

Virtual Character Conceptual Framework

Star Classroom Simulator: Assessing, Preparing and Retaining Star Teachers for Effective Classroom Management in Urban Schools

Version 2.0

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Revision History

| Date | Version | Change History |
|---------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24 April 2007 | v1 | Initial Version |
| 16 May 2007 | v1.1 | |
| 01 June 2007 | v1.2 | <i>Incorporated Dreikurs' Theory of Logical Consequences into the model.</i> The model has changed as a result. The section <i>Ascertaining Clues form SimStudent Actions</i> has been added to address how Dreikurs' Theory fits into the model and the classification of simStudent actions to serve as cues to the training teacher. |
| 08 June 2007 | v1.3 | <i>Added a new section: Creating a Star Classroom Simulator Mock-up.</i> This section will address the effort in creating a mock-up of the Star Classroom Simulator. The intent of this section is to document what was done, how it was accomplished, and offer lessons learned. |
| 14 June 2007 | v1.4 | <i>Updated Table 2, based on information received from Dr. Haberman.</i> <i>Imported static data into the database.</i> All static data, both required by the simStudent model and the proposed Star Classroom Simulator mock-up, has been inserted into the database. This includes Haberman's 14 Mid-Range Functions, Dreikurs' Theory of Logical Consequences driving needs, Kohlberg's Stages of Moral Development levels and stages, and Maslow's Hierarchy of Needs. All mappings between these theories have also been established in the database. As a result, Appendix G and F have been added depicting the SQL used in both the creation of the database and its population. The SQL has also been saved as individual files and will be included as part of the final semester-end deliverables. |
| 26 July 2007 | V2.0 | <i>Documented the Star Classroom Simulator Mock-up.</i> Section 5 has been completed which speaks to the Star Classroom Simulator Mock-up. A number of points have been addressed to include the rationale for building the mock-up, how the mock-up works from the end-user standpoint, a brief discussion as to its inner workings as a website developed in the .NET environment, the development of a SQL Server database for the virtual character conceptual framework, and concluding points calling out specific lessons learned. |

Contents

| | |
|---------------------------------------------------------------|-----------|
| Introduction..... | 8 |
| Terminology | 8 |
| Philosophy | 9 |
| Evolving the Framework | 9 |
| Haberman, Dreikurs, Kohlberg, Maslow, and Long..... | 11 |
| Haberman's Ideology and Best Practices of Star Teachers | 11 |
| Dreikurs' Theory of Logical Consequences | 12 |
| Kohlberg's Stages of Moral Development..... | 13 |
| Maslow's Hierarchy of Needs..... | 13 |
| Long's Reactive Behavior Patterns..... | 14 |
| Conceptual Framework | 16 |
| Transitioning between Stages | 16 |
| Transitioning between Needs | 18 |
| Needs and Reactive Behavior Patterns | 19 |
| Theory to Practice | 21 |
| The Star Classroom Management Protocol..... | 21 |
| The simStudent Model | 22 |
| Characteristics as Variables..... | 25 |
| Initializing Variables | 26 |
| Bridging Needs and Reactive Behavior Patterns | 27 |
| Teacher-simStudent Interaction..... | 27 |
| simStudent-simStudent Interaction | 28 |
| Ascertaining Clues from SimStudent Actions | 29 |
| Transitioning between Needs | 29 |
| Transitioning between Stages | 32 |
| Choosing between Actions..... | 33 |
| The simClassroom Model (simStudent Aggregation) | 34 |
| Character Profile..... | 34 |

| | |
|---------------------------------------------------------------------------------|-----------|
| Creating the Star Classroom Simulator Mock-up | 36 |
| Modeling after the Star Classroom Management Protocol..... | 36 |
| Accessing the Star Classroom Simulator Mock-up | 36 |
| Playing the Star Classroom Simulator Mock-up | 37 |
| Logging In..... | 37 |
| Key Code Algorithm | 37 |
| Welcome..... | 38 |
| Getting Directions..... | 38 |
| Setting the Stage..... | 39 |
| The Scenario | 40 |
| Setting the Difficulty Level..... | 40 |
| Time as a Factor | 41 |
| Interacting with Jamal and his Classmates | 41 |
| Solutions, Weights and Penalties | 42 |
| Your Score..... | 44 |
| Under the Hood: Understanding the Star Classroom Simulator Mock-up | 45 |
| Development Environment..... | 45 |
| ASP.NET Pages | 45 |
| Images and Movies..... | 46 |
| Forward Engineering the simStudent Model | 46 |
| Conclusions & Future Considerations..... | 46 |
| References | 49 |
| Appendix A..... | 50 |
| Appendix B | 51 |
| Aggressive Independent Personality | 51 |
| Aggressive Dependent Personality | 51 |
| Passive Independent Personality..... | 52 |
| Passive Dependent Personality..... | 52 |
| The Impulsive Trait | 53 |
| The Phobic Trait..... | 53 |
| The Obsessive-Compulsive Trait..... | 53 |
| The Hysterical Trait..... | 53 |

| | |
|-------------------------|-----------|
| Appendix C | 55 |
| Appendix D | 56 |
| Appendix E | 57 |
| Appendix F | 58 |
| Appendix G | 75 |
| INSERT Statements | 75 |
| SELECT Statements | 77 |

Figures

| | |
|--------------------------------------------------------------------------------------------------------|----|
| Figure 1. Framework Theoretical Foundation | 9 |
| Figure 2. Maslow's Hierarchy of Needs | 14 |
| Figure 3. Long's Reactive Behavior Patterns | 15 |
| Figure 4. Transitioning Between Stages..... | 18 |
| Figure 5. Virtual Character Conceptual Framework | 20 |
| Figure 6. simStudent Model ¹ | 23 |
| Figure 7. simStudent Model Fragment: Haberman's Mid-Range Functions..... | 23 |
| Figure 8. simStudent Model Fragment: Dreikurs' Theory of Logical Consequences..... | 24 |
| Figure 9. simStudent Model Fragment: Kohlberg's Stages of Moral Development | 24 |
| Figure 10. simStudent Model Fragment: Maslow's Hierarchy of Needs | 25 |
| Figure 11. simStudent Model Fragment: Long's Reactive Behavior Patterns | 25 |
| Figure 12. Type Integer Variable | 26 |
| Figure 13. simStudent Model Fragment: Characteristics as Variables | 26 |
| Figure 14. simStudent Model Fragment: Bridging Variables | 27 |
| Figure 15. simStudent Model Fragment: Mid-Range Functions and Teacher-simStudent Interactions | 28 |
| Figure 16. simStudent Model Fragment: simStudent-simStudent Interactions | 29 |
| Figure 17. simStudent Model Fragment: Transitioning between Needs | 32 |
| Figure 18. Choosing between Actions Example | 33 |
| Figure 19. simStudent Model Fragment: Choosing between Actions | 34 |
| Figure 20. simStudent Model Fragment: Character Sheet | 34 |
| Figure 21. Star Classroom Simulator Mock-up Login Screen..... | 37 |
| Figure 22. Star Classroom Simulator Mock-up Welcome Screen..... | 38 |
| Figure 23. Star Classroom Simulator Mock-up Directions Screen | 39 |
| Figure 24. Star Classroom Simulator Mock-up Setting the Stage Screen..... | 40 |
| Figure 25. Star Classroom Simulator Mock-up Interaction Screen..... | 42 |
| Figure 26. Star Classroom Simulator Mock-up Your Score Screen..... | 44 |
| Figure 27. simStudent Model Physical Data Model..... | 46 |

Tables

| | |
|-------------------------------------------------------------------------------------|----|
| Table 1. Haberman's 14 Mid-Range Functions..... | 12 |
| Table 2. Dreikurs Driven Needs | 12 |
| Table 3. Kohlberg's Stages of Moral Development | 13 |
| Table 4. Kohlberg-Haberman Stages of Moral Development (Haberman, 2005, p. 20)..... | 16 |
| Table 5. Kohlberg-Maslow Parallels | 17 |
| Table 6. Characteristics Defining Maslow's Needs | 19 |
| Table 7. Bridging Maslow and Long: Common Characteristics..... | 20 |
| Table 8. Transitioning between Needs Example | 31 |
| Table 9. Choosing between Actions Example..... | 33 |
| Table 10. Star Classroom Simulator Mock-up Solutions | 43 |
| Table 11. Star Classroom Simulator Mock-up Your Score | 45 |
| Table 12. Star Classroom Simulator Mock-up VS 2005 ASP.NET Pages..... | 46 |

Introduction

The Star Classroom Simulator is designed to create a realistic virtual classroom populated with simulated virtual students for practicing and pre-service teachers to hone their skills in classroom management. The simulation will provide teachers and administrators the tools to assess, practice and improve their ability to engage and motivate the most challenging students as individuals and as a group. It is anticipated that this simulator will increase the quality of K-12 education as well as improve the likelihood of retaining highly effective teachers by creating a more productive and respectful learning environment.

The Virtual Character Conceptual Framework proposed in this whitepaper provides the basis for the simulated virtual students for the Star Classroom Simulator. This work is being performed as part of a Cluster Research Seminar (IDS 7938) course and an Instructional Technology Internship (EME7942) encompassing a number of disciplines, including K-12, Instructional Systems Design, Film & Digital Media, and Computer Science.

This whitepaper has been divided into the following sections: First, the philosophy of the framework is provided. This includes a discussion of the research, an account of the framework's evolution, and a synopsis of the works employed as the basis for the framework's theoretical foundation. Second, the framework is offered. This is presented in a tiered manner, with each subsequent section building upon the last. Third, the application of the concept is discussed and put into practice. Fourth, details as to the mock-up Star Classroom Simulator are provided.

Please note, this is not an exhaustive document, but instead a vehicle for the promotion of ideas and further growth of the framework and its utility.

Terminology

The Star Classroom Simulator should be considered a constructive simulation; in that it supports models that involve simulated virtual students driven by the underlying simulation system. Real teachers will interact with these simulated virtual students in a real-time fashion, providing inputs, interpreting outputs, in the goal of applying the Star teaching ideology and best practices as it applies to classroom management in urban schools.

For clarity, the simulated virtual students will be referred to in this whitepaper as "simStudents", which should not be confused with live students, which will be referred to as "students". The virtual classroom composing the simStudents will be referred to as "simClass" or "simClassroom", unless referring to a live classroom, at which the term "class" or "classroom" will be used. Lastly, the practicing and pre-service teacher will be referred to as "teacher".

Philosophy

The virtual character conceptual framework discussed in Section 3 is built upon a number of cognitive, behavioral, and humanistic models dealing with human psychological growth focused almost exclusively on childhood development. Grounded in the works of Lawrence Kohlberg, Abraham Maslow, and William A. Long Jr., the framework incorporates moral reasoning, needs & motivation, and reactive behavior patterns providing a theoretical foundation (see Figure 1) for the development of simStudents as part of the Star Classroom Simulator. Augmenting this foundation is the work of Dr. Martin Haberman (The Haberman Educational Foundation) with his ideology and best practices of Star teachers. Also, augmenting this foundation is Rudolf Dreikurs' Theory of Logical Consequences.

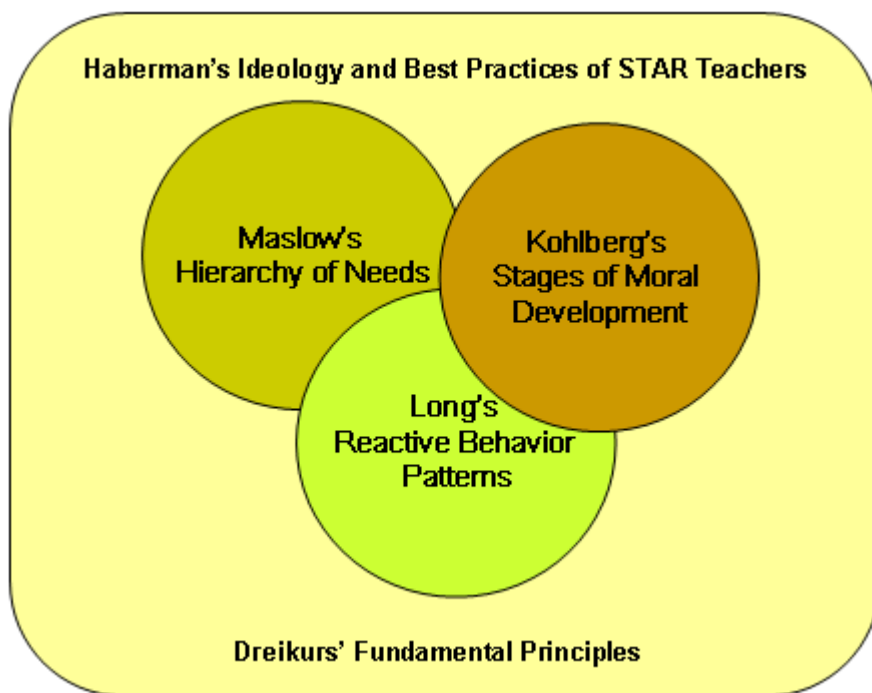


Figure 1. Framework Theoretical Foundation

An account of the framework's evolution and a synopsis of the works composing this foundation are provided next.

Evolving the Framework

The framework evolved over the course of sixteen plus weeks and underwent a number of revisions. Initially including only reactive behavior patterns, the framework evolved as a single model which attempted to categorize the patterns to include the four types—aggressive-independent, aggressive-dependent, passive-independent, and passive-dependent. These categories were then further organized into the logical groupings—"emotion", academic",

“learning”, and “social”. With the next iterations, it became evident that these categories and sub-categories were mere synonyms of one another and the attempt to clearly define them proved troublesome. To further compound the matter, the categorization of concepts, such as motivation, didn’t “fit” the existing model.

Meanwhile, literature was being sought on interactive storytelling and training to determine how scholars and practitioners have addressed the modeling of simulated virtual-based students. Little was found to be of any value. The models examined appeared to be overly complex, overly simple, or unfocused. At this time, character sheets were developed for the four reactive behavior types, derived from the current model, which were further augmented to include a history profile and an image of what the simStudent might look like. Insight from this exercise and research on interactive storytelling led to the discussion and eventual incorporation of ranges for the various categories, defining a sliding scale from -1.0 to 1.0 identifying the two polar extremes of each category. For example, each of the four types will inherit “energy level” which ranges from -1.0 (low) to 1.0 (high).

Further research ensued and the incorporation of the four traits (phobic, impulsive, obsessive / compulsive, and hysterical) was added to the model. In meeting with UCF faculty from both the education and psychology disciplines, it was noted that the model was rich in behavior, but lacked other important concepts, such as motivation. To remedy this deficiency, other theoretical models were examined. Behavioral, cognitive, humanistic, and learning models were sought for their applicability in the effort. Upon the incorporation and evaluation of a number of models, Maslow’s Hierarchy of Motivational Needs was chosen in that it (a) provided a simple well-known model on motivation and needs, (b) addressed adolescents at various growth stages, and (c) had a hierarchical nature, supporting both growth and regression.

The next iteration of the model now addressed both motivation and behavior, but more importantly, provided a theoretical foundation. In addition, the sliding scales developed earlier in the effort were incorporated into the new model, providing some implementation details, such as variables (formally categories), data types, and values for a default resting state (the value the simStudent’s variables are set to at initialization). The model was then tested and evaluated for its ease of use, but more importantly, applicability for the Star Classroom Simulator. This was performed via walkthroughs of scenarios based on knowledge taken from interactive storytelling, story, and scriptwriting (development of story). Results led to further definition of the traits using clinical references and the creation of two character sheets (see Appendix A) that included sample data for the walkthroughs. In addition, a number of lessons learned emerged and implementation specific deficiencies, such as the use of weights in calculating values, which would have to be included as part of the simStudent design.

With a stable model in place, work from Dr. Haberman on the ideology and best practices of effective teachers of diverse children and young in poverty (the theoretical basis for the Star Classroom Simulator) as well as that of Rafe Esquith (The Hobart Shakespearians) was researched for integration into the model. At this time, it became evident that both practitioners had examined and incorporated the work of Lawrence Kohlberg and his Stages of Moral Development. Furthermore, it was also clear that the model needed to be expanded to address adolescent growth beyond that of motivation. Given all this, the model grew into a framework encompassing not only the work of Long and Maslow, but Kohlberg as well.

Both the theory behind the framework and a proposed application of the framework was fully documented in this whitepaper. In late April, version 1 (v1) of the whitepaper was completed

and released to select individuals for both consumption and constructive feedback. Subsequent changes to this framework can be found in the revision section of this whitepaper.

Haberman, Dreikurs, Kohlberg, Maslow, and Long

The subsequent sections provide a brief synopsis of Haberman's Ideology and Best Practices of Star Teachers, Dreikurs' Theory of Logical Consequences, Kohlberg's Stages of Moral Development (Mid-Range Functions), Maslow's Hierarchy of Needs, and Long's Reactive Behavior Patterns. These sections have been provided as a foundation for future discussions.

Haberman's Ideology and Best Practices of Star Teachers

Martin Haberman, a professor of education at the University of Wisconsin-Milwaukee, presents his ideology and best practices of Star teachers of diverse children and youth in poverty in the form of 14 mid-range functions. These functions "are based on the assumption that the practice of any profession is both a reflection of the practitioner's predispositions and the nature of the performance demands in particular settings" (Haberman, 2005, p 78). That ideology is the most powerful predictor of professional behavior opposed to personality. And the most critical performed behaviors are tasks grouped into general functions opposed to discrete tasks.

Essentially, the mid-range functions are "behavioral clusters which are relatively small in number and which are performed by practitioners with a particular ideology under specific conditions of work" (Haberman, 2005, p. 78). Haberman developed these functions into the Star Teacher Urban Interview Questionnaire as a means in which to help disseminate candidate teachers as stars or quitters/failures, or what he commonly refers to as "fully qualified" teachers. These 14 mid-range functions can be found in Table 1.

| Mid-Range Functions | |
|---------------------|--------------------------------------------|
| A | Emotional/Physical Stamina |
| B | Organizational Ability |
| C | The Nature of Planning |
| D | Coaching (You and me against the material) |
| E | Commitment to Students with Special Needs |
| F | Interaction with Parents and Community |
| G | Creating Student Ownership |
| H | Persistence |
| I | Protecting Students' Learning |
| J | Putting Theory into Practice |
| K | Approach to At-Risk Students |
| L | Professional vs. Personal Orientation |

| | |
|---|--------------------------------------------------|
| M | Burnout: The Care and Feeding of the Bureaucracy |
| N | Fallibility |

Table 1. Haberman's 14 Mid-Range Functions

It should be noted that the mid-range functions H through N are those which can be discerned in personal interviews. Questions were never developed which allowed the assessment of the validity and reliability of the candidate's predispositions to performing the mid-range functions A through G.

Dreikurs' Theory of Logical Consequences

A social psychologist and student of Alfred Adler, Rudolf Dreikurs is probably best known for developing Adler's system of individual psychology into a method for understanding the purposes of reprehensible behavior in children and for stimulating cooperative behavior without punishment or reward. Dealing predominately with pre-adolescent misbehavior, Dreikurs reasoned that students will act out (misbehave) as a result of not having one of four basic human needs met—*power, attention, revenge, and avoidance of failure* (see Table 2).

| Driving Need | Description |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attention (1/3 or more of the class) | These students have an insatiable need for attention and approval. If they don't receive the attention they crave they become disruptive. Students who are driven by the need for attention may talk out, disrupt, interrupt others and demonstrate creative ways to get attention. |
| Power (3 to 4 students) | These students fight the teacher for control of the classroom. They dominate their peers and seek to dominate the teacher by moving and keeping the teacher and class off-task. |
| Revenge (1 to 2 students) | These students feel they have been hurt or damaged by the teacher and seek to get back at her. They do this by fostering non-compliance by the class or doing anything to make the management of the class more difficult. |
| Avoidance of Failure (1/3 or more of the class) | These students feign helplessness. They get the teacher to simplify and water down and provide individual help. Their goal is to get out of doing the work or to not be shown up as inadequate. |

Table 2. Dreikurs Driven Needs

Dreikurs argued that good discipline occurs best in a democratic classroom. In such a classroom, the teacher and students work together to make decisions about how the classroom will function, and as a result, the students gain a sense of belonging. It is when students are unable to gain this sense of belonging that they often turn to the mistaken goals of attention, power, revenge, and inadequacy. Dreikurs argued that punishment should never be used in the classroom because it is just a way for teachers to get back at students to show them who's the boss. Instead, punishment should be supplanted with logical consequences agreed upon by the entire class.

