library of [Instrument Element - Response Scale Types]	225
16.2.	Increase Survey Response Rates within Target Populations by Planning Data Collection Frequency and Interspacing	226
16.3.	Location	227
16.4.	Temporal	228
16.5.	Scope	229
16.6.	Balanced Scorecard	230
16.7.	Approval Tracking and Process Flow	231
16.8.	Mandated By	232
16.9.	General Utility Tags	233

Part Five: Deliver Power to the People

Chapter 17 Create and Retain a Productive Workforce 241

17.1.	Understand Organizational Unit Capabilities and Use This to Inform Employee Hiring and Assignments	242
17.2.	Integrating Operational Capabilities into the SKM with Connections and Tags	242
17.3.	Human Resource Practices to Reduce Management Overhead and Provide Holistic Data About Positions	244
17.4.	Integrating a Staff Role Instance into the SKM with Connections and Tags	247
17.5.	Integrating a Faculty Role Instance into the SKM with Connections and Tags	248
17.6.	Information About Specific Personnel	250

17.7.	Clearly Define Expectations of Current and Prospective Employees	255
17.8.	Build Consensus About What Faculty Excellence is and How it Should Be Measured	258
17.9.	Explicitly Define What it Takes to Manage and Lead an Institution Effectively	260
17.10.	Empower people	261
17.11.	Shape the workforce with professional development and motivate people with awards and recognitions	261
17.12.	Integrating Awards into the SKM with Connections and Tags	262
Chapter 18 Improve Student Success – Increase Graduation Rates and Decrease Time to Graduation		269
18.1.	Help Students Transition into the Institution and Meet the Expectations of Third-level Education	270
18.2.	Help Students Select and Employees Advise on the Choice of a Major and Assembly of a Credential	271
18.3.	Use Predictive Analytics to Proactively Identify Students At-risk of Non-completion	273
Chapter 19 Accurately Assess Status and Current Conditions		277
19.1.	Clearly Understand Current Conditions and Performance Using Introspective Analysis: The Accreditation Self-study Process	278
19.2.	Assess Current Performance, and Possibilities for the Future, Using Comparative Analysis (Benchmarking): Peer and Aspirant Institutions	281
19.3.	Use the SKM to Benchmark Against Comprehensive Lists of Institutional Features Pooled from Across the World	286
Chapter 20 Evaluate and Assess Student Learning		289
20.1.	Assessing Learning Requires More Than Grades	290
20.2.	Determining Learning Outcome Achievements at the Program Level	294
20.3.	Indirect Measures of Program Outcome Achievement	297
20.4.	Determining Learning Outcome Achievement Within the Liberal/General Education Program	298
20.5.	Using Program Learning Outcome Assessment Data to Make Decisions	299

20.6.	Determining Extracurricular Learning Outcome Achievement	299
20.7.	Putting Assessment Data Together	299

Chapter 21	Provide a View from the Balcony – Easily Appraise the Performance of the Institution’s Interdependent Elements and Know Where Intervention Is Needed	301
21.1.	KPIs as Bellwethers	302
21.2.	Use Performance Monitoring to Keep a Finger on the Pulse of the Institution	302
21.3.	Communicate, Corroborate, and Manage Change	304
21.4.	Identify Blind Spots and Missing Components – An Inventory of Inventories (IofI)	306

Part Six: Deliberately Drive Institutional Evolution

Chapter 22	Create an Inclusive and Robust Planning Process That Prepares the Institution for Change	317
22.1.	Prepare to Plan – A PM to Execute a Strategic Planning Process That Engages Stakeholders	318
22.2.	Establish the Committees and Teams That Will Execute the Process	318
22.3.	Establish Goals for the Planning Process	319
22.4.	Determine How Input Will Be Gathered	319
22.5.	Create a Fertile Environment for Change	321
22.6.	Determine How the Plan Will Be Written and Approved	322

Chapter 23	Gather Input, Analyze, and Develop a Strategic Plan Focused on Beneficial Change	325
23.1.	Gather Stakeholder Input	325
23.2.	Other Sources of Potential Goals and Objectives	326
23.3.	The Forward Design Approach	326
23.4.	Leverage the SKM’s Framework to Create a Highly Structured, Rigorous, and Comprehensive Strategic Plan	327
23.5.	Use an Integrative and a Backward Design Approach to Develop Strategy	329
23.6.	Vision – What the Institution Wishes to Become.	331
23.7.	Enacting Vision	334

23.8.	Integrate the Sentient Initiative into the Strategic Plan	334
23.9.	Concluding the Planning Process	334

Chapter 24	Use the Strategic Plan to Efficiently Drive Institutional Evolution	337
24.1.	Determine How the Plan Will Be Executed and Monitored	338
24.2.	Ensure that the Strategic Plan Drives All Areas of the Institution	338
24.3.	Ensure Priorities Are on Target and that Resources are Effectively Allocated by Assessing Plan Progress Dynamically	339

Part Seven: Catalyze Innovation and Reduce Duplication of Effort by Engaging and Sharing with the World-wide Higher Education Community

Chapter 25	Empower Innovation and Efficiency Through Community Sharing	345
25.1.	Develop and Promote the Use of a More Effective Method of Sharing Curated Complex Information and Resources within a Community	346
25.2.	The SKM as an Aggregator of Shared Resources	346

Chapter 26	Network and Leverage Mutual Support-The HELLO Community	367
26.1.	Using the HELLO-C Site	367
26.2.	Areas of Functional Overlap Between HELLO-C and the SKM	368
26.3.	HELLO-C Capabilities That Are Not in the SKM But Complement It.	368

Part Eight: Deploy, Update, and Contribute to the Sentient Initiative

Chapter 27	Manage SKM Deployment	375
27.1.	Use and Distribution of the SKM	376
27.2.	How to Set Up the SKM (Quick Start)	377
27.3.	SKM Roll-out Overview	377
27.4.	Detailed roll-out-Phase 1	379
27.5.	Detailed roll-out-Phase 2	380
27.6.	Detailed roll-out-Phase 3	385

27.7. Assigning the Work of Creating the Institutional Master SKM	388
27.8. Controlling Access to Maps and Models	389
Chapter 28 Support Resources to Help with SKM Implementation	393
Chapter 29 Keep Up with or Contribute to the SKM's Ongoing Development	401
29.1. Keep Information Current and Add New SKM Features and Resources as They Are Developed	401
29.2. Opportunities to Get Involved and Contribute to the Sentient Initiative	402
Chapter 30 Additional Applications of the SKM	407
30.1. The SKM as the Foundation for a Graduate Course in Higher Education Leadership or Management	407
30.2. The SKM as a Student Orientation and Employee Development Tool	407
30.3. Opportunities for Scholarship with the SKM and HELLO-C	407
Appendix 1. Expert Interview Form	409
Appendix 2. Comparison of Planning and Assessment Terminology Across Student Learning and Institutional Operations	413
Index	417