Kohlberg's Stages of Moral Development

Lawrence Kohlberg conceived his Stages of Moral Development to explain the growth of moral reasoning. His theory suggests that there are six developmental stages. Using stories outlining moral dilemmas, Kohlberg categorized solicited responses into stages. These stages have been grouped into three levels—*pre-conventional*, *conventional*, and *post-conventional* (see Table 3).

| Level | Stage |
|-----------------------------|-----------------------------------------------------------|
| Level 1 (Pre-Conventional) | 1. Obedience and Punishment Orientation |
| | 2. Individualism and Exchange (Self-interest orientation) |
| Level 2 (Conventional) | 3. Interpersonal relationship and conformity |
| | 4. Authority and social-order maintaining orientation |
| Level 3 (Post-Conventional) | 5. Social contract and individual rights |
| | 6. Universal ethics principles |

Table 3. Kohlberg's Stages of Moral Development

The pre-conventional level of moral reasoning deals with the judgment of morality of an action by its consequences to oneself. Stage one and two reside at this level. The first stage focuses on the consequences of an action, while the second stage focuses on what's in one's best interest. Both stages are focuses on self in an egocentric manner.

The conventional level of moral reasoning deals with the judgment of morality of an action by comparing the actions to society views and expectations. Stage three and four reside at this level. The third stage focuses on living up to expectations of family and community by behaving in "good" ways. The fourth stage focuses on becoming more broadly concerned with society as a whole and the importance of maintaining a functioning society.

The post-conventional level of moral reasoning deals with the realization that one's own perspective should be viewed over that of society. Stage five and six reside at this level. In the fifth stage, society is thought about in a theoretical way and rights and values that a society ought to uphold are considered over one's own society. In the sixth stage, the principles of justice become universal, in that they must apply to all (W.C. Crain, 1985).

Maslow's Hierarchy of Needs

Abraham Maslow proposed that as humans meet basic needs, they subsequently seek to meet higher needs. These needs are typically represented as a pyramid consisting of five levels—*physiological*, *safety*, *belonging and love*, *esteem*, and *self-actualization*. The first four levels are known as deficiency (D-) needs while the top level is considered a growth (B-) need. While deficiency needs must be met, growth needs are considered continually shaping behavior. Furthermore, the first four needs are associated with physiological needs, while the top level is associated with psychological needs. Figure 2 depicts Maslow's Hierarchy of Needs.

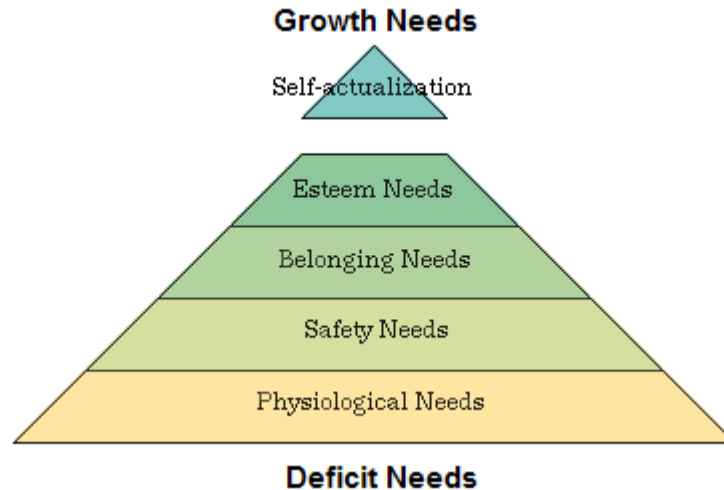


Figure 2. Maslow's Hierarchy of Needs

As lower needs are partially or completely satisfied, higher needs in the hierarchy come into focus. As needs are satisfied, growth occurs (upward movement in the pyramid). As needs become unsatisfied, regression occurs (downward movement in the pyramid) (Shippensburg University, 2006).

Long's Reactive Behavior Patterns

Developed by William A. Long Jr., a physician at the University of Mississippi Medical School, Reactive Behavior Pattern theory attempts to explain how adolescents react to their environment and associated stresses. Taught to physicians to help them understand and work with adolescent patients (Young & Dziuban, 2000), it is now being used as a vehicle for recognizing and dealing with learning diversity in the classroom. It is founded in ambivalence reflecting equally balanced feelings toward stimuli and suggests that individuals have an attraction toward one of four behavior types which can be augmented with zero to four ancillary traits (Dziuban, Moskal & Dziuban, 2000).

These behavior types are formed as a result of the intersection between *psychological energy level* and the *need for approval*, composing the four types—*aggressive-independent*, *aggressive-dependent*, *passive-independent*, and *passive-dependent* as depicted in Figure 3.

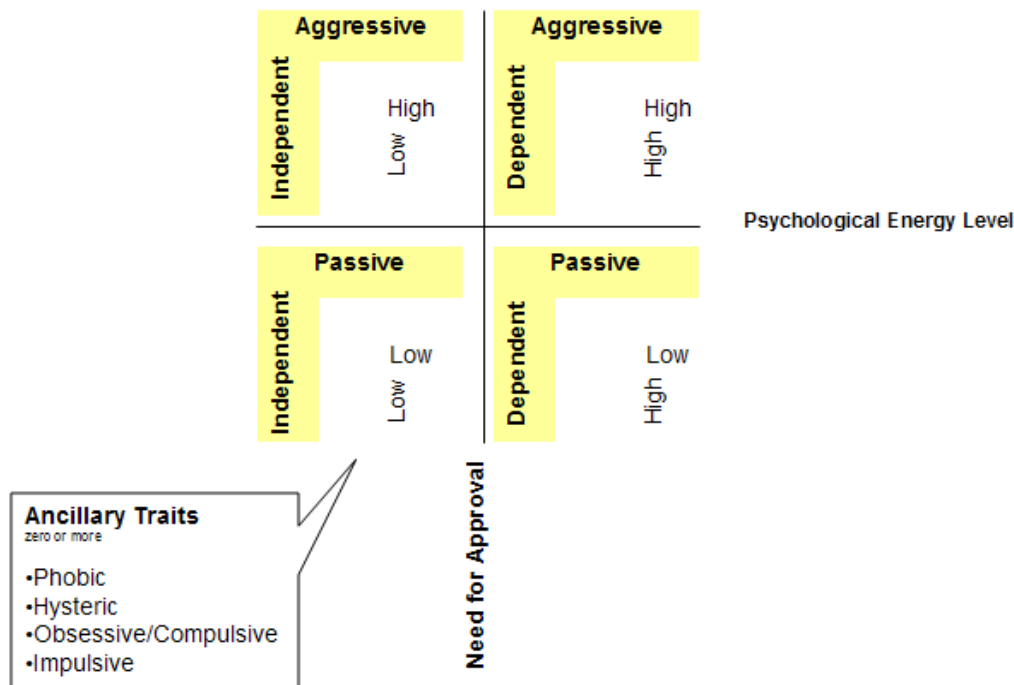


Figure 3. Long's Reactive Behavior Patterns

Long suggests that aggressiveness denotes the energy level adolescents bring to learning environments. For example, aggressive types typically exhibit high energy levels, while passive types show very little energy. Dependency, on the other hand, deals with the need for approval adolescents call for from others. While dependent types thrive on the need for approval, independent types require little need for such approval. The resulting four reactive behavior types provide an indication of an individual's strengths and weakness within the learning environment. Further complicating or enriching these types are four ancillary traits--*phobic*, *impulsive*, *obsessive / compulsive*, and *hysterical*. Each reactive behavior type can exhibit zero or more of these traits (Dziuban, Moskal & Dziuban, 2000; Long, 1975; Long, 1985; Long, 1989; Young & Dziuban, 2000).

It is important to discern that reactive behavior patterns provide important determinants of behavior and should not be considered disorders. Instead, these reactive behavior patterns are quite normal and individuals function quite fine with them well into adulthood (Young & Dziuban, 2000).

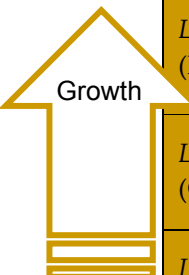
Appendix B provides descriptions of each of the four types and traits as originally published by Long (1985).

Section 3

Conceptual Framework

The Star Classroom Simulator is designed to create a realistic simClassroom populated with simStudents for practicing and pre-service teachers to hone their skills in classroom management. The intent is to offer a simulation which will provide teachers and administrators the tools to assess, practice and improve their ability to engage and motivate the most challenging students as individuals and as a group. Star and other successful teachers, however, know that it takes more than just discipline to manage a classroom and more than learning to motivate students. These teachers know that boundaries become blurred and teaching must include improving the quality of life for children, particularly those labeled diverse and economically disadvantaged. Star teachers know that schooling these students is a “life and death” situation.

The Star Classroom Simulator must, therefore, present practicing and pre-service teachers with simStudents that not only look and act the part, but allow growth based on the teaching methods employed. The framework borrows models targeting human psychological growth focusing almost exclusively on childhood development. As a result, the framework supports growth through Kohlberg’s Stages of Moral Development. This is the theoretical backbone of the framework. The simStudent moves between the pre-conventional, conventional, and post-conventional levels influenced by the interactions of other simStudents and the teacher. The goal, of course, is to help the simStudent grow well into the post-conventional level. The premise is simple. As students, whether an individual, group, or entire class matures from level 1 (and away from the focus on self, but instead to a focus of others), classroom management becomes less of a challenge and learning flourishes. Table 4 depicts a modified version of Kohlberg’s Stages of Moral Development (based on the work of Haberman) used as the basis for the framework.



| Level | Stage |
|--------------------------------|-----------------------------------------------------------------------------------------------------|
| Level 3 (Post-Conventional) | Stage 6: Concern with universal ethical principles Stage 5: Concern with right beyond legalities |
| Level 2 (Conventional) | Stage 4: Concern with preserving society Stage 3: Concern with conformity |
| Level 1 (Pre-Conventional) | Stage 2: Satisfaction of needs and wants Stage 1: Concern with obedience and punishment |

Table 4. Kohlberg-Haberman Stages of Moral Development (Haberman, 2005, p. 20)

Transitioning between Stages

Transition between the stages is accomplished through Maslow’s Hierarchy of Needs.

Before discussing how this occurs, however, it should be noted that developmental theorists do not hold that students’ progress through Kohlberg’s stages by getting their needs met (via Maslow’s hierarchy). The two

theories come from very different research paradigms. Kohlberg's theory has been supported empirically, while Maslow's has not. According to Kohlberg, one moves through the stages via cognitive disequilibrium and moral reasoning, not by having one's needs met. Kohlberg is a theory of moral reasoning and not moral behavior. The claim made in this whitepaper that Maslow's needs support movement through Kohlberg's stages is a theory proposed as part of the framework discussed in this whitepaper and of which is subject to follow-up empirical research.

With that said, each of Maslow's needs (safety, belonging and love, esteem, and self-actualization) parallels with one of Kohlberg's Stages of Moral Development as depicted in Table 5.

| Moral Stage (Kohlberg) | Need Level (Maslow) |
|--------------------------------------------------------------------------------------------|---------------------|
| Stage 6: Concern with universal ethical principles | Self-Actualization |
| Stage 5: Concern with right beyond legalities Stage 4: Concern with preserving society | Esteem Needs |
| Stage 3: Concern with conformity | Belonging Needs |
| Stage 2: Satisfaction of needs and wants Stage 1: Concern with obedience and punishment | Safety Needs |

Table 5. Kohlberg-Maslow Parallels

The exception is physiological needs. Even though this level does not explicitly parallel with a stage, it plays a vital role in the growth of the simStudent. In order for any growth to occur or to begin, these basic physiological needs (e.g. air, food, shelter, warmth, sleep, etc.) must be met. For example, if the physiological need of shelter is not met, the safety needs, security, stability, and protection from elements, will become a deficit. As a result, *Stage 1: Concern with obedience and punishment* cannot be achieved.

As the simStudent's needs are met, the simStudent grows, transitioning into the next stage, which will then require additional needs to be met for this pattern of growth to continue. The simStudent, however, can also regress. Needs which were once met can once again become deficits, forcing the simStudent to deteriorate to an earlier stage. Figure 4, depicts this pattern of growth and regression.

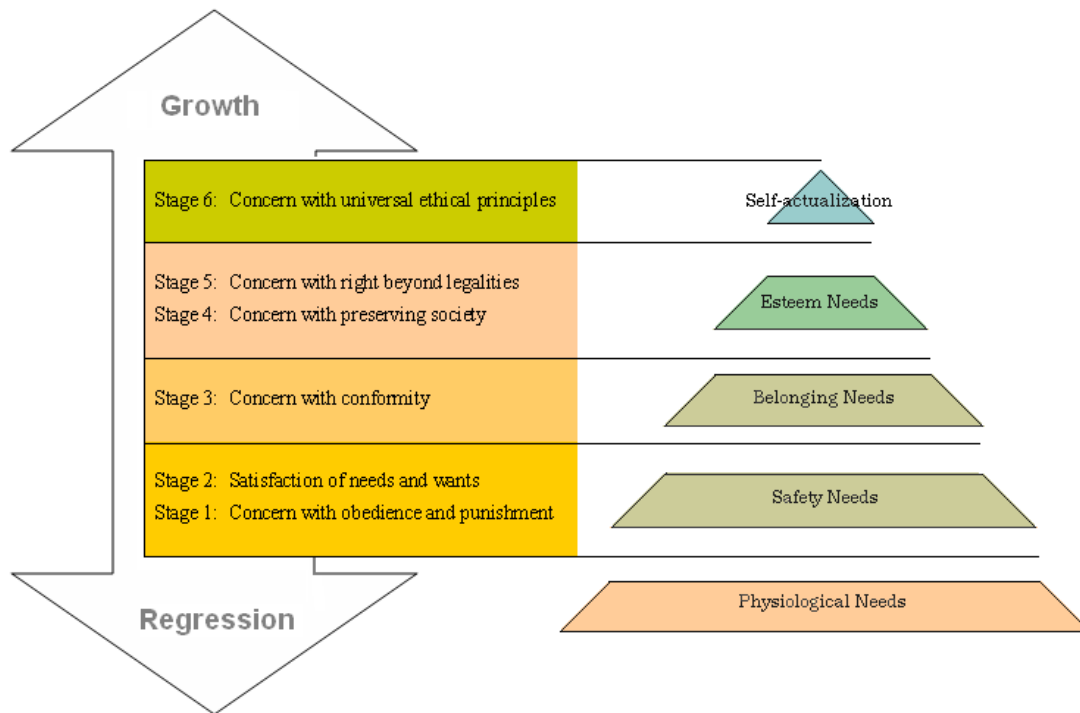


Figure 4. Transitioning Between Stages

Transitioning between Needs

As discussed, transitioning between Kohlberg's Stages of Moral Development is accomplished by attaining needs. How does transitioning occur within the hierarchy of needs? This is accomplished through the demonstration of specific characteristics. For example, it could be argued that a student who, through need, has demonstrated the ability to show affection, form and keep relationships, work in a team environment, and see the benefit of family, has reached the level of belonging and love. It is assumed that the specific characteristics for safety and physiological needs which support the esteem characteristics have also been satisfied and remain in place for continued growth. Table 6 depicts a sample set of the characteristics defining Maslow's needs.

| Need | Characteristic |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Self-Actualization | realizing personal potential, self-fulfillment, seeking personal growth and peak experiences, morality, socially compassionate, democratic, fair and non-discriminating, accepting others, not susceptible to social pressures, creative, inventive and original, spontaneous and natural, excited and interested in everything, problem solving, comfortable with oneself, sense of humor directed at oneself or the human condition, seek peak experiences that leave a lasting impression, etc. |
| Esteem | self-esteem, confidence, achievement, mastery, independence, status, dominance, prestige, recognition, competition, responsibility, respect for others, respect by others, etc. |

| | |
|---------------|-------------------------------------------------------------------------|
| Belonging | work group, family, affection, relationships, team sport, etc. |
| Safety | protection from elements, security, order, law, limits, stability, etc. |
| Physiological | air, food, drink, shelter, warmth, sleep, homeostasis, etc. |

Table 6. Characteristics Defining Maslow's Needs

Table 6 should in no way be considered a finite list, but instead examples of characteristics that define the hierarchy. The next section discusses how these characteristics bridge Maslow's Hierarchy of Needs and Long's Reactive Behavior Patterns.

Needs and Reactive Behavior Patterns

All four of Long's reactive behavior types (aggressive-independent, aggressive-dependent, passive-independent and passive-dependent) inherit specific characteristics. Psychological energy level and need for approval are simply two characteristics that help define the types. Other characteristics include *affection, communication, self-esteem, and honesty*. Depending on the type, these characteristics will fluctuate in strength. For example, an aggressive-independent and aggressive-dependent will have a high psychological energy level, while a passive-independent and passive-dependent will have a low psychological energy level. All four types inherit the same characteristic; the strength for each will vary from type to type. To provide another example, both the aggressive-independent and aggressive-dependent rate high on *communication*, they are frank and speak freely, while the passive-independent and passive-dependent rate low, speaking only when necessary or when spoke to.

These characteristics can be logically grouped according Maslow's Hierarchy of Needs. Furthermore, many resemble those characteristics shown in Table 6. Table 7 depicts the same table with many of the common characteristics highlighted.

| Need | Characteristic |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Self-Actualization | realizing personal potential, self-fulfillment, seeking personal growth and peak experiences, morality, socially compassionate , democratic, fair and non-discriminating , accepting others, not susceptible to social pressures, creative, inventive and original, spontaneous and natural , excited and interested in everything, problem solving, comfortable with oneself, sense of humor directed at oneself or the human condition, seek peak experiences that leave a lasting impression, etc. |
| Esteem | self-esteem, confidence, achievement , mastery, independence , status, dominance , prestige, recognition, competition (competitive), responsibility (responsible), respect for others (respectful), respect by others, etc. |
| Belonging | work group, family, affection, relationships , team sport, |

| | |
|---------------|-------------------------------------------------------------------------|
| | etc. |
| Safety | protection from elements, security, order, law, limits, stability, etc. |
| Physiological | air, food, drink, shelter, warmth, sleep, homeostasis, etc. |

Table 7. Bridging Maslow and Long: Common Characteristics

Keep in mind this is not an exhaustive list, but instead examples of characteristics which bridge needs and reactive behavior patterns. Many other bridging characteristics exist.

Depending on the strength of these characteristics exhibited by the four reactive behavior types, growth and regression occurs. Using the same example, an aggressive-dependent and passive-dependent might rate fairly high in demonstrating the ability to show affection, form and keep relationships, work in a team environment, and see the benefit of family, and as a result, could reach the level of belonging, whereas, the same could not be said about the aggressive-independent and passive-independent. This is not to say that the aggressive-independent and passive-independent do not have such a need and will never reach this level. Remember, reactive behavior patterns provide important determinants of behavior. They should not be considered disorders. Instead, the aggressive-independent and passive-independent will not transition into this level as easily and as quickly. It isn't part of their natural state. They have to work at it.