This page intentionally left blank

List of Figures

Fig. 1.	The Components of the Sentient Knowledge Map.	6
Fig. 2.	Sentient Serves as an Integration Layer for All Other IT Systems.	7
Fig. 3.	The Sentient Knowledge Map as Displayed Within TheBrain Application.	8
Fig. 4.	Knowledge Management Framework Applied Within Sentient.	14
Fig. 5.	The Relationships Between Data and Wisdom.	15
Fig. 6.	The Relationships Between Instruments, Questions, Metrics, and Data.	16
Fig. 7.	Naming of Thoughts in the SKM.	17
Fig. 8.	Nomenclature Filters/Modifiers that Can Be Applied to Components of an Object's Title.	18
Fig. 9.	Thought Relationships and Reading Connectors.	24
Fig. 10.	The Features of the SKM that Support an Intuitive Visual Interface.	40
Fig. 11.	The Pin Panel, Past Thoughts Panel, and the Plex Components of TheBrain App.	42
Fig. 12.	Concept Map Layout Options.	43
Fig. 13.	The Main Categories Within the Universal Institutional Model.	44
Fig. 14.	The Main Categories of the Resource Library.	46
Fig. 15.	Tags Indicating that the Content Panel of a Thought Has Links to Other Systems.	48
Fig. 16.	A Search Result Preview of Note Content.	54
Fig. 17.	Web Search Pop-up Menu.	54
Fig. 18.	TheBrain's Toolbar (from TheBrain User Guide).	55
Fig. 19.	The Type Drop-down Menu and Display of a Schema in the Plex by Its Selection.	55
Fig. 20.	Tag Schemas Visible Within the Drop-down Menu and Displayed in the Plex.	56
Fig. 21.	Type to Tag Jump Connectors in the Help Section.	56
Fig. 22.	A Part of the SKM Connector List.	57
Fig. 23.	Finding a Type or Tag.	58
Fig. 24.	Displaying all the Thoughts to Which a Tag Is Applied.	58
Fig. 25.	Using the Thought Type to Select and Display Related Information.	59
Fig. 26.	Using Tags to Select and Display Related Information.	59
Fig. 27.	Report Panel Showing Advanced Search Options.	60

Fig. 28.	Saving Reports in Sentient.	60
Fig. 29.	Dynamic Search Results Shown as Thoughts Are Created.	61
Fig. 30.	Sentient's Set of General Utility Flags.	63
Fig. 31.	TheBrain Options for How Tags Are Displayed.	64
Fig. 32.	Components of Institutional Identity.	68
Fig. 33.	The Components that Help Define the Culture and Climate of an Institution.	70
Fig. 34.	Institutional and Campus Classification Tags.	71
Fig. 35.	The Major Categories of Metrics that Define the Core Character of an Institution.	72
Fig. 36.	The Type Schema for Crucial Institutional Documents.	74
Fig. 37.	Operational Focus Policy Tags.	75
Fig. 38.	The Potential Connections and Tags of a Crucial Institutional Document.	76
Fig. 39.	Document Change Management Tags.	77
Fig. 40.	A Schema for Classifying Academic Credentials.	78
Fig. 41.	Potential Components of an Academic Credential.	79
Fig. 42.	The Potential Connections and Tags of a Credential.	81
Fig. 43.	Change Management Tags that Can Be Applied to an Academic Program.	82
Fig. 44.	Tags that Can Be Used to Assign Course Credit Requirements to a Program.	83
Fig. 45.	Tags Used to Indicate a Programs Full-time Duration.	84
Fig. 46.	Academic Programs, Learning, and Testing Main Categories.	85
Fig. 47.	Non-credentialed Programs that May be Components of Other Programs.	85
Fig. 48.	Learning Expectations Organized by Credential.	86
Fig. 49.	Financial Management Types Used to Track the Money.	87
Fig. 50.	The Accounting Roll-up Structure.	87
Fig. 51.	The Potential Connections and Tags of Accounts and Funds.	88
Fig. 52.	Predefined Fund Types.	89
Fig. 53.	Revenue Source Types for a HEI Foundation.	89
Fig. 54.	Institutional Revenue Types.	90
Fig. 55.	Revenue Types for Students.	91
Fig. 56.	Tags Applied to Funds.	92
Fig. 57.	Financial expense category schema.	92
Fig. 58.	Connector Types for Financial Modeling.	93
Fig. 59.	Relationships Between Collection Instruments, Questions, Metrics, and Data.	110
Fig. 60.	Metric Relationships with Other Parts of the Concept Map.	111
Fig. 61.	Metric Classification Types.	112
Fig. 62.	Data and Data Instrument Types Used in Sentient.	113
Fig. 63.	Focus Tags that Can Be Applied to a Question.	114
Fig. 64.	Groups that May Mandate Metrics.	117
Fig. 65.	The Nature or Character of a Metric or Rubric.	117
Fig. 66.	The Type of Measurement a Metric Embodies.	118

Fig. 67.	A Suggested List and Rotation of Open Forums on Key Areas for Information Sharing.	131
Fig. 68.	Decision Domains and Participation Processes.	133
Fig. 69.	Schema of Sentient Group Types.	138
Fig. 70.	Sentient Model Administrative Group Structure.	139
Fig. 71.	Intramural Administrative Group Structure.	139
Fig. 72.	The Potential Connections and Tags of an Organizational Unit.	140
Fig. 73.	Group Change Management Tags.	141
Fig. 74.	Types of Committees.	141
Fig. 75.	The Potential Connections and Tags of a Committee.	142
Fig. 76.	Connector Types for Committees.	143
Fig. 77.	Role Tags that Can Be Applied to Committees.	143
Fig. 78.	Organization Scope Categories that Define a Group's Sphere of Influence.	144
Fig. 79.	The First Two Levels of the Demographic Group Structure.	145
Fig. 80.	The Potential Connections and Tags of a Demographic Group.	146
Fig. 81.	Demographic Group Subtypes.	146
Fig. 82.	Bloom's Taxonomy Pyramid.	152
Fig. 83.	Tags to Apply Bloom's Taxonomy of Learning Outcomes.	152
Fig. 84.	Relationships Between Goals and Outcomes.	154
Fig. 85.	The Degree Qualification Profile Dimensions.	155
Fig. 86.	The Progression and Relationships of Learning Expectations in Various Programs.	156
Fig. 87.	The Set of Program Goals and Outcomes that an HEI May Have.	160
Fig. 88.	The Three Steps for Addressing Program Learning Outcomes in Courses.	161
Fig. 89.	The Relationships Between Program Learning Goals and Outcomes, Course Learning Outcomes, and Courses.	162
Fig. 90.	Course Sequencing with Pre- and Co-requisites.	163
Fig. 91.	Curriculum Mapping from a Course Centric Perspective.	166
Fig. 92.	Pre-defined Connectors for Mapping Relationships Between Courses in a Curriculum.	167
Fig. 93.	Mapping Program and Course-learning Goals, Outcomes, and Incomes to Courses.	168
Fig. 94.	Predefined Connector Labels for Learning Outcomes Mapping.	168
Fig. 95.	An Example Decision Point Within a Curriculum Map.	169
Fig. 96.	The Potential Connections and Tags of a Course.	174
Fig. 97.	Course and Section Types.	174
Fig. 98.	Course Content Panel Display of Catalog Information.	175
Fig. 99.	Course Change Management Tags.	176
Fig. 100.	Academic Terms.	176
Fig. 101.	Tag Set for Managing Course Offering Periodicity.	177
Fig. 102.	The Purpose a Course Is Designed For.	177
Fig. 103.	Skill Set Emphasized Within Courses.	178

Fig. 104. Course Scheduling Relationships with Other Courses.	178
Fig. 105. Special Use Approvals That Courses May Require.	179
Fig. 106. The Potential Connections and Tags of a Course Section.	180
Fig. 107. A Course Section Content Panel Displaying the Institutions Schedule.	180
Fig. 108. The Delivery Mode Options for a Course Section.	180
Fig. 109. Pedagogical and Evaluation Options for a Course Section.	181
Fig. 110. The Term Lengths Offered by the Institution.	182
Fig. 111. Facility Types.	194
Fig. 112. The Potential Connections and Tags of a Room.	195
Fig. 113. ADA Tags for Non-accessible Areas.	196
Fig. 114. Capacity Range Tags That Can Be Applied to a Room.	196
Fig. 115. Classroom Configuration Tags.	197
Fig. 116. The Room Provisioning Tag Set.	198
Fig. 117. Tags Used to Identify Room Scheduling Entities and Their Uses.	198
Fig. 118. Room Structure Tags.	199
Fig. 119. The Utility Tag Sets for a Room.	199
Fig. 120. The Building and Room Use Tag Set.	200
Fig. 121. Tags Used to Track Changes in Facilities.	200
Fig. 122. Stages in the Student Recruitment Process.	204
Fig. 123. Demographic Groups for the Student Recruiting Process.	205
Fig. 124. Former Student Demographic Groups.	207
Fig. 125. The Top-level Responsibilities for an Enrollment Management Organization.	209
Fig. 126. Second-level Responsibilities and Metrics for an Enrollment Management Organization.	209
Fig. 127. Process Flow Diagram for a Faculty Search.	216
Fig. 128. Types of Process/Procedure Documents.	217
Fig. 129. The Potential Connections and Tags of a Process.	218
Fig. 130. Schema of Process Categories.	218
Fig. 131. Process Change Management Tags.	219
Fig. 132. The Process Components of the Balanced Scorecard.	219
Fig. 133. The Connections and Tags of a Service.	220
Fig. 134. Categories of Services.	221
Fig. 135. Service Change Management Tags.	222
Fig. 136. Service Trigger Tags.	222
Fig. 137. Tags to Indicate Service Access Restrictions or Provider Type.	223
Fig. 138. Response Scale Library.	226
Fig. 139. Using the Timeline Tool to Plan Survey Delivery.	227
Fig. 140. Creating an Event Associated with a Thought from Its Properties.	227
Fig. 141. Location Tag Schema.	228
Fig. 142. Tags Used to Indicate Periodicity.	229
Fig. 143. Tags Used to Indicate the Target Date or Milestone.	230
Fig. 144. Tags Used to Indicate the Range or Duration of an Event.	231
Fig. 145. Tags Used to Indicate the Scope or Influence of an Object.	232

Fig. 146. The Balanced Scorecard Levelling Approach to Planning and Resource Allocation.	232
Fig. 147. Tags Used to Indicate Level of Approval and Its Timing.	233
Fig. 148. Tags Indicating the Source of a Mandate.	233
Fig. 149. General Utility Tag Sets.	234
Fig. 150. Housekeeping Flags for Content Generators.	234
Fig. 151. Selection and Filtering Flags.	235
Fig. 152. Tags Used to Deliver Messages to Users.	235
Fig. 153. The Potential Connections and Tags of an Operational Capability.	243
Fig. 154. Operational Capability Category Schema.	243
Fig. 155. Operational Capabilities L1 Categories.	243
Fig. 156. Role Type and Job Description Schemas.	244
Fig. 157. The Potential Connections and Tags of a Role Type and Its Instances.	245
Fig. 158. The Potential Connections and Tags of a Line Number.	246
Fig. 159. Line Number Type Schema.	246
Fig. 160. HR Line Change Management and Status Tags.	247
Fig. 161. The Potential Connections and Tags of a Staff Role Instance.	248
Fig. 162. The Potential Connections and Tags of a Faculty Role Instance.	249
Fig. 163. Role Types for Faculty Positions.	249
Fig. 164. The Potential Connections and Tags of a Staff Employee Name.	250
Fig. 165. Employee Full Name Types.	251
Fig. 166. Status and Change Management Tags That Can Be Applied to Personnel.	251
Fig. 167. Tags Used to Help Create Relationships Between Mentors and Mentees.	252
Fig. 168. The Potential Connections and Tags of a Faculty Member's Name.	253
Fig. 169. Faculty Demographic Groups That Aid in Defining a Position.	254
Fig. 170. Honorary Role Tags That Can Be Applied to a Role Instance.	255
Fig. 171. Faculty Role Release Time Tags.	255
Fig. 172. An Assembled Job Description.	256
Fig. 173. Process for Generating an Employee Performance Plan and Evaluation.	257
Fig. 174. Employee Evaluation from the Supervisor's Perspective.	258
Fig. 175. A List of Expectations That a Faculty Member Should Possess.	259
Fig. 176. A Faculty Value Translated Into an Activity That Generates a Metric.	259
Fig. 177. The Characteristics of Good Leaders and Managers.	260
Fig. 178. Characteristics of a Good Manager/Leader Translated into Activities and Metrics.	260
Fig. 179. Award Categories.	263
Fig. 180. A Sample Award Category Showing Its List of Awards.	264