A few words on the ancillary traits (phobic, impulsive, obsessive/compulsive, and hysterical) are warranted. Each of the four types can exhibit zero or more of these traits, which can either greatly enrich or complicate the types. They ensure no two individuals of the same type are completely the same. As a result, they add a layer of variability to the framework. Using our example, an aggressive-dependent who is phobic may not rate as high in demonstrating the ability to show affection, form and keep relationships, work in a team environment, and see the benefit of family as say an aggressive-dependent who is hysterical. Each would reach the level of belonging, but it might take more effort on the part of the phobic, aggressive-dependent. In other cases, these traits would not apply at all.

Figure 5 makes an attempt at depicting the framework in its entirety, showing the relationships between Kohlberg, Maslow, and Long.

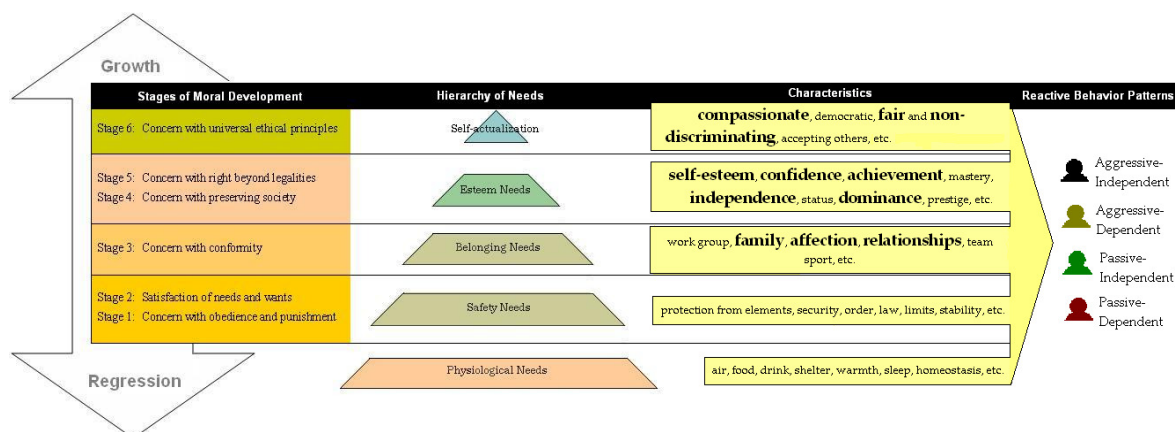


Figure 5. Virtual Character Conceptual Framework

Next, the framework is applied into practice.

Section 4

Theory to Practice

As mentioned the Star Classroom Simulator must present practicing and pre-service teachers with simStudents that not only look and act the part, but allow growth based on the teaching methods employed. This growth (and regression) is accomplished by applying the framework discussed thus far.

The goal of the teacher is to employ the ideology and best practices of Star teachers to hone their skills in classroom management by engaging and motivating the simStudents both as individuals and as a group. The interaction between the teacher and simStudent is therefore vital if any learning is to take place. With the employment of successful teaching methods, the simStudent grows, transitioning stages. The opposite is also true. For success to be achieved, the teacher must transition their simClass to the highest stage possible. The higher the level, the less of a challenge classroom management becomes. This is easier said than done, however.

The teacher will be faced with a number of simStudents, each potentially portraying one of four reactive behavior types (aggressive-independent, aggressive-dependent, passive-independent, and passive-dependent) who may also show signs of zero to four traits (phobic, impulsive, obsessive / compulsive, hysterical). Based on their reactive behavior pattern, each simStudent will show evidence of different needs and thus will be at different stages. The teacher will quickly realize that their actions solicit different responses from their simClass—some desired while others not so. To further compound matters, simStudents will react to one another. The actions of one simStudent may feed the actions of another or the entire simClass. The teacher will have to meet the needs of individual simStudents so that they grow individually, but at the same time, maintain the simClassroom. Depending on the simStudent's type and trait(s), different techniques may have to be used, as each simStudent will transition between the stages differently.

The subsequent sections describe the design behind the simStudent, the simClass, and the interactions with the teacher. Please note that while some implementation details are provided, the following sections predominately describe the design at a conceptual level. It will be at the simulation developer's discretion as to the implementation details. First, however, a few words on *The Star Classroom Management Protocol* interactive-computer game, the predecessor to the Star Classroom Simulator.

The Star Classroom Management Protocol

From the Haberman Educational Foundation, the Star Classroom Management Protocol is an assessment tool for school districts, universities, and researchers to address whether or not individuals will be able to manage a classroom. Developed as an interactive-computer game, the Star Classroom Management Protocol is the predecessor to the Star Classroom Simulator. It is based on Rudolph Dreikurs' theory of logical consequences; in that students misbehave because of their particular need for attention, power, revenge, or avoidance of failure. In practicing with this interactive game, it is expected that teachers will improve in the following areas:

1. *With-it-ness*—a heightened awareness of everything all the children in the classroom are doing at any moment in time.
2. *Multi-tasking*—an increased ability to think about resolving several children's problems simultaneously.
3. *Responding to individual needs*—tailoring responses to particular student needs.
4. *Increasing their repertoire of responses*—practicing 50 positive teacher responses.
5. *Avoid escalating problems*—extinguishing automatic teacher responses that feed into and make situations worse.
6. *Professionalizing teacher behavior*—learning to act in response to children's needs rather than responding to teacher needs.
7. *Acting decisively*—learning to act quickly and staying in control of the situation.

It is anticipated that the Star Classroom simulator will provide a next generation solution to the Star Classroom Management Protocol. In addition to helping practicing and pre-service teachers in the seven areas previously mentioned, it will support a higher degree of interactivity between the teacher and virtual classroom environment, a richer virtual student model, and an immersive feeling currently unattainable with the Classroom Management Protocol. Appendix C provides screen shots from the Star Classroom Management Protocol.

The simStudent Model

For the Star Classroom Simulator to be a success and provide practicing and pre-service teachers with a realistic classroom setting in which they can hone their classroom management skills, the simStudents must look and act the part of typical urban school students found across the United States. Their clothing, mannerisms, behaviors, actions, dialogue, and even facial expressions must be authentic to immerse the teacher in the learning experience. In other words, the simStudent model instantiated and controlled by the simulation must be realistic, so that emphasis is placed on teacher learning, and not on the simulator itself. Figure 6 depicts the simStudent model¹ proposed for use by the Star Classroom Simulator. This model is based on the conceptual framework discussed earlier in this whitepaper. A larger depiction can be found in Appendix D.

¹ IDEF1X is a data modeling technique that is used by many branches of the United States Federal Government, particularly in modeling and simulation. It is typically associated with the design of relational databases with syntax designed to support the semantic constructs necessary to develop a conceptual schema. Even though many other modeling techniques exist, IDEF1X has been chosen here as a vehicle in which to promote understanding of the simStudent model and to leverage the collection of data and meta-data which may be needed to drive the simulation.

- *Dreikurs' Theory of Logical Consequences.* The four human needs (power, attention, revenge, and avoidance of failure) are supported. The needs represent the types of actions acted by the simStudent and provide an additional cue as to the current state of the simStudent. For example, if the actions performed by the simStudent are those of revenge, this information is presented to the teacher as a visual cue so that the teacher can react appropriately. Figure 8 depicts a fragment of the simStudent model showing Dreikurs' Theory of Logical Consequences.

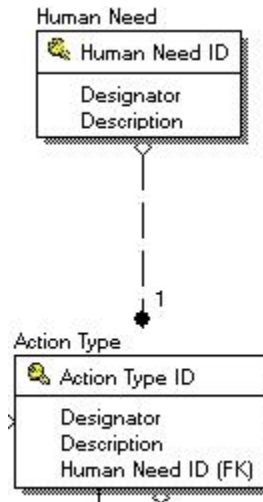


Figure 8. simStudent Model Fragment: Dreikurs' Theory of Logical Consequences

- *Kohlberg's Stages of Moral Development.* Both levels and stages are supported. Growth and regression occur as motivational needs are satisfied and lost. Figure 9 depicts a fragment of the simStudent model showing Kohlberg's Stages of Moral Development.

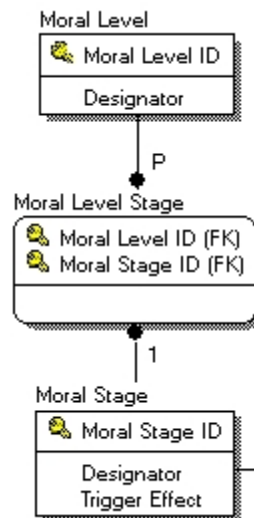


Figure 9. simStudent Model Fragment: Kohlberg's Stages of Moral Development

- *Maslow's Hierarchy of Needs.* Both motivational need level and the specific characteristics defining the need are supported. Growth and regression occur as characteristics are demonstrated. These characteristics are defined as variables in the model, each with a

range of possible values. Figure 10 depicts a fragment of the simStudent model showing Maslow's Hierarchy of Needs.

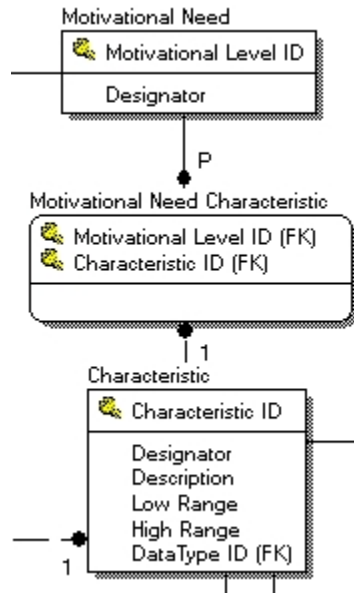


Figure 10. simStudent Model Fragment: Maslow's Hierarchy of Needs

- *Reactive Behavior Patterns.* Both type and trait(s) are supported. The instantiation of a model is representative of one reactive behavior pattern type and zero or more traits. For example, once populated with data, the model found in Figure 6 may be representative of an aggressive-independent who is obsessive/compulsive. Behaviors are defined based on reactive behavior patterns (type and trait(s)). A pool of actions is further defined based on this composite. These relationships are depicted in Figure 11.

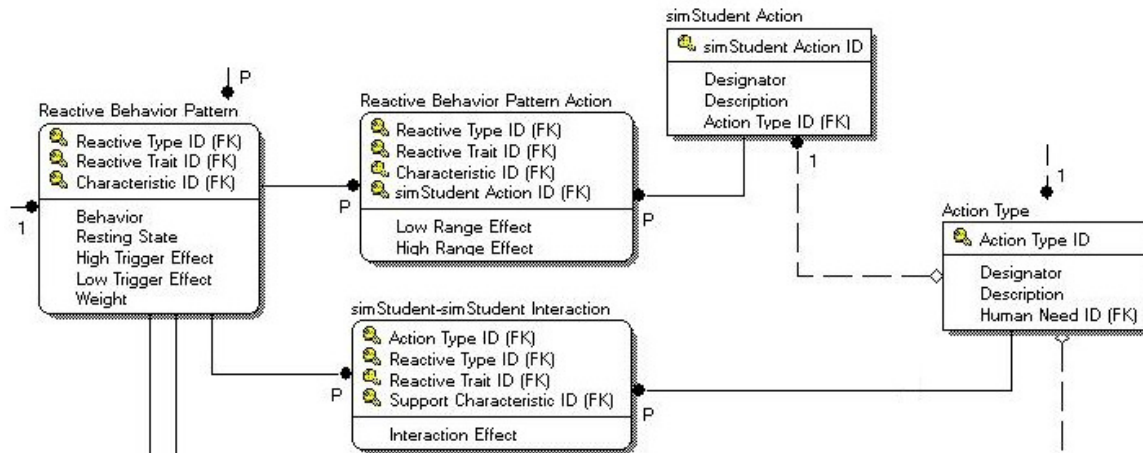


Figure 11. simStudent Model Fragment: Long's Reactive Behavior Patterns

The subsequent sections describe the interactions of this model.

Characteristics as Variables

The common characteristics bridging Maslow's Hierarchy of Needs and Long's Reactive Behavior Patterns are represented as variables. From the computer science domain, variables are

nothing more than places where a quantity can be stored. For example, the characteristic affection might be represented as a variable called *iAffection* that has a value of 0.8. Each characteristic used in the simStudent model will be represented as a variable and will house a single value. Each variable has a declared datatype, which is nothing more than the type of value that can be stored. The *iAffection* variable, for example, would have a datatype of *Integer*. Most variables in the simStudent model will be either of type *Integer* or *Boolean*.

A variable of type *Integer* will be represented as a range of possible values. Each variable will have a declared *high range* and *low range*. Adopting the methodology proposed by Crawford (2005), the low range will be set at -1 while the high range will be set at 1. Values will fluctuate within this range. Figure 12 depicts the composition of a variable of type *Integer*.



Figure 12. Type Integer Variable

Even though a range of possible values is conceivable, only one value at any given time is permitted. Each variable will, therefore, have a value within the possible range from -1 to 1 called a *resting state*. This value is the current state of the variable. The exception is the value 0, which indicates the variable, even though initialized, is not in use by the simulation. Looking at the previous *iAffection* example, the resting state was 0.8, and would therefore be in use by the simulation.

A variable of type *Boolean* will be represented as one of two possible values, 0 or 1. A 1 indicates the variable is in use by the simulation, while a 0 indicates the variable is not in use.

The differences between these variables and their use will become clearer as the workings of the simStudent model are traversed. For the remainder of this whitepaper, the term “variable” will be used when discussing simStudents from a simulation perspective, while “characteristic” will continue to be used when discussing simStudents from a conceptual framework standpoint. Figure 13 depicts a fragment of the simStudent model that addresses characteristics as variables, their range, and declared data type.

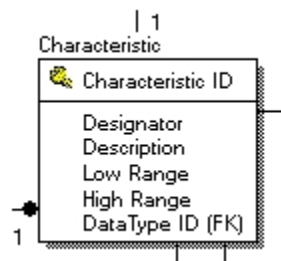


Figure 13. simStudent Model Fragment: Characteristics as Variables

Initializing Variables

All variables will be initialized at simulation startup. A variable of type *Integer* can have one of two resting states. It may be in use by the simulation and have a value between -1 and -0.1 or 0.1 and 1. This is referred to as a “calculated” resting state, in which the value is dynamically

calculated by the simulation based on a number of factors (soon to be discussed). It may also have a “default” resting state, which is the initial value used to instantiate the variable at simulation startup. The default resting state is a constant. A calculated resting state could also have a value of 0, which implies it is not in use by the simulation. This is different than a default resting state set to 0 implying that the variable will never be used by the simulation.

As discussed, variables of type Boolean are much easier to represent than those of type Integer, in that a 1 indicates they are in use, while a 0 indicates they are not. In other words, a 1 is considered on, while a 0 is considered off.

Bridging Needs and Reactive Behavior Patterns

As discussed earlier in this whitepaper, shared characteristics bridge Maslow’s Hierarchy of Needs and Long’s Reactive Behavior Patterns. This same logic holds true in the model. Each reactive behavior pattern (type and trait) has a number of variables of which are also assigned to one of the motivational levels. Figure 14 depicts a fragment of the simStudent model that shows this bridge.

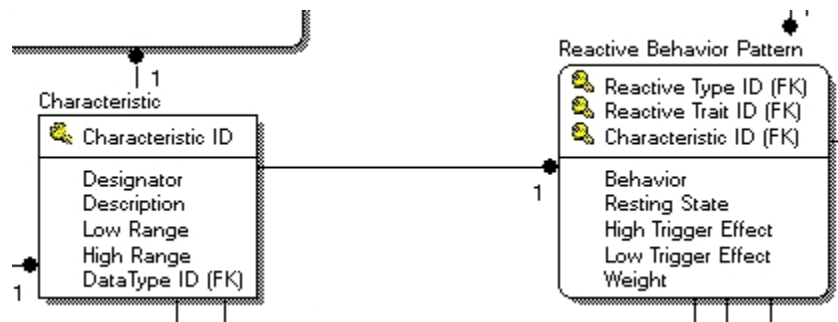


Figure 14. simStudent Model Fragment: Bridging Variables

Teacher-simStudent Interaction

Haberman’s 14 mid-range functions will be defined in the simStudent model (even though it is anticipated that at only functions H through N (see Table 1) will be used). Each mid-range function will have a defined behavior or set of behaviors which describe the ideology and best practices. Furthermore, each mid-range function may also have one or more actions which put the theories into practice. These are actions by the practicing or pre-service teacher in response to the feedback with the simStudents, whether individually or as a class.

Not all actions, however, are those based on the Star teacher ideology and best practices. The Star Simulator must be able to interpret the actions of practicing and pre-service teachers, some of which may not be Star teachers, or may only be partially fluent in the 14 mid-range functions. As a result, other actions are also included, common with “fully qualified” teachers. By including both desired and undesired actions, greater interaction can be achieved.

Each action will be assigned an *interaction effect* and a list of one or more variables which are affected by the action. The interaction effect is a numerical value that is applied against the resting state of all applicable variables. Depending on the composite of action and variable, the interaction effect will make a situation better or worse. Since a simStudent is a composite of characteristics represented as variables, depending on the magnitude of applicable variables and the value of the interaction effect, a single action may have far-reaching impacts.

The interaction effect is applied by either adding or subtracting from the resting state. For instance, using the iAffection variable, if the current resting state is 0.8 and the interaction effect is -0.5, the new resting state would be 0.3. The interaction effect equation is as follows:

$$\text{Resting State} = \text{Resting State} \pm \text{Interaction Effect}$$

Provisions will have to be taken to ensure that in calculating, the resting state never surpasses -1 or 1. Figure 15 depicts a fragment of the simStudent model that addresses Haberman's Mid-Range Functions, actions, and teacher-simStudent interactions.

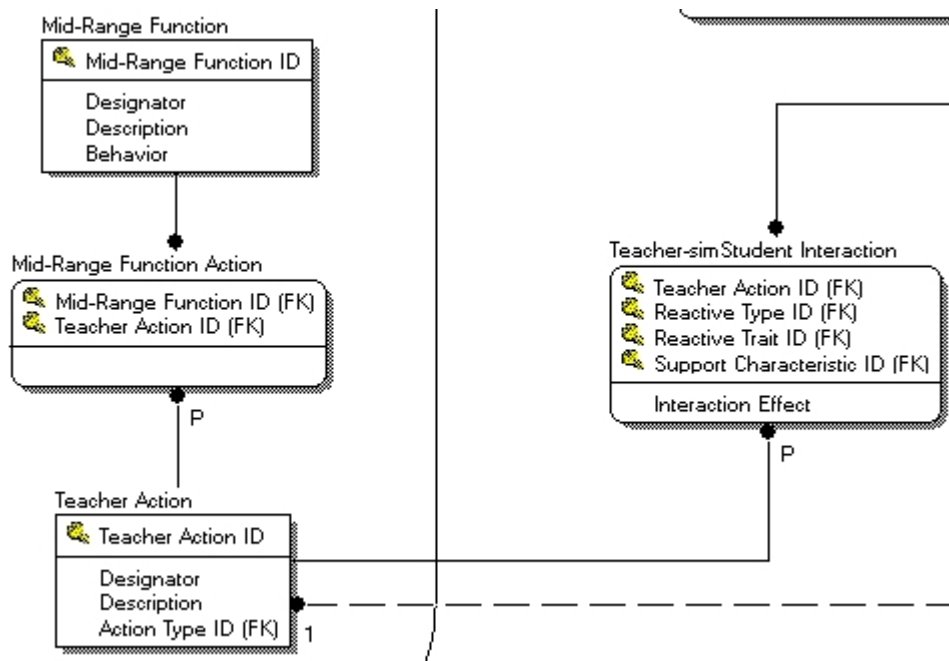


Figure 15. simStudent Model Fragment: Mid-Range Functions and Teacher-simStudent Interactions

simStudent-simStudent Interaction

As in many classrooms, student behavior is not only driven by the interactions with the teacher, but the interactions with other students. As a result, a simStudent-simStudent interaction will also exist. This interaction works identically to the teacher-simStudent interaction.

simStudents will have a pool of actions which are specific to the composite of a simStudent's type, trait, and characteristic. In the same manner that both desired and undesired teacher actions will be captured, simStudent actions will represent both actions deemed acceptable and desired by the practicing or pre-service teacher and those less desirable, unacceptable, and/or troublesome. By including both desired and undesired actions, greater interaction can be achieved.