Fig. 181. The Potential Connections and Tags of an Award or Recognition.	264
Fig. 182. A Branch of the CIP code Schema Showing Its Information Web Page.	272
Fig. 183. Part of the Decision Tree for the Selection of a Major and Assembly of a Credential.	272
Fig. 184. Decision Tree Options for Pre-Professional Preparation Programs.	273
Fig. 185. Institutional and Program Accreditation Tracking Tags.	278
Fig. 186. Accreditor Categories Used in Sentient.	280
Fig. 187. Example of a Set of Standards Mapped to an Accrediting Agency.	280
Fig. 188. Tags Used to Designate Peer and Aspirant Institutional Types and Comparative Categories.	282
Fig. 189. Categories of metrics for selecting peer and aspirant institutions.	283
Fig. 190. Peer and aspirant institution selection criteria.	284
Fig. 191. Mapping Peer and Aspirant Selections Between Institutions.	284
Fig. 192. Correlating Course Grading Activities with Assessment of Student Learning Outcomes.	292
Fig. 193. Comparison of Outcomes Achievement Rates Prior to and Following a Course Redesign.	294
Fig. 194. Assessing Program Learning Outcomes.	295
Fig. 195. Rolling Course Assessment Achievements up to Generate Program Achievements.	296
Fig. 196. Performance Monitoring Tags.	303
Fig. 197. Selecting Tagged Items to Produce a Count.	304
Fig. 198. Evolution and Change Management Categories.	305
Fig. 199. Change Management Specific Connectors.	306
Fig. 200. The Inventory of Inventories – Categories and Lists Part 1.	307
Fig. 201. The Inventory of Inventories – Categories and Lists Part 2.	308
Fig. 202. A List of Initiatives for the Planning Phase of Strategic Planning.	318
Fig. 203. A Rubric to Assess a Strategic Plan.	320
Fig. 204. The Schema of Thought Types for Strategic Planning.	328
Fig. 205. The Components of a SKM based Strategic Plan.	328
Fig. 206. Correspondence Between SWOT Elements and Objectives.	328
Fig. 207. Driving Employee Tasks with the Strategic Planning Process.	339
Fig. 208. Committee and Employee Roles in Executing and Evaluating Strategic Plans.	341
Fig. 209. Resources Shared Within Sentient by Other Institutions and Individuals.	347
Fig. 210. Shared Resource Focus Tags.	348
Fig. 211. Resources Grouped by Type of Contributor.	349
Fig. 212. Contributors Grouped by Type of Donation.	349
Fig. 213. The Directories of Organizations and Providers Within Sentient.	350

Fig. 214. The Potential Connections and Tags of an Accrediting Agency.	350
Fig. 215. A Sample of a Submitted Accreditation Self-Study Report.	351
Fig. 216. A Sample from a Self-Study Report Showing Links to Metrics Embedded in the Document.	351
Fig. 217. Tools Available to Help Assess Student's Preparation and Learning.	352
Fig. 218. Metrics Grouped Into Categories by Types and Tags.	353
Fig. 219. Perspective Analyses Contributed to Sentient.	353
Fig. 220. A Partial List of the Benefits Stakeholders Expect from Their Institution of Employment.	354
Fig. 221. The Format of Contributed Strategic Plans Within the Sentient Resource Library.	356
Fig. 222. Inter-Institutionally Shared Good PMs.	357
Fig. 223. Rubric Sets Within the Rubric Library.	359
Fig. 224. The Potential Connections and Tags of a Rubric.	359
Fig. 225. A Sample Institutional Roll-out Plan for Sentient.	378
Fig. 226. Starting the Backup to Brain Archive Process.	381
Fig. 227. The Universal Institutional Org Chart with the Demo Prefixes in Place.	382
Fig. 228. Access Rights to a Brain.	389
Fig. 229. Sentient Help Resources, About Information, and Tools.	394
Fig. 230. A Concept Map of All the Features of Sentient.	394
Fig. 231. The Benefits That an Institution Can Realize from Sentient.	395
Fig. 232. Searching for Types in the Help Section's Listing.	396
Fig. 233. Sentient Complex Relationship Maps.	397
Fig. 234. Sample Results from a Reverse Lookup.	397
Fig. 235. Synchronizing a Local Concept Map Copy with TheBrain Master Version.	402
Fig. 236. Changed Thoughts.	403
Fig. 237. Changed Types.	403
Fig. 238. Changed Tags.	403

This page intentionally left blank

List of Tables

Table 1.	Schemas Used in the SKM to Structure Information.	22
Table 2.	Community Shared Resource Sections with Links and Cross References.	47
Table 3.	Relating Program Outcomes to Existing Courses.	164
Table 4.	Levels of Course Learning Outcome Achievement.	291
Table 5.	Possible Contributors to Determining CLO Achievement Levels in a Course.	293
Table 6.	CLO 1 Assessment Rubric.	293
Table 7.	Longitudinal Analysis of Student Performance Within Biological Sub-Systems.	297

This page intentionally left blank

List of Acronyms

AI	Artificial Intelligence
CC	Community College
CIP	Classification of Instructional Programs
CLO	course-level Learning Outcomes
CQI	continuous quality improvement
DQP	Degree Qualification Profile
EM	Enrollment Management
FAFSA	Free Application for Federal Student Aid
FTE	full-time equivalent
HC	headcount
HEI	higher education institution
HELLO-C	Higher Education Leadership Learning Online Community
IECQI	Institutional Effectiveness and Continuous Quality Improvement
IPEDS	Integrated Postsecondary Education Data System
NCP	non-credential program
PA	perspective analysis
PLO	program learning outcome
PM	Practice Model
RFP	request for proposals
SKM	Sentient Knowledge Map
SLO	Student learning outcomes
SMART	Specific, Measurable, Achievable, Relevant, Timely
SWOT	Strengths, Weaknesses, Opportunities, and Threats

This page intentionally left blank

About the Author

Dr Graham Glynn is a Neuroscientist interested in how people learn. He is also a technophile with a passion for using technology to extend the capabilities of the human mind. In 2002, these interests led him to create a software company that developed personal knowledge management software called Knowledge Workshop that sold in over 40 countries. This software was designed around information science and knowledge management principles to help manage the overwhelming amount of information that today's professionals are expected to know and use. His current project, called the Sentient initiative, was begun in 2015 and combines these knowledge management principles with a concept mapping and modeling approach that emulates how the brain stores and retrieves information by creating associations between thoughts. The Sentient Knowledge Map (SKM) is the embodiment and a practical implementation of this approach and accompanies this book.