Identical to the teacher-simStudent interaction, each action will be assigned an *interaction effect* and a list of one or more variables which are affected by the action. The interaction effect is a numerical value that is applied against the resting state of all applicable variables. Depending on the composite of action and variable, the interaction effect will make a situation better or worse. Since a simStudent is a composite of characteristics represented as variables, depending on the

magnitude of applicable variables and the value of the interaction effect, a single action may have far-reaching impacts.

The interaction effect is applied by either adding or subtracting from the resting state. For instance, using the iAffection variable, if the current resting state is 0.8 and the interaction effect is -0.5, the new resting state would be 0.3. The interaction effect equation is as follows:

$$\text{Resting State} = \text{Resting State} \pm \text{Interaction Effect}$$

Again, provisions will have to be taken to ensure that in calculating, the resting state never surpasses -1 or 1. Figure 16 depicts a fragment of the simStudent model that addresses the simStudent, actions, and simStudent-simStudent interactions.

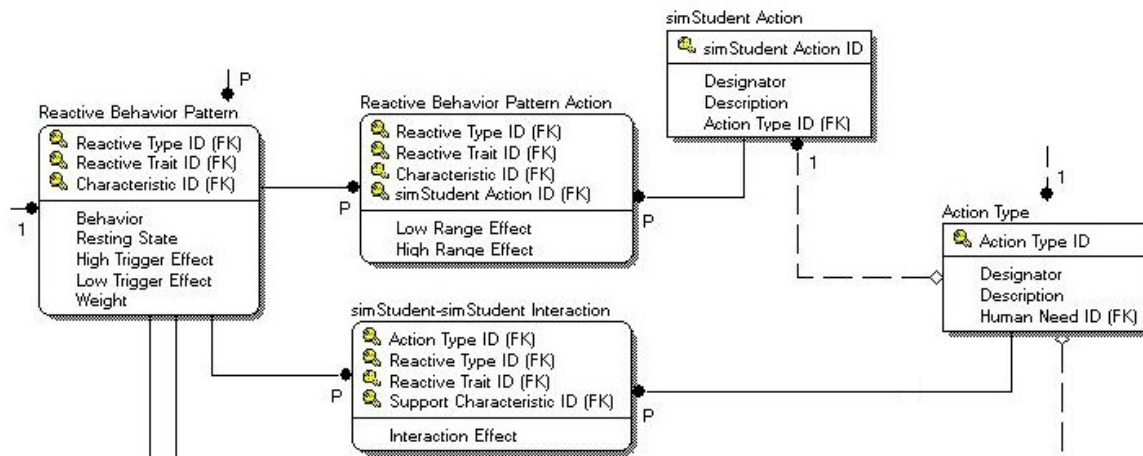


Figure 16. simStudent Model Fragment: simStudent-simStudent Interactions

Ascertaining Clues from SimStudent Actions

As discussed, simStudents will have a pool of actions which are specific to the composite of a simStudent's type, trait, and characteristic. Each of these actions, however, also has a corresponding type, which not only defines the action to be performed by the simStudent (e.g. verbal, psycho-motor, etc.), but is also classified using Dreikurs' Theory of Logical Consequences. Each action, therefore, is classified as the simStudent's attempt at attaining power, attention, revenge, or eventual avoidance of failure. This information will be presented to the teacher as a visual indication as to the current state of the simStudent. This will provide the teacher with an idea as to what appropriate actions should take place to diffuse the situation. For example, actions which deal with talking out or showing off may be classified as that of attention. As these actions are acted out by the simStudent, the teacher will be presented with the action type (in this case attention) so that the appropriate teacher action can take place. See figure 8 for a fragment of the simStudent model that addresses action types and their classification using Dreikurs' Theory.

This approach has been adopted from the Haberman Educational Foundation's Star Classroom Management Protocol (discussed earlier).

Transitioning between Needs

As discussed, transitioning between Kohlberg's Stages of Moral Development is accomplished by attaining needs. Furthermore, transitioning between the needs is accomplished through the

demonstration of specific characteristics. For example, it could be argued that a student who, through need, has demonstrated the ability to show affection, form and keep relationships, work in a team environment, and see the benefit of family, has reached the level of belonging and love. It is assumed that the specific characteristics for safety and physiological needs which support the esteem characteristics have also been satisfied and remain in place for continued growth. In the model, this is accomplished using resting state, triggers, and supporting variables.

Depending on the motivational level of each variable, it will be assigned supporting variables. For example, the iAffection variable will belong to the belonging and love motivational level. Furthermore, it is dependent on a number of variables from the safety and physiological levels. If any of these supporting variables acquire a resting state of 0, depending on the importance of the dependency, the iAffection variable may also acquire a resting state of 0, further causing a ripple effect.

How the actions of the teacher and simStudent have already been discussed along with how using the interaction effect can alter the resting state of affected variables. Each supporting variable also has a *high* and *low trigger effect*, which indicates the strength at which dependent variables are set their default resting state or a resting state of 0. A high trigger effect is used to set a dependent variable's resting state to its default value (thus used by the simulation), while a low trigger effect is used to set a dependent variable's resting state back to 0 (thus no longer used by the simulation). What follows is a simple example.

Our iAffection variable has been initialized. Based on a number of factors, including the simStudent's reactive behavior pattern (type and trait), the default resting state has been set to 0.8. This variable has the motivational level belonging and love. It also has a high and low trigger effect of 0.9 and -0.1. Furthermore, the iAffection variable has two supporting variables. These are *iSecurity* and *iStability*, both of which have been initialized using their default resting states of 0.5 and 0.7 respectively. Now further entertain the idea that these two variables have a high and low trigger effect. The high and low trigger effect of iSecurity is 0.8 and -0.1, while the high and low trigger effect of iStability is 0.9 and 0.1. Table 8 depicts these variables, their properties, and values (see column A).

| Variable | Property | Value (A) | Value (B) | Value (C) |
|---------------------------|---------------------|--------------------|--------------------|--------------------|
| iAffection (dependent) | Motivational Level | belonging and love | belonging and love | belonging and love |
| | Resting State | 0.8 | $0.8 - 0.6 = 0.2$ | $0.8 + 0.1 = 0.9$ |
| | High Trigger Effect | 0.9 | 0.9 | 0.9 |
| | Low Trigger Effect | -0.1 | -0.1 | -0.1 |
| iSecurity (supporting) | Motivational Level | security | security | security |
| | Resting State | 0.5 | $0.5 - 0.6 = -0.1$ | $0.5 + 0.1 = 0.6$ |
| | High Trigger Effect | 0.8 | 0.8 | 0.8 |

| | | | | |
|-------------------------|---------------------|----------|-------------------|-------------------|
| | Low Trigger Effect | -0.1 | -0.1 | -0.1 |
| iStability (supporting) | Motivational Level | security | security | security |
| | Resting State | 0.7 | $0.7 - 0.6 = 0.1$ | $0.7 + 0.1 = 0.8$ |
| | High Trigger Effect | 0.9 | 0.9 | 0.9 |
| | Low Trigger Effect | 0.1 | 0.1 | 0.1 |

Table 8. Transitioning between Needs Example

Now assume the “fully qualified” teacher has screamed at the simStudent, which has an interaction effect of -0.6. Applying the resting state equation as it applies to interaction effect, the new set of values (see column B) show that the new resting state for the supporting variables is -0.1 for iSecurity and 0.1 for iStability. Given that these values are \leq to the low trigger effect of each supporting variable, the dependent variable iAffection can no longer be supported during simulation play. And as a result, would have its resting state set to 0. This, of course, would cause a ripple effect in that the iAffection variable is also a supporting variable to other variables.

If the “fully qualified” teacher had instead performed an action based on one of the 14 mid-range functions, the outcome might have been different. Say the action resulted in an interaction effect of 0.1. The new set of values (see column C) shows that the new resting state of the iAffection variable is \geq to the high trigger effect. If this variable is a supporting variable to other dependent variables, depending on the resting state of the other supporting variables, this new iAffection resting state might be enough to set the default resting state of one or more dependent variables currently set to 0.

The following rules may be applied when transitioning between needs within the model:

- The resting state never surpasses -1 or 1. Instead, a viable solution may be to set the resting state at the highest value possible, which would be either -1 or 1, when calculations warrant such practice.
- In using the interaction effect equation, the resting state calculated at 0 is automatically considered no longer in use by the simulation. And as a result, dependent variables may be impacted.

These are only recommendations. It is at the simulation developer’s discretion as to the implementation and rules. Figure 17 depicts a fragment of the simStudent model that addresses the transitioning between needs.

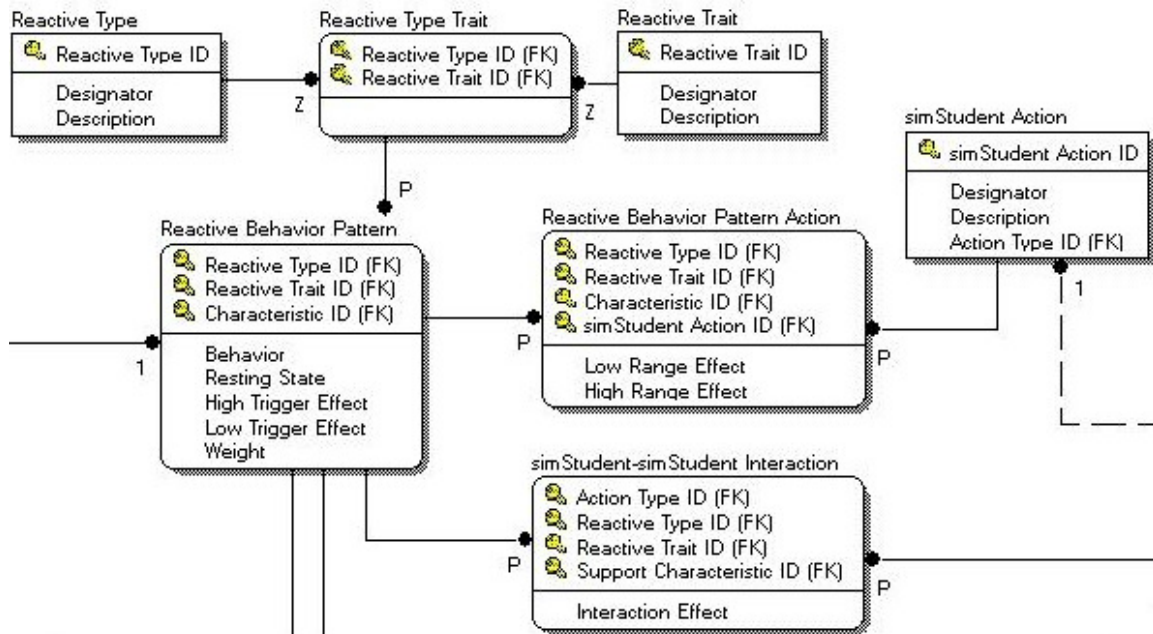


Figure 17. simStudent Model Fragment: Transitioning between Needs

Next, the transitioning of stages will be discussed.

Transitioning between Stages

Transition between the stages is accomplished through Maslow's Hierarchy of Needs. Each of Maslow's needs (safety, belonging and love, esteem, and self-actualization) parallels with one of Kohlberg's Stages of Moral Development as originally depicted in Table 4. This is also supported by the model.

Transitioning between stages in the model is accomplished using weights assigned to each variable as well as a *trigger effect* defined for each moral stage. A *weight* is used to place emphasis on certain variables which have more influence than others. Not all variables are created equal. The trigger effect, on the other hand, is similar to the trigger effects of variables. It defines the value that must be met in order for the simStudent to have attained the moral stage. The equation to calculate current effect of the moral stage so that it can be compared against the trigger effect is as follows:

$$\text{Current Effect} = \sum(\text{variable resting state}(\text{weight}))$$

The simStudent can only remain in the stage as long as the current effect is equal to the trigger effect. It is entirely feasible that even though a simStudent has a number of variables at a motivational level, depending on their weights and resting states, they may not be able to achieve the desired stage.

To date, how characteristics are represented as variables, how the teacher-simStudent interacts, how simStudent-simStudent interacts, how the simStudent transitions between motivational levels and how they transition between stages of moral development has been discussed. Next, a discussion as to how the simStudent actions are selected is provided.

Choosing between Actions

At any given point during the simulation, each *simStudent* will have a number of variables which are either set to a default resting state, a calculated resting state, or 0. Those variables which are not 0, are each assigned one or more *simStudent* actions. Depending on the state of the *simStudent* at any given time, a number of variables may be at play, which may further result in a very large pool of available actions. So, how does the simulation decide among potentially dozens of actions? Which one does the simulation have the *simStudent* perform?

Each action has a *low* and *high range effect*, which is directly related to the low and high range of type Integer variables (see Figure 12). The low and high range effect spans a subset of the entire range defined by the low and high range in the variables. Depending on the resting state of the variable at the time, only those actions will be applicable which have a low and high range effect that encompasses the default or calculated resting state.

Here's an example.

Say the *iAttention* variable has 3 actions associated with it for a *simStudent* who is of type, aggressive-independent, with the trait obsessive-impulsive. The current calculated resting state is -0.5. Table 9 lists the actions with the low and high range effect of each.

| Variable | Action | Low Range Effect | High Range Effect |
|------------|-----------------------------------|------------------|-------------------|
| iAttention | Doodles, writing directly on desk | -0.1 | -0.3 |
| | Stares at ceiling | -0.4 | -0.5 |
| | Walks to pencil sharpener | -0.6 | -0.8 |

Table 9. Choosing between Actions Example

In this example, only the actions "Stares at ceiling" and "Walks to pencil sharpener" would be applicable, since the resting state of -0.5 falls within the ranges. Figure 18 provides a pictorial representation of this.

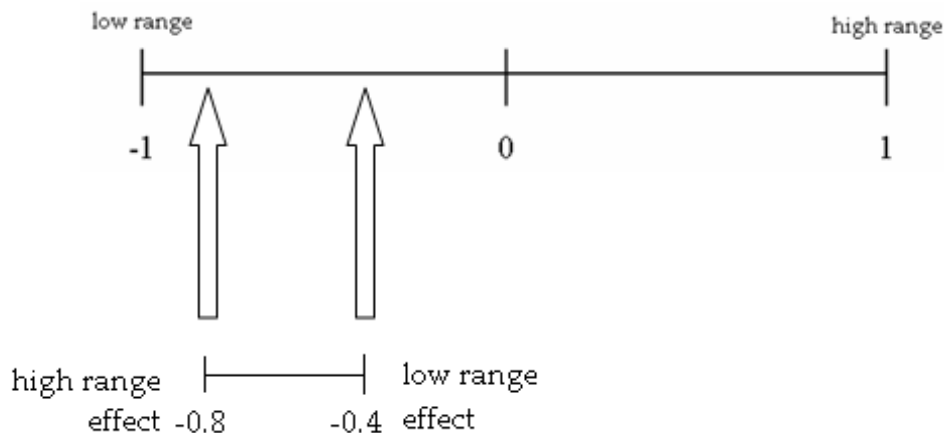


Figure 18. Choosing between Actions Example

The low and high range effect is intended to apply weight to the actions assigned to variables for the *simStudent* to perform. Depending on the variable in question, both desired actions and undesired actions can be created and assigned a subset range (low and high range effect). For example, undesired behavior, which may be excessive, such as screaming profanity, kicking a

desk, or just leaving the classroom may only be assigned a subset range between -1 and -0.7. The opposite could also be established. Those incredibly desirable actions, which may not be common place, may only be assigned a subset range between 0.7 and 1. Given this, it would be known that the simStudent will only perform these extreme actions if their resting states across variables reach a boiling point, which may only occur if they are repeatedly interacting with certain extreme teacher actions.

Even when using this approach, a number of actions may still be available. At this point, a random function algorithm may be employed which selects from the pool of available actions. Please note, overlap between low and high range effects should be avoided as to not cause ambiguity. Figure 19 depicts a fragment of the simStudent model that addresses the selection of actions.

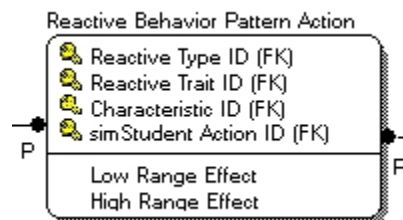


Figure 19. simStudent Model Fragment: Choosing between Actions

The simClassroom Model (simStudent Aggregation)

Further research needs to be performed on the interactions when treating all simStudents as a single entity—the *simClassroom*. Currently, the *simClassroom* is an aggregation of all simStudents within the classroom. As the practicing or pre-service teacher interacts with the *simClassroom*, the teacher actions are applied against all simStudents (if their *bListening* variable of type Boolean is set to 1). As a result, research needs to be performed as to how the teacher can interact with a single simStudent or group of simStudents within the *simClassroom*.

Character Profile

The model described thus far has laid the framework for the development of the simStudent and interactions between the simStudent, other simStudents, and the teacher. The model, however, also supports the development of character profiles, allowing unique, individual character sheets to be created. Figure 20 depicts a fragment of the simStudent model that addresses character profiles and the ultimate creation of character sheets.

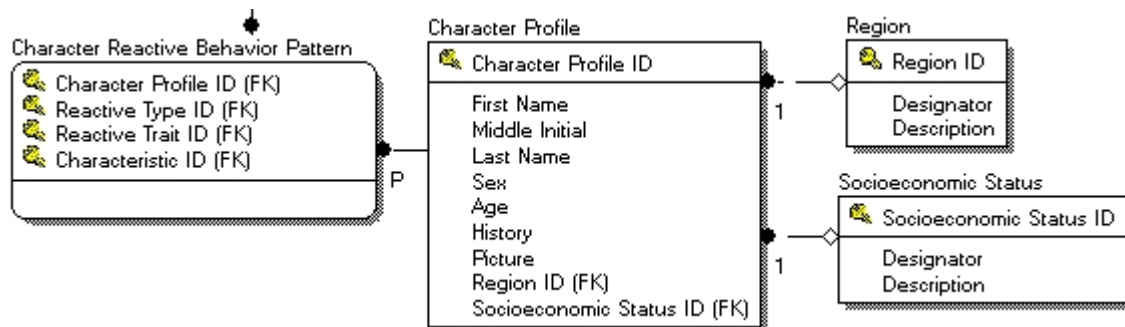


Figure 20. simStudent Model Fragment: Character Sheet

As depicted in Figure 20, the character profile consists of properties commonly used in the creation of character sheets, such as the character's name, *sex*, *age*, and some *history* about the character which may be of significant importance. The character profile also includes a *picture* of what the simStudent might look like, and other information, such as what part of the country they are from and their *socioeconomic* status.