Following a post-doctoral fellowship in the pharmaceutical industry, he gained wide experience working in multiple higher education settings and types of institutions spanning big research institutions like Penn State University and Stony Brook University, and regional comprehensives, private, state, religious and minority serving institutions, and in professional schools. He also completed a sabbatical at the British Open University, at the time the largest provider of online education in the World. Subsequently, he was instrumental in starting the World's first online school of Pharmacy at Creighton University. He has led numerous re-accreditation and strategic planning processes and served on several institutional accreditation review teams.

In his academic career, he capitalized on his interests in learning science and technology by helping his peer faculty develop teaching and learning skills. He is responsible for founding and leading several faculty development centers at universities across the United States. As his administrative responsibilities broadened from these development roles, it was natural to apply these skills to management and leadership endeavors and peer manager development. As a trained scientist, he has, to the extent possible, incorporated data and modeling into his decision-making approach. However, while serving as the Provost and Vice President for Academic Affairs at two large universities, he discovered that the tools and systems needed to support this approach in complex organizations like higher education institutions are sorely lacking. In particular, tools and approaches to help plan and run the institution with an integrated approach and to support

transparent knowledge-informed decision making were non-existent. He, therefore, set out to create such an approach.

He also felt that many of the projects he was working on had aspects of reinventing the wheel and that other institutions had likely “been there and done that.” With his background in peer development, he, therefore, created the Higher Education Leadership Learning Online (HELLO) community <https://hellocommunity.net/>¹ as a place where institutional leaders could network, share experience, resources, and good practices. For more information about him, please visit <https://www.grahamglynn.com/>.²

¹<https://hellocommunity.net>

²<https://www.grahamglynn.com>

Preface

As administrators move up the ladder, the complexity of the organization that must be managed increases and they become more distanced from a nuanced understanding of day-to-day operations. It becomes increasingly challenging to keep all the moving parts coordinated – the view from the balcony where the movements of the various units can be choreographed becomes more difficult to achieve. Integrative thinking is needed to knit all the functions supported by a wide variety of divisions, departments, and offices together into a coordinated purposeful approach. This ability is supported by holistic knowledge of the institution, ideally organized in a hierarchical manner that enables drill down from the complex to the simple, strategy to tasks, divisions to individuals, degrees to course sections, and so on. In addition, non-hierarchical interconnections add essential information such as cross-organizational expectations of cooperation and support and dotted line reports. Similarly, metrics, tactics, processes, services, etc., commonly span the borders between organizational units. To enable integrated thinking and management, the navigation mechanism must, therefore, display not only how things are connected but also why they are connected. **Creating such a system that supports integrative thinking at all levels of leadership is a major goal of this book and the Sentient system on which the methodology is built.**

Administrators are constantly asked to make decisions, and most would like to do so based on readily available data that is pertinent to the decision at hand. Unfortunately, it is common to find that helpful data either does not exist or that it is overlooked because it is not easy to find or access. Consequentially, decisions are more likely to be based on intuition and political influence.

Data are most critical to what are the two most challenging processes that are commonly undertaken in higher education today – strategic planning and accreditation self-studies. For many people, the most challenging aspect of these processes is the provision of metrics that are used to support claims that standards were met or to assess whether strategic initiatives are working and worthy of continuation. Critical decisions are made based on these metrics, so choosing the right set is especially important. There are many factors which must be considered when choosing a metric. Does the metric truly reflect the status of the challenge being addressed? Is it the most directly affected measure that will respond quickly and accurately to the proposed intervention? Can it be measured reliably? Can it be normed against peer institutions? Who will be responsible for its collection, analysis, monitoring, and effecting change? Is the intelligence it provides

worth the investment (cost-to-benefit ratio)? Each adopted metric costs money – someone must collect the data, analyze it, and present it, and recipients must spend time digesting it. An institution must, therefore, be very strategic about the metric set that it chooses to invest in. **A goal of the Sentient Initiative is to provide a library of metrics to help with this selection process.** Having such a library also enables a backward approach to planning. It is considered backward because instead of first producing a strategy and then metrics to determine if it is successful, a backward approach starts by first selecting a metric of interest and then creating objectives around it. This complements the traditional forward design process used in planning by providing a different perspective on the institution.

There will always be a comprehension gap between leaders and those being led. One of the advantages of promotion is that one does gain a broader understanding of how various aspects of the institution function and are interdependent. This education changes an administrator's perspective and how they think. However, more junior employees remain unchanged and may have a less sophisticated outlook. Similarly, as an administrator's education transforms them, it may be difficult for them to appreciate the perspectives of those who have not had the benefit of this education. (As an exaggerated example of this, try to put yourself in the shoes of someone who cannot read. Their perspective on the World would be so radically different to yours that it would be hard to appreciate.) In addition, an administrator's perspective may be altered by confidential information which cannot be shared with others. Therefore, many stakeholders may not be aware of all the factors that the administration must consider when making decisions and may not, therefore, understand the rationale behind them. In addition, even if an administrator has risen through the ranks, and has been there and done that, the further they are away from managing daily operations the less people trust their understanding of and decisions about their needs. Furthermore, one must deal with the tyranny of the anecdote (a small number of cases extrapolated as evidence of a trend), rumors, false information, and the unfortunate fact that people tend to believe in malicious intent before considering whether they have all the information and whether incompetence or errors by fallible people could be involved. **To counter all of this and create a culture of trust, therefore, requires an active and deliberate strategy of information sharing and transparency which is embodied in Sentient.**

Releasing control of information can be difficult as there is power in selective knowledge. However, power is like love; the more you are willing to give it away, the more you get back. People tend to trust others who do not want power more than those who do. This is particularly true of servant leaders, and it is they who will reap the most benefit from this book and the Sentient approach.

Ideally, with ubiquitous access to information, stakeholders can become more active in decision-making processes which leads to better decisions. Conversations between the administration and stakeholders that are based on facts are much more productive and less contentious than those based on feelings and assumptions. The more open the institution is with information, the more trust it will engender and the less often people will feel the need to check the facts – just knowing that they can do so often suffices and of course keeps the administrators

honest. Data may still be challenged based on its source, study design, or integrity. Hopefully, most of the time, it will withstand these challenges. If not, a new mutually agreed upon study can always be implemented.

For data to be useful, it must also be easy to find and to understand. It is also important to show all the relevant data to a user and not just those they were looking for. They may not know that other data exists or may not have thought it was relevant until presented with a connection. In higher education, for example, end of course survey data is routinely collected by most institutions. It may sit in an obscure database and be accessed once a year for inclusion in annual evaluations of faculty. However, if one maps that data to the classroom where the instruction occurred, to the faculty member who delivered it, and to the course sections from which it was collected, it becomes infinitely more useful and powerful. Trends can more easily be studied. Facilities management can see classroom issues reported by students from multiple courses simply by selecting the room within the model. Similarly, issues from multiple sections can indicate the need for a course redesign or ratings from multiple courses with the same instructor may indicate a personnel issue. The more ways the data is connected, the more useful it becomes. In this way, **data can be transformed from information into knowledge that provides powerful assistance with decision making.** When metrics from all operational areas are mapped in this synergistic way, the map transforms into an operational model of the entire institution.

Providing intuitive access to as much data as possible within confidentiality constraints and making it a customary practice to share the information during conversations and meetings is a powerful way to create a culture of trust and transparency and to move decisions forward in an effective and justifiable way. **Creating an intuitive and powerful information-sharing system that supports this approach and that is accessible to all stakeholders is another major goal of this book and the Sentient system.**

Another challenge institutions face is that they do not know what they do not know. What should they be monitoring that they are not? What data are other institutions using to make similar decisions? What processes and services are they not providing? These challenges can be solved by **improving transparency and sharing resources between institutions.**

Higher education institutions are very complex organizations that fall within the upper tier of management difficulty. The approach, methodology, and tools provided by Sentient and this book can, therefore, be applied to and customized for any industry. The author's area of expertise and experience is in higher education and that is, therefore, the focus of this book. However, one can look on this as a specific case study of principles that are much broader in application.

This page intentionally left blank

Abstract

Higher education institutions (HEIs) are under pressure from many entities to become more efficient, control tuition and fees, and lower the burden of debt that many students graduate with. The expectation is that HEIs become more “business-like” in their operations. However, they are unique entities because of the level of expertise of their primary employees, the faculty. In addition, with high turnover rates of senior administrators, the faculty is often the stabilizing influence, medium- and long-term memory of the institution. Shared governance is, therefore, a cultural keystone of HEIs and often conflicts with and resists the adoption of more business-like practices. However, the two approaches are not incompatible if a business approach that integrates transparency and stakeholder engagement is adopted. This book is about creating such an environment using concept/mind map-based institutional modeling to empower holistic, transparent, knowledge-informed, and strategic management; integrative- and backward design-based thinking; and inter-institutional resource sharing for improved effectiveness, efficiency, stakeholder engagement, and shared governance. It is also **an invitation to higher education managers and leaders to participate in the development of this knowledge and in a community for sharing it.** The book is, therefore, accompanied by a free Creative Commons licensed system called the Sentient Knowledge Map (SKM) which provides a template model of a HEI and extensive inter-institutionally shared resource libraries. For administrators, the SKM provides the “view from the balcony” that enables them to conceptualize and appraise all the complex, intertwined operations of the institution in one place and easily determine the performance of its individual elements. For faculty and staff, it enables a comprehensive understanding of the institution, its resources, and metrics. Thus, it empowers their active participation in decision-making processes.

This page intentionally left blank

Document Conventions

Throughout this book various symbols are used to indicate components of the accompanying Sentient Knowledge Map (SKM):

- Square brackets are used to indicate [a thought].
- The pipe symbols indicate |a type|.
- Braces indicate {a tag}.
- The greater than and less than symbols are used to indicate an <item in the application menu>.
- Titles for =connectors between thoughts= start and end with an equal sign.

It is Highly Recommended That Readers Print the Above List so that they can refer to it as they read the book. Links to chapter endnotes are shown as superscripted numbers encased in parentheses such as ⁽¹⁾. The first use of an abbreviation is shown in un-superscripted parentheses. The connect, connector, connections, etc., terms are reserved for the lines between concept map objects, whereas link always refers to an Internet hyperlink.

Links that open the SKM content in the user's default web browser are provided in each chapter's endnotes. These are accompanied by QR codes which, when scanned by a web cam, smart phone or similar device, will open the URL within the user's default browser providing an interactive experience for the reader. In addition, most are also accompanied by links that will open the same content within TheBrain application as shown in this example (brain://api.thebrain.com/_XHg2DZrjOSj-Pll2NvFa2w/HQyIvyl7z06_La7Dfm1Lmw/ScmUserManual). TheBrain application must be installed for these links to work. Activating these links may produce a security alert that can safely be ignored. Links to other web sites are shown in normal hyperlink format, usually underlined and the same size as normal text. Desktop users can scan the QR codes with a web cam or connect to a smartphone and use its camera to open the links on the desktop. Check your built-in camera app or visit your favorite app store to enable these capabilities.

Authors Notes

The SKM that is a companion to this book is in an ongoing state of evolution and always will be. As such, many parts of it are incomplete or need additional work, and there may be some differences between the figures shown in this book and those seen in the SKM. The framework is, however, mature enough to warrant sharing. Part of the intent of publishing at this time is to recruit collaborators who will contribute their knowledge and experience to the initiative and hopefully help complete some of the parts that are incomplete (see Section 29.2).

This page intentionally left blank

Part One

The Big Picture

This page intentionally left blank

Chapter 1

Introduction, Vision, Goals, and Benefits

Upon completion of this chapter, the reader will be able to:

- Explain why this book was written.
- Explain the vision and goals of the Sentient Initiative and the benefits an adopting institution can expect to realize.
- Explain why modeling a complex organization can lead to a greater understanding of it for all stakeholders and more effective management techniques.
- Explain why concept/mind mapping was chosen as the modeling tool.
- Explain what the main components of the Sentient Knowledge Map (SKM) are, what they do, and the management techniques empowered or enabled by them.
- Explain what the Universal Institutional Model is.
- Explain the relationships between the Sentient Initiative, this book, the SKM, and the HELLO Community.

Watch the video entitled A High-Level Overview of Sentient¹ that complements this chapter.

The preferred title of this book would be “Concept map-based institutional modeling as a tool for holistic, transparent, knowledge-informed, and strategic management; integrative- and backward design based-thinking; and inter-institutional resource sharing for improved effectiveness, efficiency, stakeholder engagement and shared governance in higher education.” This had to be condensed to a shorter version, so it could fit on a cover and would not scare readers away! However, the best way to start this introduction is by explaining the long title.