Each character profile is then assigned a reactive behavior pattern and all applicable characteristics. This fragment of the model needs further examination, however. Other properties may be applicable, particularly when examining students from urban schools. This may include added report(s) typically found in such schools which track student progress, such as grades, disciplinary actions, parent involvement, etc. It would prove beneficial to store such information about each simStudent, allowing the practicing or pre-service teacher to review such information pre, during, or post simulation execution.

In addition, a vehicle in which to set different default resting states for specific character profiles is also warranted. This will allow different instantiations of simStudents to use different default resting states, and as a result, each simStudent will be unique, even if a simClassroom is composed of more than one of the same reactive behavior patterns. In other words, a simClassroom may have two simStudents that are derived from the aggressive-independent who is phobic model, but both simStudents will be unique, look different, behave and act differently.

Given the data-driven nature of the model, it is anticipated that a data-entry system with reporting capabilities could be devised to allow Star teachers and other subject matter experts to supply the data and meta-data to build these simStudent models. Reporting features could then be used to dynamically generate reports and character sheets which are explicitly customized to those who need them.

Creating the Star Classroom Simulator Mock-up

This section addresses the effort in creating a mock-up of the Star Classroom Simulator. The intent of this section is to document how the simulator works and the logic behind it. Throughout the remainder of this section, the word *mock-up* will refer to the Star Classroom Simulator Mock-up unless otherwise noted. Furthermore, the screen shots found in this section may not be representative of the current mock-up version, as the screens may have changed since the writing of this whitepaper.

Modeling after the Star Classroom Management Protocol

Given limited time and resources, the full-scale Star Classroom Simulator could not be built for this effort. Instead, a slice of the full-scale simulation was created, using a rapid prototyping methodology, for evaluation, testing, demonstration, and study. This mock-up was developed to mimic the existing Haberman Educational Foundation's Star Classroom Management Protocol interactive-computer game used by school districts, universities, and researchers to address whether or not individuals will be able to manage a classroom.

Accessing the Star Classroom Simulator Mock-up

The mock-up was developed as a web-enable application. This was done to reach the greatest number of end-users (e.g. teachers) and to avoid the common dilemma of distribution, installation, and configuration commonly found with software applications. As a result, the mock-up has very few requirements. Many of which will already be met by the majority of end-users. These requirements are:

- A broadband Internet connection.
- Minimum screen resolution of 1024 by 768 pixels.
- Microsoft Internet Explorer 6.5 or later. Does not currently support Firefox.
- Text size in browser set to medium or smaller.
- The Apple QuickTime Player. A free download from <http://www.apple.com>.
- The Adobe Flash Player. A free download from <http://www.macromedia.com>.

Since the mock-up is multimedia-intensive, end-users must have the latest versions of both the Apple QuickTime and Adobe Flash Players installed on their computers. Both are free downloads available from their respective software makers. In addition, the mock-up has been developed with Visual Studio 2005. It is therefore recommended that end-users experience the mock-up in Microsoft Internet Explorer 6.5 or later. At the time of this writing, the Firefox Internet browser is not supported.

The mock-up can be accessed from www.creative-instincts.net. A key code is required for full access. Those end-users in need of a key code should click the [Request a key code](#) hyperlink found on the *Login* screen.

Playing the Star Classroom Simulator Mock-up

The following sections describe how to play the mock-up. Each screen composing the mock-up is described in detail. A discussion is provided from the perspective of the end-user and game play. These sections do not delve into the code behind each screen, but may provide insights into the inner workings of the mock-up that the end-user should not be privy to.

Logging In

When users first access the website, they'll be presented with the *Login* screen as depicted in Figure 21. This screen forces all end-users to first login before they can experience the mock-up. Each end-user will have to enter a key code. Those end-users in need of a key code should click the [Request a key code](#) hyperlink found on the screen.

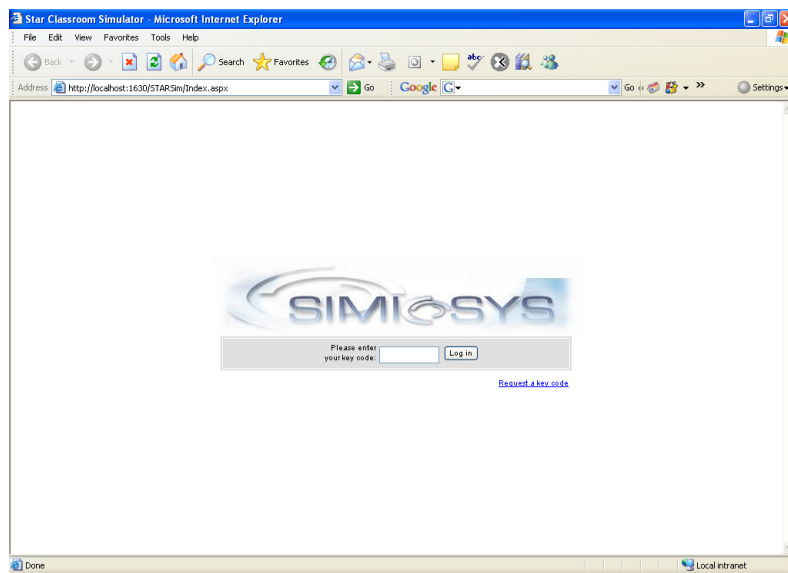


Figure 21. Star Classroom Simulator Mock-up Login Screen

Key Code Algorithm

The key code uses a simple algorithm based on the current date. The key code convention is as follows:

DyyMdd

Where:

D = The first letter of the day of the week. For example, 'M' would be used for Monday, 'T' for Tuesday and so on.

yy = The last two digits of the year. For example, 07 would be used for the year 2007.

M = The first letter of the month. For example, 'J' would be used for July, 'S' for September and so on.

dd = The day of the month. For example, 23 would be used for the 23rd of the month, 7 for the 7th of the month and so on.

Given this convention, a key code for Monday, July 23rd would be “M07J23”. The key code is case sensitive and expects capitals to be used for the first letter of the day of the week and the month. Using the same example, “m07j23”, “M07j23”, or “m07J23” would not be valid key codes. End-users who enter an invalid key code are presented with the message “The key code you entered is invalid, please try again”. The mock-up does not audit or track invalid attempts.

It is strongly recommended that end-users are given key codes using the above convention as requested. The key code will be valid for the day assigned or can be generated for a future date. Sharing the key code convention with end-users is discouraged, as this will allow end-users with unlimited, future access.

Welcome

Upon successfully logging in, end-users will be presented with the *Welcome* screen as depicted in Figure 22. This screen introduces end-users to the mock-up, providing a cursory overview of the mock-up and its theoretical foundation in Rudolph Dreikurs’ Theory of Logical Consequences. A QuickTime movie is also played, narrated by the authors, setting the stage for the classroom scenario used.

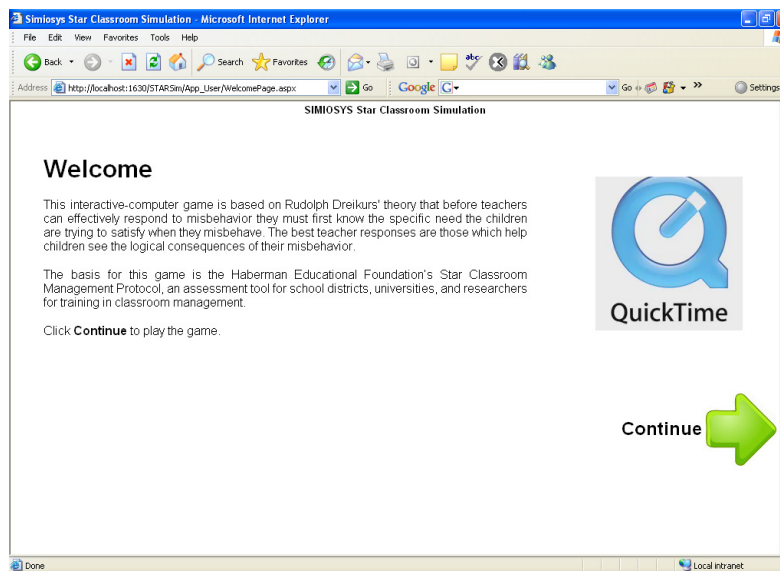


Figure 22. Star Classroom Simulator Mock-up Welcome Screen

The QuickTime movie is automatically downloaded and played upon accessing the screen. The end-user does not have to watch the entire movie or read the text provided. End-users wishing to continue can do so by clicking the **Continue** arrow found on the screen. First time users will experience a brief delay upon accessing the screen, as the movie will have to download. Download time will depend on the end user’s broadband connection. Once downloaded, the movie will be cached and will play instantly upon future visits to the screen.

Getting Directions

Upon continuing from the Welcome screen, end-users will be presented with the *Directions* screen as depicted in Figure 23. This screen provides pictorial directions on playing the mock-up. This

was done to mimic the Haberman Educational Foundation's interactive-computer game and to avoid ambiguity or confusion sometimes found in traditional text-based directions. End-users can continue by clicking the **Continue** arrow or they can return to the Welcome screen by clicking the **Back** arrow.

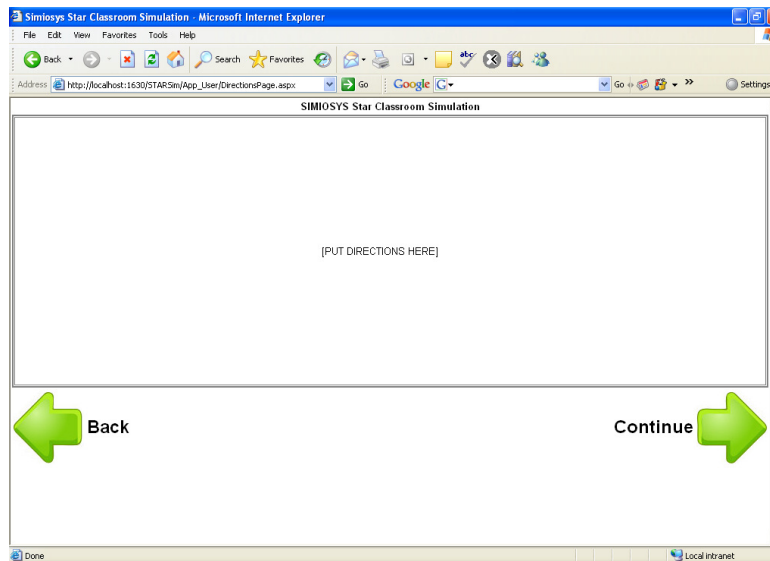


Figure 23. Star Classroom Simulator Mock-up Directions Screen

Setting the Stage

Upon continuing from the Directions screen, end-users will be presented with the *Setting the Stage* screen as depicted in Figure 24. This screen sets the stage for the classroom scenario. The end-user will be presented with a short Flash movie establishing the classroom situation that will have to be diffused before it escalates to disastrous results. In addition to watching the movie, end-users will be presented with two choices. First, they'll be asked about difficulty level, or how hard they want the scenario to be. Second, they'll be asked if they want time to be a contributing factor while playing the game. In other words, as in the real world, is time taken into consideration when making decisions. Each of these choices will be discussed in detail. First however, the scenario for the mock-up is described.

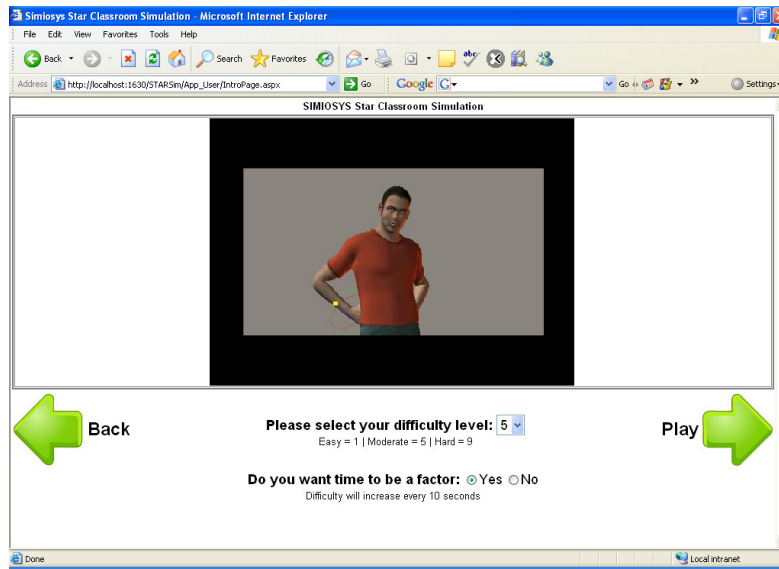


Figure 24. Star Classroom Simulator Mock-up Setting the Stage Screen

The Scenario

You've just graduated from college. You've been successful in your academic career, graduating with a 4.0 GPA and winning a number of awards, including a full scholarship. Because of your achievements, finding a job hasn't been a problem. You've been offered a number of great opportunities. Wanting a challenge however, you accept a teaching position at a school in the historical district a few miles from your home.

The scenario begins. It's your first day. While taking attendance, you meet Jamal for the first time. Jamal is a tall slender student who is more interested in socializing with his classmates than finding a seat and getting ready for class. An altercation takes place involving Jamal and two other male students. You've been so absorbed with attendance you don't really know what happened. However, it's clear that Jamal is upset and wants out of the classroom. In fact, he feels that he needs to be transferred to another class. So much so that he's questioning your authority and becoming a distraction for the entire class. You have to do something and soon. What will do you?

You'll be presented with a number of solutions to choose from. Some will be good, making the situation better, while others will make the situation worse. These solutions are based on the work of Rudolf Dreikurs' Theory of Logical Consequences. Since a slice of the full-scale simulation was developed, only the need for attention was incorporated into the mock-up. As such, the solutions presented all deal with attention, as this is what Jamal is trying to get.

It's up to you to decide how you'll deal with the situation and what choices are best. You'll only have a finite number of attempts in a short period to diffuse the situation. If you take too long, or make too many less than desirable choices, the classroom will explode into chaos and you'll lose total control.

Setting the Difficulty Level

There are 9 difficulty levels built into the mock-up. **One** is the easiest of the levels; typically, only needing one correct or moderately correct choice to diffuse the situation, while **9** is the hardest, typically only needing one bad or moderately bad choice to cause the classroom to explode. Level

5 is the default level if the end-user chooses not to select a level. Level 5 can be considered a moderate difficulty level. The end-user can select the desired difficulty level from the **Please select your difficulty level** dropdown list found on the Setting the Stage screen as depicted in Figure 24.

It should be mentioned that weights are assigned to each solution. This means that some solutions will be weighted more heavily than others, and may make more of an impact on the outcome than others. In addition, a penalty is calculated based on time and the number of attempts taken to diffuse the situation. This penalty is impacted by the end user's selection of difficulty level. In other words, picking an easier level may get the end-user closer to successfully diffusing the situation, but at the same time, choosing solutions more critical as the weights and penalties will be more severe.

Time as a Factor

Time can be used as a factor in calculating the implications of the solutions chosen by the end-user. If used, a penalty is incurred for every 10 seconds that the end-user cannot make a decision. If not used, no such penalty is incurred using time. This option is provided as a realistic representation of what such a situation in a real classroom would be like. Teachers don't have all the time in the world to diffuse a situation. Time is automatically used by default, unless otherwise changed by the end-user. Time as a factor can be changed by selecting either the **Yes** or **No** radio buttons for the **Do you want time to be a factor** option found on the Setting the Stage screen as depicted in Figure 24.

End-users can continue by clicking the **Play** arrow to begin game play or they can return to the Directions screen by clicking the **Back** arrow.

Interacting with Jamal and his Classmates

Once the end-user has selected a difficulty level and determined whether they want time to be a contributing factor during game play, the game begins. A short Flash movie will play providing insight to Jamal's state of mind. The end-user will also be presented with 3 solutions in which to pick. At minimum, one solution will be the better of the three, but other good solutions may also be presented. In other words, the mock-up does not take the traditional approach of displaying one correct answer supplementing the remaining options with incorrect answers. In some cases, three good solutions may be presented all with different weights.

Desirable solutions are selected by clicking the green button found above each solution as depicted in Figure 26. Once a solution is selected, a new Flash movie is played providing more insight into Jamal's state of mind and that of the class. State or how well the end-user is doing is represented as an apple found in the lower right hand corner of the screen. The apple will undergo three stages: green, yellow, and red.

A *green* apple is considered a safe situation, Meaning, Jamal is upset, but his actions are mild, distractions to the rest of the class aren't a problem, and with the choice of one or two good solutions, Jamal will sit in his chair and participate in the class.

A *yellow* apple is considered a situation that isn't severe, but could become such very quickly. With a yellow apple, solutions need to be applied quickly and effectively to prevent Jamal from further disrupting the class and reaching an explosive stage.

A *red* apple is considered a critical situation. Jamal is one or two solutions away from exploding and taking the class with him. This is a critical state. The end-user must select the most desirable solutions consistently to diffuse the situation.

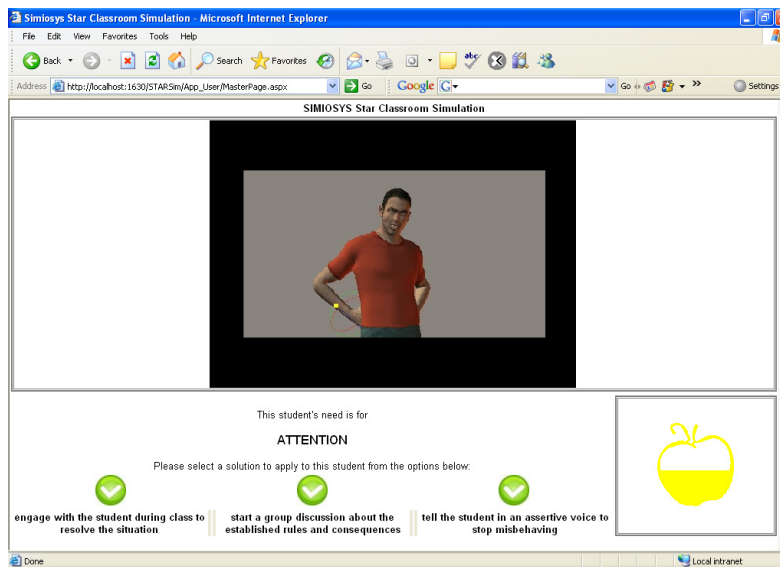


Figure 25. Star Classroom Simulator Mock-up Interaction Screen

Keep in mind that each solution has a weight associated with it and penalties are incurred if time is a factor and a decision isn't made within 10 seconds. A penalty is also incurred for each solution selected over 4 attempts. The end-user must effectively diffuse the situation in the least number of attempts as possible. The more choices made, the harder it becomes to diffuse the situation and the more likely Jamal and the rest of the class will explode.

Solutions, Weights and Penalties

There are 26 solutions to choose. All solutions have been derived from the work of Rudolf Dreikurs and his Theory of Logical Consequences. Since a slice of the full-scale simulation has been developed, only the need for attention has been used. Attention was selected because this need is typically found in 1/3 or more of classrooms, making it one of the most frequently addressed needs. The full-scale simulator will address all four needs (e.g. attention, power, revenge, and avoidance of failure).