An *institutional model* is an accurate representation of a business in some medium other than the real world. Architects, for example, might print a model of a building in 3D to see how air flows around it or to get approval from clients on its structure and appearance. Models are often used to test decisions before they are applied in the real world. They differ from simulations in that they are not expected to automatically convert inputs to outputs such as a flight simulator would.

Holistic means to consider all the parts, how they work together, and how they may create something that is greater than the sum of their parts. Consciousness, for example, emerges from the human brain because of the complexity of the connections between and within its parts. Complex business organizations have many similarities to a sentient human, such as a personality, and can be just as difficult to understand and control. A complete holistic model of a business, therefore, enables users to fully understand the institution and goes a long way toward enabling predictions of its behavior.

The best model is one that can be held inside the mind where it can be accessed instantly and advanced cognitive skills such as pattern extraction can be applied to it. However, knowing enough about an organization and how it works to be able to create a complete internal model is particularly challenging, so tools must be used to help. One of the best tools to extend cognitive capacity is concept/mind mapping because it emulates the way humans think using associations. A model that uses a concept map as its medium is, therefore, as close as one can get to creating an internal model. Creating such a model and using its unique and innovative capabilities to improve how complex businesses such as higher education institutions (HEIs) can be managed is the basis for this book.

It should be recognized that the processes involved in the creation of the model, the selection and categorization of the parts needed to create a complete representation of a complex institution has value in and of itself and led to many of the insights and strategies presented here. The reader, therefore, need not plan to create a model to reap the benefits of this book; however, more advantages will be gained by doing so.

The connections inherent to concept maps mean that they are by nature integrative – they connect all parts together and explain why the connections exist. This empowers integrative management which considers the impact of decisions and changes on all parts of the institution. Connectivity also transforms information into knowledge just as learning does for the human mind. The concept map is also the explicit embodiment of the implicit knowledge held by many of the key leaders and managers of an institution and it can and should be made available to all stakeholders. Using this approach enables knowledge-informed decision making that is based on transparency. By making pending decisions transparent, the campus community is invited to participate in the process which therefore, strengthens shared governance.

A sentient being is one that is self-aware and self-reflective, which is what a business institution ought to be. This book is part of what has been entitled “*The Sentient Initiative*” which has the following three goals:

1. Improve the management of complex institutions.
2. Speed up the rate of evolution of institutions.
3. Provide a better way to share knowledge and resources across institutions and, thus, reduce duplication of effort.

Each of these goals is addressed in its own section below. In addition to this book which documents its philosophy and approach, the Sentient Initiative has

several components that were developed to support the achievement of these goals as follows:

- The SKM which houses an institutional modeling environment and libraries of resources. Instructions for downloading and accessing the SKM can be found in Chapter 27.
- A user handbook² and set of video tutorials³ to provide the practical and technical support for using the SKM.
- An online user community⁴ for higher education leaders and managers. This is addressed in detail in Chapter 26.

It is highly recommended that readers explore the SKM each time as it is referenced in this book, as both are mutually supportive components of the initiative and viewing them simultaneously will greatly enhance the learning experience. The learning outcomes listed at the beginning of each chapter assume this is happening. Quick start setup instructions for the SKM can be found in Section 27.2.

1.1. Goal 1: Improve the Management of Complex Institutions

1.1.1. The Benefits of Concept Mapping/Modeling an Institution

To manage an institution well, it must first be understood. The ultimate indicator that a system is comprehended is that it can be simulated, ideally with mathematical formulas that can predict behavior based on prevailing conditions. Flight simulators, for example, could only be built when the physics of flight, the impact of weather, and the mechanics of the airplane were fully understood, mathematically modeled, and programmatically controlled. A simulator is expected to take inputs and produce outputs that match what would happen in the environment being simulated. A model is one step down from a simulator in that it does not automatically generate outputs from inputs. However, it must have all the parts, document the rules of interaction and consequences of action, and include measures of the outputs and outcomes. It is a simulator without the logic and effectors to produce action – the leaders and managers of the organization perform these components. With artificial intelligence (AI), it may be possible to create a simulator of complex organizations that considers the behavior of its populations of people, but that is outside the scope of this book. The modeling environment should, therefore, be able to accomplish several goals. It must:

- Act as a database to store information about the components of an institution.
- Be able to organize the information in logical ways.
- Be able to guide people to additional information and systems outside of the modeling environment.
- Be able to document why and how items in complex relationships are connected.
- Provide an intuitive visual interface that makes it easy to understand the structure and find information.

- Extend the cognitive capacity of the user.
- Be easy to use and inexpensive.

When considering software to accommodate these goals, three types of applications were assessed. Spreadsheets are great for crunching numbers but do not show relationships well. Databases have built-in relationships, but they are visualized through tables and forms that are difficult to interpret. Concept maps have the strength of relational databases, but with an intuitive visual map-based process for documenting the relationships. In addition, because concept maps emulate the way humans connect ideas internally, they provide an external extension to that process and, therefore, increase the cognitive capacity of the user. Concept mapping was, therefore, chosen as the optimal way to communicate and communally develop the complex information and interrelationships needed to support Sentient’s goals. Several concept mapping applications were evaluated for compatibility with the goals and a product called TheBrain (TheBrain.com) was chosen.

1.1.2. The SKM

The SKM is made up of three major components as shown in Fig. 1. The modeling environment (unshaded) contains the institutional knowledgebase (unshaded box), tools to establish relationships (light gray box), and tools to connect to URLs outside the model (bottom-most unshaded box). TheBrain app has an integrated web browser which can display material in the content panel of a selected thought. The concept map, therefore, acts as an intuitive menu system for this content – selecting a thought brings up its associated browser content and notes as shown in the upper right part of Fig. 2. This content can be data from other systems such as an Enterprise Management System, databases, and content from

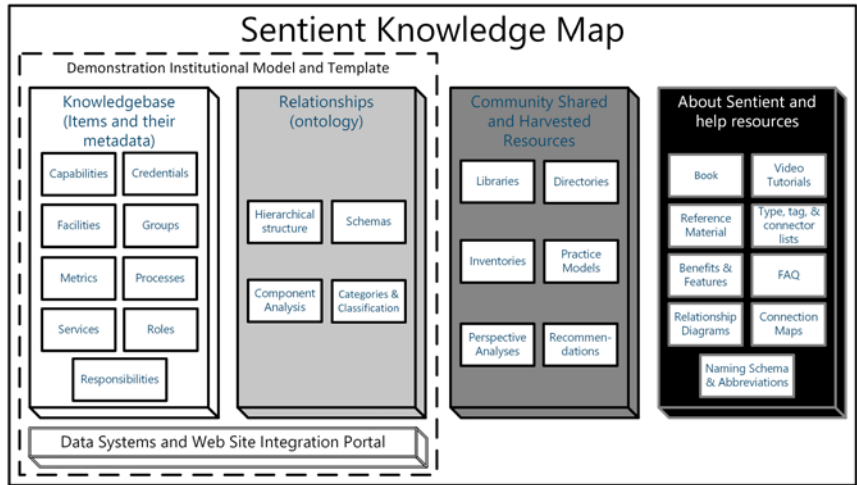


Fig. 1. The Components of the Sentient Knowledge Map.