Thirteen solutions are considered desirable, while 13 are considered less than desirable. These solutions and their respective weights can be found in Table 10. Solutions are randomly selected by the mock-up. At minimum, one desirable solution will be presented with two less than desirable solutions. However, as discussed earlier in this whitepaper, this is not always the case. Under the best of circumstances, three desirable solutions will be presented.

| Solution | Weight |
|-------------------------------------------------------------------|--------|
| tell student you can't do anything about the situation | 1 |
| sit next to student and calmly discuss the situation during class | 1 |
| promise student you'll fix the situation after class | 1 |

| | |
|----------------------------------------------------------------------------|---|
| plead with student to be patient until class is over | 1 |
| engage with the student during class to resolve the situation | 1 |
| ask student to step outside to discuss the situation in private | 2 |
| tell the student in an assertive voice to stop misbehaving | 2 |
| imitate the student's behavior using humor | 2 |
| remind class of the established rules and consequences | 2 |
| call security to diffuse the situation | 3 |
| briefly leave classroom to collect your thoughts | 3 |
| remind student that you're the teacher and he's the student | 3 |
| threaten physical force if student's behavior continues | 4 |
| ignore the student and situation, but stand close by | 1 |
| prevent interaction with other students | 1 |
| give student written-notice of unacceptable behavior | 1 |
| change the student's seat to the 'time-out' chair | 1 |
| move student away from distractions in classroom | 1 |
| play age appropriate music or turn out lights as a distraction | 2 |
| solicit opinions from the entire class about the situation | 2 |
| ask entire class to remind student of the classroom rules they established | 2 |
| start a group discussion about the established rules and consequences | 2 |
| involve class in a discussion as to how the situation will benefit them | 3 |
| ask student a direct question not related to the situation | 3 |
| change the activity to involve the student and entire class | 3 |
| have class decide upon a solution to situation using classroom rules | 4 |

Table 10. Star Classroom Simulator Mock-up Solutions

Each solution has a respective weight. These weights are important because they inform the mock-up how to calculate the selected solution into the outcome. Weights range from 1 to 4. In the case of desirable solutions, end-users want to select solutions with a weight of 4, as these solutions will diffuse the situation the quickest and under the least number of attempts. In the case of less than desirable solutions, end-users want to select solutions with a weight of 1, as these solutions will make the situation only slightly worse, opposed to those with a weight of 4.

The final outcome is driven by a calculated state, which takes into account the difficulty level, time as a contributing factor, the total calculated weight of all solutions selected to date, and the total number of attempts (total number of solutions selected). The total number of attempts and time as a factor are represented as a penalty that is incremented for each solution selected over 4 attempts and for every 10 seconds which passes that a decision isn't made. The calculated state is represented pictorially as the apple.

The mock-up has been developed to provide the same degree of difficulty as that of the Haberman Educational Foundation's interactive-computer game. As more time passes and the number of attempts increase, the chances of diffusing the situation decreases because the difficulty increases. The classroom situation needs to be diffused quickly and in less than 4 attempts.

Your Score

Eventually, the end-user will be taken to the *Your Score* screen as depicted in Figure 27. Upon launching, the end-user will be presented with a Flash movie that shows Jamal calming down and sitting at his desk working, or Jamal becoming so irate, that he leaves the classroom without permission, causing the entire class to go into disarray. Essentially, the end-user will diffuse the situation successfully or the classroom will explode. Irrespective of the outcome, the end-user will be presented with their score as to how well they did.

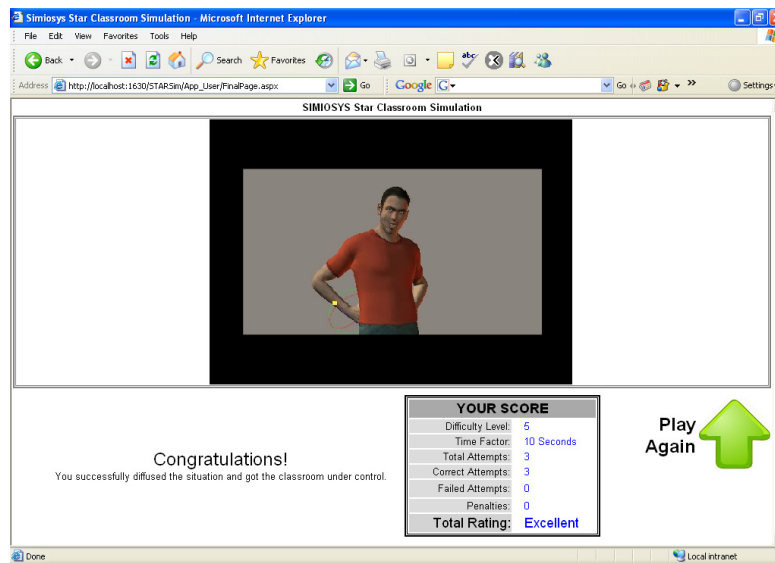


Figure 26. Star Classroom Simulator Mock-up Your Score Screen

Their score will be composed of the difficulty level, time factor, total attempts, correct attempts, failed attempts, penalties, and a total rating. Each is briefly defined in Table 11.

| Category | Description |
|------------------|-----------------------------------------------------------------------|
| Difficulty Level | The default difficulty level or difficulty level set by the end-user. |
| Time Factor | Whether time was chosen as a factor during game play. |
| Total Attempts | Total attempts made by the end-user before the situation was |

| | |
|------------------|----------------------------------------------------------------------------------------------------|
| | successfully diffused or the classroom exploded. |
| Correct Attempts | Total number of correct attempts. Measured by the number of most desirable solutions selected. |
| Failed Attempts | Total number of failed attempts. Measured by the number of least desirable solutions selected. |
| Penalties | Total penalties incurred during game play. A factor of time and total number of attempts. |
| Total Rating | Total rating based on all variables discussed thus far. Total rating is Excellent, Good, and Poor. |

Table 11. Star Classroom Simulator Mock-up Your Score

The end-user can try again, by clicking the **Play Again** arrow found on the screen. When doing so, the end-user will be taken to the Setting the Stage screen, in which they can view the Flash movie setting the stage for the scenario, select a difficulty level, and/or decide if they want time to be an influencing factor.

Under the Hood: Understanding the Star Classroom Simulator Mock-up

This section provides a brief overview as to the inner workings of the mock-up. This section does not provide a walk-through of the code and its dependencies.

Development Environment

The mock-up was developed using Microsoft Visual Studio (VS) 2005 Professional Edition version 8.050727.762, running SP .050727-7600, and running on the Microsoft .NET Framework, version 2.0.50727. The mock-up project has been developed using standard VS 2005 conventions, with the exception that a master page concept was not employed in the development of the project. This was simple due to a lack of time and resources. Both ASP.NET 2.0 and C# are used.

ASP.NET Pages

The project itself is composed of 6 primary pages. These pages map directly to the screens discussed earlier in this whitepaper. Table 12 depicts a summary of these pages.

| Page | Screen |
|---------------------|-------------------|
| Default.aspx | Login |
| WelcomePage.aspx | Welcome |
| DirectionsPage.aspx | Directions |
| IntroPage.aspx | Setting the Stage |
| MasterPage.aspx | Game Play |
| FinalPage.aspx | Your Score |

Table 12. Star Classroom Simulator Mock-up VS 2005 ASP.NET Pages

Images and Movies

The project is composed of 17 images and 13 movies. The images make up the apple, arrow and solution buttons, and logos. The movies make up the author narration and all Flash movies to include the setting the stage movie. These images and movies can be found in the *Assets* folder in their respective directories.

Forward Engineering the simStudent Model

Figure 6 depicted the simStudent model proposed for use by the Star Classroom Simulator that was based on the conceptual framework discussed earlier in this whitepaper. Figure 27 depicts the physical implementation of this model in MS SQL Server. A larger depiction can be found in appendix E, while the scripts to create the database can be found in appendix F and SQL to insert the default data into the database can be found in appendix G. These appendixes have been included here for future development of the full-scale Star Classroom Simulator.

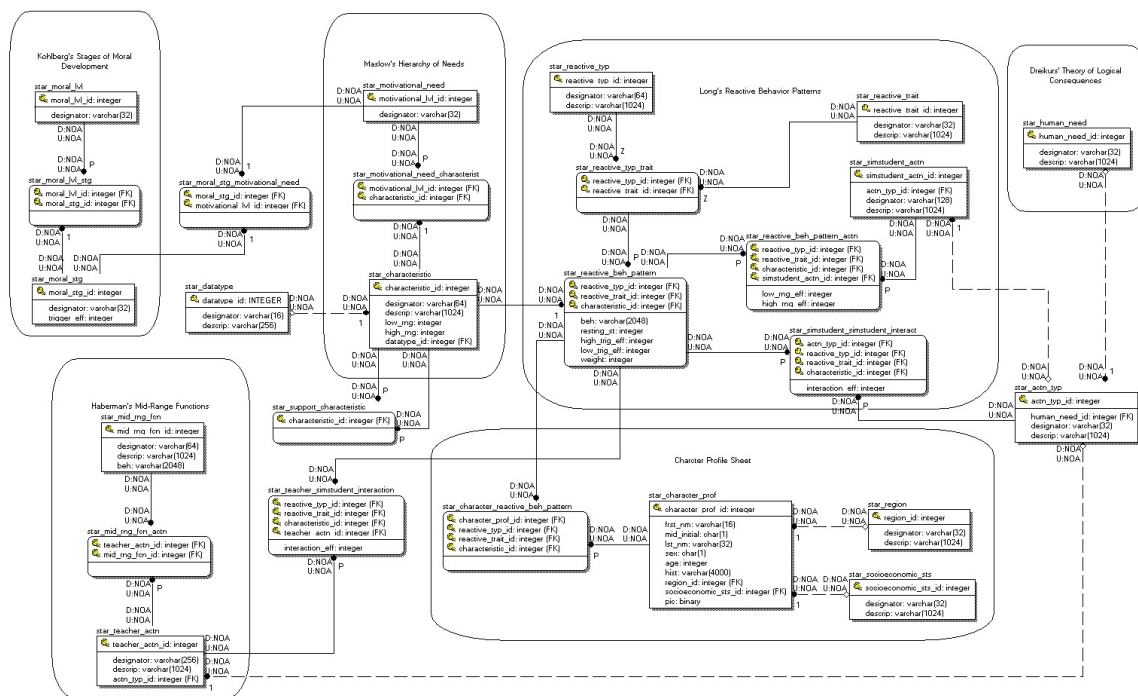


Figure 27. simStudent Model Physical Data Model

Conclusions & Future Considerations

The purpose of this effort was to develop a slice of what will eventually be the full-scale version of the Star Classroom Simulator. A number of factors were taken into consideration in building this mock-up.

First, being interactive in nature, as much insight as possible was taken from the book *Chris Crawford on Interactive Storytelling* (Crawford, 2005). However, Crawford discusses concepts that are far beyond the realm of what has been typically developed to date on interactive storytelling. It is strongly recommended that the full-scale version of the Star Classroom Simulator take into consideration the work of Crawford and the essence of true interactive storytelling.

Second, the mock-up was developed to mimic the Haberman Educational Foundation's interactive-computer game. Given the limited time and resources, this was done to provide a baseline in which to begin development as opposed to what will be done with the full-scale Star Classroom Simulator, which is a thorough analysis and design from scratch taking into consideration the work of Crawford, the Haberman Educational Foundation's interactive-computer game, the latest technologies currently available (particularly on voice synthesis/recognition, artificial intelligence, and inferencing), and the needs of teachers and K12 schools.

Third, even though the mock-up was developed to mimic the Haberman Educational Foundation's interactive-computer game as a feasible baseline in which to start development, the intent was to provide greater depth and realism in the mock-up than what is currently found in the existing interactive-computer game. For example, teachers who use the current Haberman Foundation interactive-computer game are not truly immersed in game play. The classroom is a flat 2-dimensional representation that does not provide insight into the student's state of mind (see Appendix C for screen shots of the game). Teachers cannot infer or assess the situation based on the current interactive game. Teachers cannot infer how the students might be feeling based on how they speak, what they say, how they act, and so on. The mock-up attempted to correct this deficiency with Flash movies in the hopes of taking the current interactive-computer game and making it more relevant in the real world. More research and work is needed, however. Simply incorporating animation is not enough.

Fourth, as can be seen in reading this whitepaper, an effort was made to develop a sound intervention through the incorporation of theory and practice. Even though the mock-up only addresses the work of Rudolf Dreikurs, a number of theories were used to develop a virtual character conceptual framework capable of producing simStudents that act and look like real students. It is hoped that this virtual character conceptual framework is re-evaluated as a viable solution when developing the full-scale Star Classroom Simulator.

As for future considerations, there are lessons learned from this effort that warrant further study. These are listed here in no particular order. This is not an exhaustive list but note those of most importance.

- The formative feedback presented during game play (as the apple changing color) and the summative feedback presented at the end of game play as a score is simply inadequate. When examining such feedback, it provides little use to the end-user. It is recommended that further research take place in the incorporation of formative and summative evaluation and feedback. This will be vital in the full-scale Star Classroom Simulator. Extensive work has been performed with the Department of Defense in what they refer to as summative evaluation in simulation as after action reviews. Research from this area might help develop a sound and well thought out evaluation system. That is, a system that is truly capable of providing meaningful feedback to teachers concerning their performance and areas needing further training.
- The animations (Flash movies) found in the mock-up are simply inadequate. They provide a higher level of detail than that found in the Haberman Educational Foundation's interactive-computer game, but further research is needed. Advancements in artificial intelligence, inferencing, voice recognition and synthesis may provide much more of an interactive nature, further promoting motivation and immersion on the part of the teacher. Once again, it is recommended that the work of Chris Crawford be

examined, as he has been able to capture the true essence of interactive storytelling, but more importantly, what interactive storytelling is not.

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7

Sample Aggressive-Independent and Passive-Dependent Character Sheets

[illegible]

Passive Dependent Character Sheet

| | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | | Name: Jason DeCompte | | | | Age: 16 Gender: Male | |
| | | History Profile | | | | | |
| <p>Jason is the youngest of a large family of 5 kids, most of which have moved out of the house or gone away to college. So, he spends most of his time with his parents or other family members. He has some friends his own age, but very few compared to other children his age. He does well in school, but not as well as he could. He seems to "coast" through school with little effort on his part, only doing what is required and not going above and beyond simply because he is afraid to do anything other than what is required. Because he spends most of his time with older family, he comes across as much more mature than children his age, hiding any adolescent emotions, but instead showing the appearance of depression. He's described by his family as having his head in the clouds, and being a creative child.</p> | | | | | | | |
| Positive Characteristics | | Summary | | Proven Ways to Work With | | | |
| <p>give clear and complete directions and limit questions to important ones</p> <p>assign group membership (not too many passive dependents in one group, however)</p> <p>encourage initiative</p> <p>assign a buddy to work with them</p> <p>above all, be gentle</p> <p>assign tasks which can be completed successfully</p> <p>encourage independent problem solving</p> <p>be aware that they thrive on praise</p> <p>be very sensitive to their feelings</p> | | | | | | | |
| Maslow's Hierarchy of Motivational Needs | | Profile | | | | | |
| Motivational Need | Characteristics | Variable | Distortive | Traits | Value | Behavior | |
| Grasp Needs | Self-Actualization | realizing personal potential, self-knowledge, seeking personal growth and peak experiences, morally, socially, communally, democratic, rat and non-conformist, accepting others, not susceptible to social pressures, spontaneous and natural, excited and interested in everything, problem solving, combines with several sense of humor, focused at oneself or the human condition, past peak experiences that have a lasting impression, etc. | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low fearful of taking chances, low energy anxious higher do to chaos state strongly keep regularity to be organized low to overachieving, higher energy level | |
| | | honesty flexible ambitious, democratic, rat and non-conformist, accepting others, not susceptible to social pressures, spontaneous and natural, excited and interested in everything, problem solving, combines with several sense of humor, focused at oneself or the human condition, past peak experiences that have a lasting impression, etc. | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low not to "make things better" / may feel white lies to make things better not to make trouble not to make trouble not to make trouble will tell lies to make impulsive state | |
| | | attention span short <= long | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | sensitivity anxious extreme | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | self-reliant compliant | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | approval low <= high | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | self-reliance low <= high | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | self-esteem low <= high | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | self-esteem low <= high | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | self-esteem low <= high | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| Existence | self-esteem, confidence, achievement, mastery, independence, status, dominance, power, recognition, compassion, respectability, respect for others, respect by others, etc. | confrontation with others = fight | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | communication frequency low | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | longer expression = relaxed | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | communicative reserved | internal + to 1 | anomic phobic hysteria obsessive / compulsive impulsive | -0.5 0.910 -0.9 0.710 -0.9 -0.210 -0.1 0.410 -0.3 | low anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others anxious to be others' very sensitive to the feelings of others | |
| | | negative | internal + to 1 | | | | |

Appendix B

Reactive Behavior Pattern Descriptions as Originally Published by Long (1985)

Aggressive Independent Personality

The individual possessing this behavior pattern is endowed with considerable energy. He is an action-orientated person prone to translate emotional energy into direct language or activity. The independent aspect of his behavior defines him as an individual who tends to disregard the importance of approval from authority figures, thus releasing him to act out his impulses or emotions without fear of reprisal to rejection. Such an orientation predisposes such an adolescent to act quickly without restraint, and to be relatively uninhibited in his general attitude.

As a consequence of such a pattern of activity, these teenagers are frequently in trouble with authority, develop a poor track record for conforming to expected behavior, and often have a low self-esteem because of that poor record. They also tend to lie excessively in order that their inexplicable impulsive behavior be covered and minimized. Their understanding of their own difficulty is often poor, and their estimate of themselves is that they are in many ways inferior to the rest of humanity and are doomed to failure. These young people are refreshingly open, sometimes disturbingly frank, but responsive to total honesty and direct talk from the therapist, rendering them probably the easiest and simplest to counsel at minimum time expenditure.

As this personality type matures, especially during the later stages of adolescence, a progressive degree of self-control over their impulsivity emerges. Although their energy does not diminish noticeably, they direct their energy to more constructive ends than was seen in early adolescence. They learn and profit from structured environments, compensate somewhat for their relative lack of self-discipline and control. They seem to learn progressive methods of stopping themselves before they encounter those external limits when they are thus structured. They are a number of risks inherent in this personality, especially in regard to daring or adventurous activity. As a result of their impulsivity coupled with a feeling of immunity to harm in whatever they undertake, they are often found to be in trouble with authority outside the home despite their lack of malicious intent (Long, 1985, p. 87).

Aggressive Dependent Personality

This individual possesses the same degree of energy and need for action that characterized the previously described personality type, but a greater dependency upon approval from authority provides a built-in stop-gap to impulsive behavior. This adolescent seeks to exert personal control over his aggressions and to translate energies into constructive and complaint tasks. This personality is often defined as the over-achiever and is no doubt the ideal child in parental eyes. From this group come most of our campus and youth leaders, high academic achievers, dedicated athletes and candidates for professional schools. These young people are often highly idealistic and many set lofty life goals for themselves, driving them-selves to even higher levels of achievement and sometimes to exhaustion. Due to their difficulty in expressing negative feelings, the overachieving adolescent suppresses ambivalence for long periods of time, resulting in a considerable accumulation of anger and guilt over the adolescent years.

Secondary to this phenomenon, these young people often suffer from significant depression late in adolescence. They are unable to ventilate anger without the threat of offending those on whom they most depend for approval. They may become self-destructive unless they can find proper

outlet for that oppressive guilt and overwhelming depression, emotions they can neither explain nor fathom. At the college age level, the suicide and breakdown incidence is uncommonly high in this personality group for reasons that become quite evident when the factors active in their personality are clearly understood. To the casual observer, such depression, critical self-regard, and feeling of personal inadequacy represent a true paradox when they are externally seen as people who are unusually accomplished, gifted, energetic, and advantaged. Such regard from others only serves to cast further pressure and guilt upon the adolescent who becomes all the more frightened that his self-conceived “true” nature will become apparent to others, resulting in rejection and abandonment (Long, 1985, p. 88).