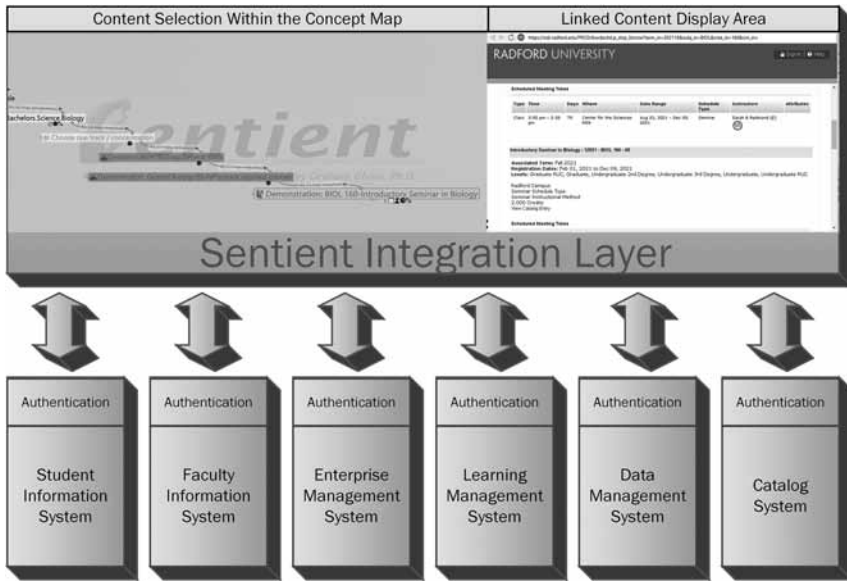


Fig. 2. Sentient Serves as an Integration Layer for All Other IT Systems.

any web site, providing additional information about the thought's subject matter. The SKM can, therefore, serve as an **integration system and layer** that sits on top of all other institutional systems and provides links into them using its built-in browser, as illustrated in the lower part of Fig. 2. Access to the content within these other systems is controlled by their individual authentication processes and, therefore, not part of Sentient.

The community shared and harvested resources section (Fig. 1 – dark gray box) contains a database of resources (metrics, rubrics, self-study documents, etc.), directories (government agencies, accreditors, contributors, etc.), inventories (lists of institutional components), practices (selecting peer institutions, etc.), perspectives (the value-add of higher ed, etc.), and recommendations (vendors, reading materials, etc.) that can be used in building the model. The [About the Sentient Knowledge Map and help resources] section (Fig. 1 – black shaded box) has resources to help the user understand the SKM and use its tools.

While each of these five components is valuable, in combination they act synergistically to provide integrated and comprehensive insights into the structure and functionality of the entire institution. It is also important to define what the SKM is not intended to be or to replace, that is, data management systems, access control systems, student or employee information systems, hiring management systems, and so on. Some information may, therefore, have to be duplicated within the SKM from these systems to enable targeted links between them, but this is kept to an absolute minimum. For example, an employee's name may have to be entered into the SKM, so it can be mapped to a role. However, from then on, all other information about that employee can then be accessed from within the

SKM using links to that employee’s records in other systems such as the Faculty Information System. Access rights to those records are determined by the system that is the target of the links. Login credential requests appear as necessitated by those systems and are entered via forms in TheBrain’s built-in browser.

Fig. 3⁵ shows the implementation of the SKM component diagram (Fig. 1) in TheBrain application. The “help resources” section can be found to the left of the home thought. To its right is the demonstration institutional model and template. Beneath the model are the community resources. The content panel for a thought is shown on the far right. This is also where the information from linked systems is displayed, that is, the portal functionality.

1.1.3. A Demonstration Institutional Model

To prototype, demonstrate, and provide institutions with a template for creating a model of their own, a model of a generic or universal institution was created. It incorporates the features that are commonly shared by HEIs within the United States, most of which should be applicable to HEIs in other countries. It is intended that this model be cloned and then modified by an adopting institution to create a customized, institution-specific model for any type of HEI.

The universal model is not complete, for example, not all committee memberships or organizational responsibilities have yet been mapped. However, it is complete enough to justify publishing at this point. It should be noted that the SKM will never be complete as it is designed to be a reactive and constantly evolving body of knowledge that is developed by the higher education community.

1.1.4. A Set of Management Strategies and a Toolset

Knowledge is power and a system such as the SKM that organizes knowledge in a way that is easy to use is, therefore, useful and powerful. In addition, when

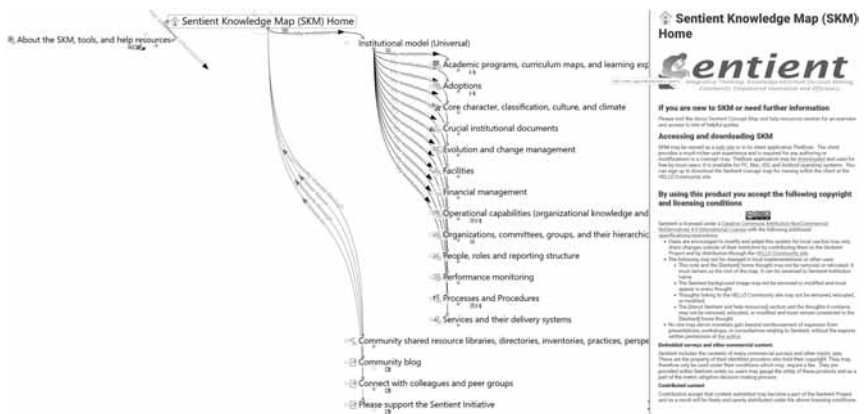


Fig. 3. The Sentient Knowledge Map as Displayed Within TheBrain Application.