Passive Independent Personality

By virtue of relatively decreased energy, this individual reacts characteristically by withdrawal, isolated, or inactivity when stressed. Furthermore, the non-approval-seeking independence of this type of personality dictates a distinct resistance to parental (authoritative) expectation. The resultant behavior in this type of individual is stubbornness, resulting in considerable frustration of authority figures who are trying to motivate these young people to perform in a specific manner.

The passive independent adolescent becomes an enigma to parent and teacher alike as he refuses to perform even when performance would ultimately benefit the person. Adults tend to forget, however, that in an adolescent’s system of priorities, the expression of independent control over authority is often uppermost, and long-range consequences, whether positive or negative, rarely considered. It behooves the guiding authority, therefore, to consider long range results of excessive pressures on such an adolescent if those pressures gain nothing than resistance. Subtler alternative methods must be advised to circumvent potentially damaging behavior in such young people, and parents must be given continuing support in their practice of restraint with such children. These adolescents also tend to develop poor self-esteem secondary to their habitual negative behavior resulting in poor performance records (Long, 1985, p. 88).

Passive Dependent Personality

This type of low-energy individual thrives on affection and approval, and is the slowest to mature emotionally due to a significant inability to express open resentment or anger. Anything that threatens the dependency bond with authority figures speaks to them of rejection, and compliance becomes almost an obsession with them. They are often misunderstood and rejected by their peers because of their lack of identification with adolescent customs and because of the widening gap of communication with youth of other personality types who move from milestone to milestone in their development while these youngsters refuse to make the progressive breaks with home ties that allow such progress in maturity and independence. Lying becomes a method of strengthening the dependency ties with parents, and it is almost always designed to aggrandize the adolescent in the eyes of authority.

Dependent parents often value that closeness of these young people and see their continuing dependence on home and family to be a positive characteristic. Independent parents, however, begin to show concern as these children exhibit no inclination to relate to their peers, to enter into adolescent activities, and to emerge from the seclusion and security of family circles as they pass middle adolescence. No amount of urging seems to hasten that emergence into the outside world,

and much patience must be shown by families as these individuals slowly satisfy their dependency needs and mature in a fashion and at a rate all their own (Long, 1985, p. 88-89).

The Impulsive Trait

Impulsivity may occur in any of the major personality types. It may be a particularly complicating factor in the independent individuals who are already typically under controlled. When this trait is attached to the aggressive independent personality, excessive impulsivity may result and all its damaging consequences might occur unless there is proper definition and management. An impulsive aggressive dependent (overachieving) personality might quickly develop poor self-esteem as a result of escape from self-control, rendering his works-for-reward ethic less effective in gaining approval from authority. Considerable hazard exists to an individual adolescent from this trait and insights must be given to the patient and his parents so that adequate controls may be established and maintained until sufficient internal controls are developed to compensate for the characteristic lack of forethought and judgment (Long, 1985, p. 89).

The Phobic Trait

Innate in many individuals is the tendency to develop well-focused fears of unrealistic proportions. These fears are quite individual in their content, and are often disabling in their extent. In some teenagers, phobias act as built-in insurance against undue risk-taking and are sometimes beneficial. They may extend well into normal and expected areas of performance, however, and become deterrents to achievement or progress in social and emotional development. When a phobia develops in regard to school attendance, a relatively common phenomenon in early adolescence, severe disability may result that penalizes the teenager significantly in competitive area of development. On the other hand, a fear of heights in an aggressive independent personality will at least ensure that sky-diving will be avoided in selecting risk-taking adventures! (Long, 1985, p. 89)

The Obsessive-Compulsive Trait

The methodical organized individual who seems to possess inherent qualities of self-discipline and structure is often linked with high achievement if those qualities are not carried to excess. Efficiency of work method and movement may be a significant boon to achievement in certain individuals, while other great amounts of time may be wasted in ritualism, which may become an unavoidable factor in the daily routine of obsessive-compulsive child. Again, the normalcy of the trait is interpreted in light of its benefits or deterrents in the performance of individual patient, and treatment is recommended only when the trait becomes destructive or inhibitory to normal development of accomplishment. The overcontrol often exhibited by these teenagers may be used to advantage in helping them to overcome their ritualism and nonproductive compulsive behaviors. Restructuring of their life habits may be considerable benefit to them during this stage of their growth (Long, 1985, p. 89).

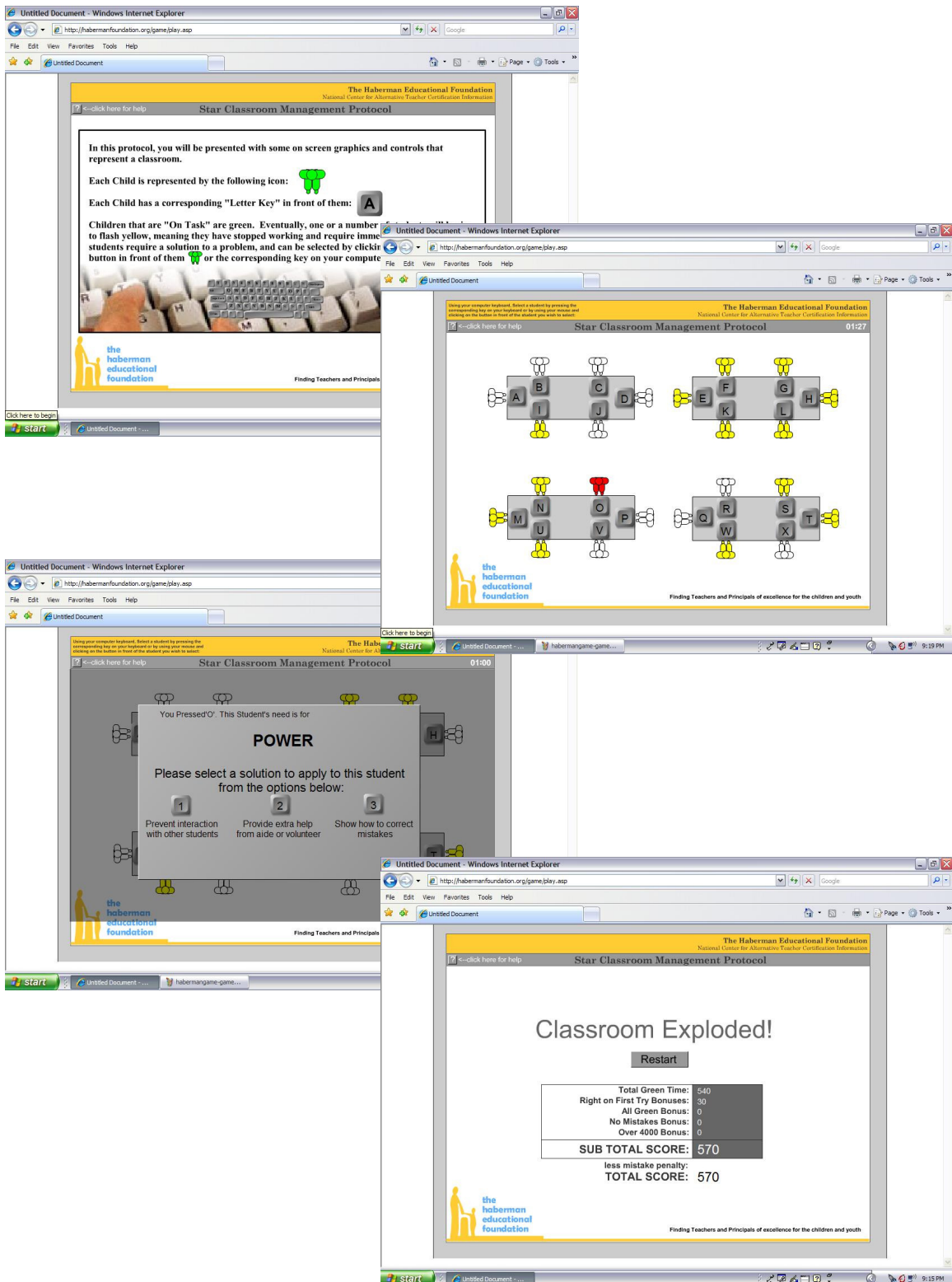
The Hysterical Trait

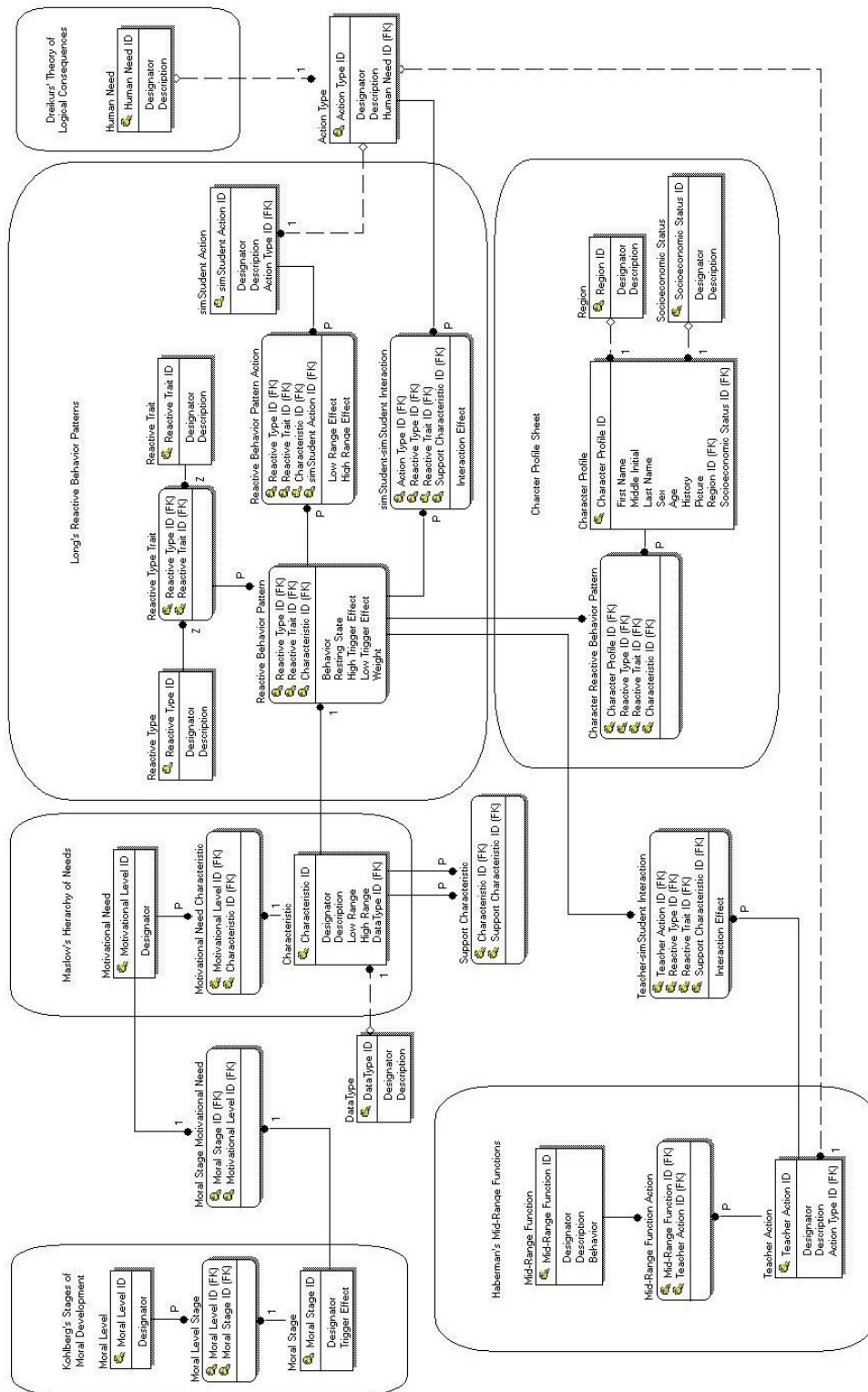
Certainly, the most noteworthy of all ancillary traits is that of hysterical behavior, most often seen in the female adolescent, but present in both sexes. Characteristically these individuals are dramatic in their presentation, often excessive in their emotional response and dress. They are

fantasy-laden in their thought processes to the extent that they may during times of stress have considerable difficulty in maintaining a clear perception of reality. Their hysterical episodes are most often provoked by surprisingly inconsequential factors, rendering them a true mystery to their parents and other family members. They tend to be crisis-prone, and may even seem to be happiest when they are unhappy, a factor in their personality that leads them into situations that often trap them in miserable circumstances. They must constantly be reminded of reality, the good sense of moderation in response to stress; the essential nature of tackling life's problems with sober thought and an accurate assessment of the factors involved; and the constant need to maintain a certain degree of control on one's emotions so that sensible judgments may be made. Drama is the watchword in the lives of these young people, and everything around them assumes a theatrical quality as they react, counter react, and overreact to life situations. Their hysterical behavior often begets hysteria in family members, and control must be urged in their environmental settings in order that they might learn to function in a calmer manner, particularly in times of stress (Long, 1985, p. 89-90).

Appendix C

Screen shots from the Star Classroom Management Protocol



Proposed Star Classroom Simulator simStudent Model (in IDEF1X¹)

Implementation of the Star Classroom Simulator simStudent Model in MS SQL Server



Appendix F

SQL used in creating the database.

```
/*
Creates the simStudent Model used by the proposed Star Classroom
Simulator
NOTE: The Identity, Identity Seed, and Identity Increment are not
established by this script. This will have to be done manually
*/

CREATE TABLE star_actn_typ
(
    actn_typ_id integer NOT NULL ,
    designator varchar(32) NOT NULL ,
    descrip varchar(1024) NOT NULL ,
    human_need_id integer NOT NULL
)
go

ALTER TABLE star_actn_typ
    ADD CONSTRAINT XPKAction_Type PRIMARY KEY NONCLUSTERED (actn_typ_id
ASC)
go

CREATE TABLE star_character_prof
(
    character_prof_id integer NOT NULL ,
    frst_nm varchar(16) NOT NULL ,
    mid_initial char(1) NOT NULL ,
    lst_nm varchar(32) NOT NULL ,
    sex char(1) NOT NULL ,
    age integer NOT NULL ,
    hist varchar(4000) NOT NULL ,
    region_id integer NOT NULL ,
    socioeconomic_sts_id integer NOT NULL ,
```

```

        pic binary NOT NULL
    )
go

ALTER TABLE star_character_prof
    ADD CONSTRAINT XPKCharacter_Profile PRIMARY KEY NONCLUSTERED
(character_prof_id ASC)
go

CREATE TABLE star_character_reactive_beh_pattern
(
    character_prof_id integer NOT NULL ,
    reactive_typ_id integer NOT NULL ,
    reactive_trait_id integer NOT NULL ,
    characteristic_id integer NOT NULL
)
go

ALTER TABLE star_character_reactive_beh_pattern
    ADD CONSTRAINT XPKCharacter_Reactive_Behavior_Pattern PRIMARY KEY
NONCLUSTERED (character_prof_id ASC,reactive_typ_id ASC,reactive_trait_id
ASC,characteristic_id ASC)
go

CREATE TABLE star_characteristic
(
    characteristic_id integer NOT NULL ,
    designator varchar(64) NOT NULL ,
    descrip varchar(1024) NOT NULL ,
    low_rng integer NOT NULL ,
    datatype_id integer NOT NULL ,
    high_rng integer NOT NULL
)
go

```

```
ALTER TABLE star_characteristic
```

```
    ADD CONSTRAINT XPKCharacteristic PRIMARY KEY NONCLUSTERED  
(characteristic_id ASC)
```

```
go
```

```
CREATE TABLE star_datatype
```

```
(  
    datatype_id INTEGER NOT NULL ,  
    designator varchar(16) NOT NULL ,  
    descrip varchar(256) NOT NULL  
)
```

```
go
```

```
ALTER TABLE star_datatype
```

```
    ADD CONSTRAINT XPKDataType PRIMARY KEY NONCLUSTERED (datatype_id  
ASC)
```

```
go
```

```
CREATE TABLE star_driven_need
```

```
(  
    human_need_id integer NOT NULL ,  
    designator varchar(32) NOT NULL ,  
    descrip varchar(1024) NOT NULL  
)
```

```
go
```

```
ALTER TABLE star_driven_need
```

```
    ADD CONSTRAINT XPKHuman_Need PRIMARY KEY NONCLUSTERED  
(human_need_id ASC)
```

```
go
```

```
CREATE TABLE star_mid_rng_fcn
```

```
(
```

```
designator varchar(64) NOT NULL ,
mid_rng_fcn_id integer NOT NULL ,
descrip varchar(1024) NOT NULL ,
beh varchar(2048) NOT NULL
)
go
```

```
ALTER TABLE star_mid_rng_fcn
    ADD CONSTRAINT XPKMid_Range_Function PRIMARY KEY NONCLUSTERED
(mid_rng_fcn_id ASC)
go
```

```
CREATE TABLE star_mid_rng_fcn_actn
(
    teacher_actn_id integer NOT NULL ,
    mid_rng_fcn_id integer NOT NULL
)
go
```

```
ALTER TABLE star_mid_rng_fcn_actn
    ADD CONSTRAINT XPKMid_Range_Function_Action PRIMARY KEY
NONCLUSTERED (teacher_actn_id ASC,mid_rng_fcn_id ASC)
go
```

```
CREATE TABLE star_moral_lvl
(
    moral_lvl_id integer NOT NULL ,
    designator varchar(64) NOT NULL
)
go
```

```
ALTER TABLE star_moral_lvl
    ADD CONSTRAINT XPKMoral_Level PRIMARY KEY NONCLUSTERED (moral_lvl_id
ASC)
```

go

```
CREATE TABLE star_moral_lvl_stg
(
    moral_lvl_id integer NOT NULL ,
    moral_stg_id integer NOT NULL
)
```

go

```
ALTER TABLE star_moral_lvl_stg
    ADD CONSTRAINT XPKMoral_Level_Stage PRIMARY KEY NONCLUSTERED
(moral_lvl_id ASC,moral_stg_id ASC)
```

go

```
CREATE TABLE star_moral_stg
(
    moral_stg_id integer NOT NULL ,
    designator varchar(32) NOT NULL ,
    trigger_eff integer NOT NULL
)
```

go

```
ALTER TABLE star_moral_stg
    ADD CONSTRAINT XPKMoral_Stage PRIMARY KEY NONCLUSTERED (moral_stg_id
ASC)
```

go

```
CREATE TABLE star_moral_stg_motivational_need
(
    moral_stg_id integer NOT NULL ,
    motivational_lvl_id integer NOT NULL
)
```

go

```
ALTER TABLE star_moral_stg_motivational_need
    ADD CONSTRAINT XPKMoral_Stage_Motivational_Need PRIMARY KEY
NONCLUSTERED (moral_stg_id ASC,motivational_lvl_id ASC)
go
```

```
CREATE TABLE star_motivational_need
(
    motivational_lvl_id integer NOT NULL ,
    designator varchar(32) NOT NULL
)
go
```

```
ALTER TABLE star_motivational_need
    ADD CONSTRAINT XPKMotivational_Need PRIMARY KEY NONCLUSTERED
(motivational_lvl_id ASC)
go
```

```
CREATE TABLE star_motivational_need_characterist
(
    motivational_lvl_id integer NOT NULL ,
    characteristic_id integer NOT NULL
)
go
```

```
ALTER TABLE star_motivational_need_characterist
    ADD CONSTRAINT XPKMotivational_Need_Characteristic PRIMARY KEY
NONCLUSTERED (motivational_lvl_id ASC,characteristic_id ASC)
go
```

```
CREATE TABLE star_reactive_beh_pattern
(
    reactive_typ_id integer NOT NULL ,
    reactive_trait_id integer NOT NULL ,
    characteristic_id integer NOT NULL ,
```

```

        beh varchar(2048) NOT NULL ,
        resting_st integer NOT NULL ,
        high_trig_eff integer NOT NULL ,
        low_trig_eff integer NOT NULL ,
        weight integer NOT NULL
    )
go

ALTER TABLE star_reactive_beh_pattern

        ADD CONSTRAINT XPKReactive_Behavior_Pattern PRIMARY KEY NONCLUSTERED
(reactive_typ_id ASC,reactive_trait_id ASC,characteristic_id ASC)
go

CREATE TABLE star_reactive_beh_pattern_actn
(
        reactive_typ_id integer NOT NULL ,
        reactive_trait_id integer NOT NULL ,
        characteristic_id integer NOT NULL ,
        simstudent_actn_id integer NOT NULL ,
        low_rng_eff integer NOT NULL ,
        high_rng_eff integer NOT NULL
)
go

ALTER TABLE star_reactive_beh_pattern_actn

        ADD CONSTRAINT XPKReactive_Behavior_Pattern_Action PRIMARY KEY
NONCLUSTERED (reactive_typ_id ASC,reactive_trait_id ASC,characteristic_id
ASC,simstudent_actn_id ASC)
go

CREATE TABLE star_reactive_trait
(
        reactive_trait_id integer NOT NULL ,
        designator varchar(32) NOT NULL ,

```



```
        descrip varchar(1024) NOT NULL
    )
go
```

```
ALTER TABLE star_reactive_trait
    ADD CONSTRAINT XPKReactive_Trait PRIMARY KEY NONCLUSTERED
    (reactive_trait_id ASC)
go
```

```
CREATE TABLE star_reactive_typ
(
    reactive_typ_id integer NOT NULL ,
    designator varchar(64) NOT NULL ,
    descrip varchar(1024) NOT NULL
)
go
```

```
ALTER TABLE star_reactive_typ
    ADD CONSTRAINT XPKReactive_Type PRIMARY KEY NONCLUSTERED
    (reactive_typ_id ASC)
go
```

```
CREATE TABLE star_reactive_typ_trait
(
    reactive_typ_id integer NOT NULL ,
    reactive_trait_id integer NOT NULL
)
go
```

```
ALTER TABLE star_reactive_typ_trait
    ADD CONSTRAINT XPKReactive_Type_Trait PRIMARY KEY NONCLUSTERED
    (reactive_typ_id ASC,reactive_trait_id ASC)
go
```

```
CREATE TABLE star_region
```

```
(  
    region_id integer NOT NULL ,  
    designator varchar(32) NOT NULL ,  
    descrip varchar(1024) NOT NULL  
)  
go
```

```
ALTER TABLE star_region
```

```
    ADD CONSTRAINT XPKRegion PRIMARY KEY NONCLUSTERED (region_id ASC)  
go
```

```
CREATE TABLE star_simstudent_actn
```

```
(  
    simstudent_actn_id integer NOT NULL ,  
    designator varchar(128) NOT NULL ,  
    descrip varchar(1024) NOT NULL ,  
    actn_typ_id integer NOT NULL  
)  
go
```

```
ALTER TABLE star_simstudent_actn
```

```
    ADD CONSTRAINT XPKsimStudent_Action PRIMARY KEY NONCLUSTERED  
(simstudent_actn_id ASC)  
go
```

```
CREATE TABLE star_simstudent_simstudent_interact
```

```
(  
    actn_typ_id integer NOT NULL ,  
    reactive_typ_id integer NOT NULL ,  
    reactive_trait_id integer NOT NULL ,  
    characteristic_id integer NOT NULL ,  
    interaction_eff integer NOT NULL  
)
```

)

go

ALTER TABLE star_simstudent_simstudent_interact

ADD CONSTRAINT XPKsimStudent_simStudent_Interaction PRIMARY KEY
NONCLUSTERED (actn_typ_id ASC,reactive_typ_id ASC,reactive_trait_id ASC,characteristic_id
ASC)

go

CREATE TABLE star_socioeconomic_sts

(

socioeconomic_sts_id integer NOT NULL ,

designator varchar(32) NOT NULL ,

descrip varchar(1024) NOT NULL

)

go

ALTER TABLE star_socioeconomic_sts

ADD CONSTRAINT XPKSocioeconomic_Status PRIMARY KEY NONCLUSTERED
(socioeconomic_sts_id ASC)

go

CREATE TABLE star_support_characteristic

(

characteristic_id integer NOT NULL

)

go

ALTER TABLE star_support_characteristic

ADD CONSTRAINT XPKSupport_Characteristic PRIMARY KEY NONCLUSTERED
(characteristic_id ASC)

go

CREATE TABLE star_teacher_actn

```
(
    teacher_actn_id integer NOT NULL ,
    designator varchar(256) NOT NULL ,
    descrip varchar(1024) NOT NULL ,
    actn_typ_id integer NULL
)
go
```

```
ALTER TABLE star_teacher_actn
    ADD CONSTRAINT XPKTeacher_Action PRIMARY KEY NONCLUSTERED
(teacher_actn_id ASC)
go
```

```
CREATE TABLE star_teacher_simstudent_interaction
(
    reactive_typ_id integer NOT NULL ,
    reactive_trait_id integer NOT NULL ,
    characteristic_id integer NOT NULL ,
    teacher_actn_id integer NOT NULL ,
    interaction_eff integer NOT NULL
)
go
```

```
ALTER TABLE star_teacher_simstudent_interaction
    ADD CONSTRAINT XPKTeacher_simStudent_Interaction PRIMARY KEY
NONCLUSTERED (reactive_typ_id ASC,reactive_trait_id ASC,characteristic_id
ASC,teacher_actn_id ASC)
go
```

```
ALTER TABLE star_actn_typ
    ADD CONSTRAINT R_52 FOREIGN KEY (human_need_id) REFERENCES
star_driven_need(human_need_id)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION
```

go

```
ALTER TABLE star_character_prof
    ADD CONSTRAINT R_32 FOREIGN KEY (region_id) REFERENCES
star_region(region_id)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION
```

go

```
ALTER TABLE star_character_prof
    ADD CONSTRAINT R_33 FOREIGN KEY (socioeconomic_sts_id) REFERENCES
star_socioeconomic_sts(socioeconomic_sts_id)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION
```

go

```
ALTER TABLE star_character_reactive_beh_pattern
    ADD CONSTRAINT R_34 FOREIGN KEY (character_prof_id) REFERENCES
star_character_prof(character_prof_id)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION
```

go

```
ALTER TABLE star_character_reactive_beh_pattern
    ADD CONSTRAINT R_35 FOREIGN KEY
(reactive_typ_id,reactive_trait_id,characteristic_id) REFERENCES
star_reactive_beh_pattern(reactive_typ_id,reactive_trait_id,characteristic_id)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION
```

go

```
ALTER TABLE star_characteristic
    ADD CONSTRAINT R_31 FOREIGN KEY (datatype_id) REFERENCES
star_datatype(datatype_id)
    ON DELETE NO ACTION
```

ON UPDATE NO ACTION

go

ALTER TABLE star_mid_rng_fcn_actn

ADD CONSTRAINT R_39 FOREIGN KEY (teacher_actn_id) REFERENCES
star_teacher_actn(teacher_actn_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_mid_rng_fcn_actn

ADD CONSTRAINT R_40 FOREIGN KEY (mid_rng_fcn_id) REFERENCES
star_mid_rng_fcn(mid_rng_fcn_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_moral_lvl_stg

ADD CONSTRAINT R_5 FOREIGN KEY (moral_lvl_id) REFERENCES
star_moral_lvl(moral_lvl_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_moral_lvl_stg

ADD CONSTRAINT R_6 FOREIGN KEY (moral_stg_id) REFERENCES
star_moral_stg(moral_stg_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_moral_stg_motivational_need

ADD CONSTRAINT R_7 FOREIGN KEY (moral_stg_id) REFERENCES
star_moral_stg(moral_stg_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_moral_stg_motivational_need

ADD CONSTRAINT R_8 FOREIGN KEY (motivational_lvl_id) REFERENCES
star_motivational_need(motivational_lvl_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_motivational_need_characterist

ADD CONSTRAINT R_1 FOREIGN KEY (motivational_lvl_id) REFERENCES
star_motivational_need(motivational_lvl_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_motivational_need_characterist

ADD CONSTRAINT R_2 FOREIGN KEY (characteristic_id) REFERENCES
star_characteristic(characteristic_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_reactive_beh_pattern

ADD CONSTRAINT R_16 FOREIGN KEY (reactive_typ_id,reactive_trait_id)
REFERENCES star_reactive_typ_trait(reactive_typ_id,reactive_trait_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_reactive_beh_pattern

ADD CONSTRAINT R_17 FOREIGN KEY (characteristic_id) REFERENCES
star_characteristic(characteristic_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_reactive_beh_pattern_actn

ADD CONSTRAINT R_42 FOREIGN KEY
(reactive_typ_id,reactive_trait_id,characteristic_id) REFERENCES
star_reactive_beh_pattern(reactive_typ_id,reactive_trait_id,characteristic_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_reactive_beh_pattern_actn

ADD CONSTRAINT R_43 FOREIGN KEY (simstudent_actn_id) REFERENCES
star_simstudent_actn(simstudent_actn_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_reactive_typ_trait

ADD CONSTRAINT R_9 FOREIGN KEY (reactive_typ_id) REFERENCES
star_reactive_typ(reactive_typ_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_reactive_typ_trait

ADD CONSTRAINT R_10 FOREIGN KEY (reactive_trait_id) REFERENCES
star_reactive_trait(reactive_trait_id)

ON DELETE NO ACTION

ON UPDATE NO ACTION

go

ALTER TABLE star_simstudent_actn

ADD CONSTRAINT R_48 FOREIGN KEY (actn_typ_id) REFERENCES
star_actn_typ(actn_typ_id)

ON DELETE NO ACTION
ON UPDATE NO ACTION

go

ALTER TABLE star_simstudent_simstudent_interact

ADD CONSTRAINT R_50 FOREIGN KEY (actn_typ_id) REFERENCES
star_actn_typ(actn_typ_id)

ON DELETE NO ACTION
ON UPDATE NO ACTION

go

ALTER TABLE star_simstudent_simstudent_interact

ADD CONSTRAINT R_51 FOREIGN KEY
(reactive_typ_id,reactive_trait_id,characteristic_id) REFERENCES
star_reactive_beh_pattern(reactive_typ_id,reactive_trait_id,characteristic_id)

ON DELETE NO ACTION
ON UPDATE NO ACTION

go

ALTER TABLE star_support_characteristic

ADD CONSTRAINT R_26 FOREIGN KEY (characteristic_id) REFERENCES
star_characteristic(characteristic_id)

ON DELETE NO ACTION
ON UPDATE NO ACTION

go

ALTER TABLE star_support_characteristic

ADD CONSTRAINT R_27 FOREIGN KEY (characteristic_id) REFERENCES
star_characteristic(characteristic_id)

ON DELETE NO ACTION
ON UPDATE NO ACTION

go

ALTER TABLE star_teacher_actn

```
        ADD CONSTRAINT R_49 FOREIGN KEY (actn_typ_id) REFERENCES  
star_actn_typ(actn_typ_id)
```

```
        ON DELETE NO ACTION
```

```
        ON UPDATE NO ACTION
```

```
go
```

```
ALTER TABLE star_teacher_simstudent_interaction
```

```
        ADD CONSTRAINT R_44 FOREIGN KEY  
(reactive_typ_id,reactive_trait_id,characteristic_id) REFERENCES  
star_reactive_beh_pattern(reactive_typ_id,reactive_trait_id,characteristic_id)
```

```
        ON DELETE NO ACTION
```

```
        ON UPDATE NO ACTION
```

```
go
```

```
ALTER TABLE star_teacher_simstudent_interaction
```

```
        ADD CONSTRAINT R_45 FOREIGN KEY (teacher_actn_id) REFERENCES  
star_teacher_actn(teacher_actn_id)
```

```
        ON DELETE NO ACTION
```

```
        ON UPDATE NO ACTION
```

```
go
```

Appendix G

SQL used to insert static records and query the database. See comments for a description of the SQL. Comments have been indented for readability purposes.

INSERT Statements

The follow statements were used to insert the necessary static records into the database from the conceptual data presented earlier in this whitepaper.

```
/*
    Inserts records found in Table 1: Haberman's 14 Mid-Range Functions
    (Descriptions and behaviors will be inserted at a later date once they are retrieved from
    Haberman's book)
*/

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Emotional/Physical
Stamina', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Organizational Ability', '',
'');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('The Nature of Planning', '',
'');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Coaching (You and me
against the material)', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Commitment to Students
with Special Needs', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Interaction with Parents
and Community', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Creating Student
Ownership', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Persistence', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Protecting Students'
Learning', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Putting Theory into
Practice', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Approach to At-Risk
Students', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Professional vs. Personal
Orientation', '', '');
```

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Burnout: The Care and Feeding of the Bureaucracy', '', '');

INSERT INTO star_mid_rng_fcn (designator, descrip, beh) VALUES ('Fallibility', '', '');

/* Inserts records found in Table 2: Dreikurs Driven Needs */

INSERT INTO star_driven_need (designator, descrip) VALUES ('Attention', 'These students have an insatiable need for attention and approval. If they don't receive the attention they crave they become disruptive. Students who are driven by the need for attention may talk out, disrupt, interrupt others and demonstrate creative ways to get attention.');

INSERT INTO star_driven_need (designator, descrip) VALUES ('Power', 'These students fight the teacher for control of the classroom. They dominate their peers and seek to dominate the teacher by moving and keeping the teacher and class off-task.');

INSERT INTO star_driven_need (designator, descrip) VALUES ('Revenge', 'These students feel they have been hurt or damaged by the teacher and seek to get back at her. They do this by fostering non-compliance by the class or doing anything to make the management of the class more difficult.');

INSERT INTO star_driven_need (designator, descrip) VALUES ('Avoidance of Failure', 'These students feign helplessness. They get the teacher to simplify and water down and provide individual help. Their goal is to get out of doing the work or to not be shown up as inadequate.');

/* Inserts level records found in Table 3: Kohlberg's Stages of Moral Development */

INSERT INTO star_moral_lvl (designator) VALUES ('Level 1 (Pre-Conventional)');

INSERT INTO star_moral_lvl (designator) VALUES ('Level 2 (Conventional)');

INSERT INTO star_moral_lvl (designator) VALUES ('Level 3 (Post-Conventional)');

/* Inserts stage records found in Table 3: Kohlberg's Stages of Moral Development */

INSERT INTO star_moral_stg (designator) VALUES ('Obedience and Punishment Orientation');

INSERT INTO star_moral_stg (designator) VALUES ('Individualism and Exchange (Self-interest orientation)');

INSERT INTO star_moral_stg (designator) VALUES ('Interpersonal relationship and conformity');

INSERT INTO star_moral_stg (designator) VALUES ('Authority and social-order maintaining orientation');

INSERT INTO star_moral_stg (designator) VALUES ('Social contract and individual rights');

INSERT INTO star_moral_stg (designator) VALUES ('Universal ethics principles');

/* Inserts level and stage assignments found in Table 3: Kohlberg's Stages of Moral Development */

```

INSERT INTO star_moral_lvl_stg (moral_lvl_id, moral_stg_id) VALUES (1, 1);
INSERT INTO star_moral_lvl_stg (moral_lvl_id, moral_stg_id) VALUES (1, 2);
INSERT INTO star_moral_lvl_stg (moral_lvl_id, moral_stg_id) VALUES (2, 3);
INSERT INTO star_moral_lvl_stg (moral_lvl_id, moral_stg_id) VALUES (2, 4);
INSERT INTO star_moral_lvl_stg (moral_lvl_id, moral_stg_id) VALUES (3, 5);
INSERT INTO star_moral_lvl_stg (moral_lvl_id, moral_stg_id) VALUES (3, 6);

```

```

/* Inserts records found in Figure 2: Maslow's Hierarchy of Needs */
INSERT INTO star_motivational_need (designator) VALUES ('Self-Actualization');
INSERT INTO star_motivational_need (designator) VALUES ('Esteem Needs');
INSERT INTO star_motivational_need (designator) VALUES ('Belonging Needs');
INSERT INTO star_motivational_need (designator) VALUES ('Safety Needs');
INSERT INTO star_motivational_need (designator) VALUES ('Physiological Needs');

```

```

/* Inserts moral stage (Kohlberg) and need level (Maslow) assignments found in Table 5:
Kohlberg-Maslow Parallels */
INSERT INTO star_moral_stg_motivational_need (moral_stg_id, motivational_lvl_id) VALUES
(1, 4);
INSERT INTO star_moral_stg_motivational_need (moral_stg_id, motivational_lvl_id) VALUES
(2, 4);
INSERT INTO star_moral_stg_motivational_need (moral_stg_id, motivational_lvl_id) VALUES
(3, 3);
INSERT INTO star_moral_stg_motivational_need (moral_stg_id, motivational_lvl_id) VALUES
(4, 2);
INSERT INTO star_moral_stg_motivational_need (moral_stg_id, motivational_lvl_id) VALUES
(5, 2);
INSERT INTO star_moral_stg_motivational_need (moral_stg_id, motivational_lvl_id) VALUES
(6, 1);

```

SELECT Statements

The follow statements were used to select the static records inserted to ensure the values were correct and the data was retrieved as expected. This SQL can be used in the future to retrieve static records as needed.

```

/* Get all Haberman's 14 Mid-Range Functions (See Table 1) */

```

```
SELECT * FROM star_mid_rng_fcn;
```

```
/* Get all Dreikurs' Theory of Logical Consequences driving needs (See Table 2) */  
SELECT * FROM star_driven_need;
```

```
/* Get all Kohlberg's Stages of Moral Development levels (See Table 3) */  
SELECT * FROM star_moral_lvl;
```

```
/* Get all Kohlberg's Stages of Moral Development stages (See Table 3) */  
SELECT * FROM star_moral_stg;
```

```
/* Get all Kohlberg's Stages of Moral Development mapped keys (See Table 3) */  
SELECT * FROM star_moral_lvl_stg;
```

```
/* Get all Kohlberg's Stages of Moral Development mapped level and stage descriptors  
(See Table 3) */  
SELECT star_moral_lvl.designator, star_moral_stg.designator  
FROM star_moral_lvl, star_moral_stg, star_moral_lvl_stg  
WHERE star_moral_lvl.moral_lvl_id = star_moral_lvl_stg.moral_lvl_id  
AND star_moral_stg.moral_stg_id = star_moral_lvl_stg.moral_stg_id;
```

```
/* Get all Maslow's Hierarchy of Needs (See Figure 2) */  
SELECT * FROM star_motivational_need;
```

```
/* Get all Kohlberg-Maslow mapped keys (See Table 5) */  
SELECT * FROM star_moral_stg_motivational_need;
```

```
/* Get all Kohlberg-Maslow descriptors (See Table 5)*/  
SELECT star_moral_stg.designator, star_motivational_need.designator  
FROM star_motivational_need, star_moral_stg, star_moral_stg_motivational_need  
WHERE star_motivational_need.motivational_lvl_id =  
star_moral_stg_motivational_need.motivational_lvl_id  
AND star_moral_stg.moral_stg_id = star_moral_stg_motivational_need.moral_stg_id;
```

```
/* Get all Kohlberg-Maslow descriptors (See Table 5)*/  
SELECT star_moral_stg.designator, star_motivational_need.designator  
FROM star_motivational_need, star_moral_stg, star_moral_stg_motivational_need  
WHERE star_motivational_need.motivational_lvl_id =  
star_moral_stg_motivational_need.motivational_lvl_id  
AND star_moral_stg.moral_stg_id = star_moral_stg_motivational_need.moral_stg_id;
```