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FOREWORD – Dr. Adam Hartley, Superintendent of Schools, Fenton, Michigan

Benjamin Franklin is often quoted to have said, “Tell me and I forget. Teach me and I remember. Involve me and I learn.” Student involvement is often forgotten in K-12 schools, giving way to the traditional classroom settings we have known for years. While the traditional setting continues to provide the education many of our students succeed in, more and more young men and women within our schools are researching alternative or innovative learning opportunities. These new, engaging opportunities look different, feel different and ultimately lead to better outcomes. It is the last part of this quote that I believe every child should experience in their K-12 career. When a student is involved in their learning, and not being a passive participant, this leads to ownership and ownership leads to true to learning.

As Superintendent of Schools, I experience the gravitational pull of the status quo each and every day. New ideas are tried, new technology arrives, and teachers battle through yet another change to curriculum, instructional practices and assessments. Time and energy are often lost on tweaks to traditional mindsets and we are brought back to where we were a decade ago, eventually giving way to telling and teaching, not involving. Odysseyware has helped us fight the gravitational pull of the status quo and is a viable partner in finding ways to involve our students, giving them ownership in their learning.

GEARup Academy, “The School that Works,” is our alternative high school located in the heart of Flint, Michigan. When visiting GEARup Academy, you will see students interacting online with their teachers, collaborating with their classmates on a social improvement project, or researching solutions to real problems within their neighborhoods. With the help of Odysseyware, there is no room for traditional. Odysseyware has provided us with an array of opportunities to teach the whole learner. Our GEARup Academy, our hybrid classroom settings, and our initiative to tackle social and emotional issues through Odysseyware’s partnership with BASE Education, are just a few examples of why we continue to work with Odysseyware in creating learning environments that involve students.
INTRODUCTION

Educators are faced with managing many complexities in their profession. On any given day, a teacher makes over a thousand decisions directly related to teaching and learning (Stephens, 2011). Teachers are expected to meet the unique needs of every student while keeping pace with curriculum expectations, creating healthy and safe learning environments, and managing the many tasks and duties associated with the job. Meeting all these needs can be challenging. As your trusted partner in education, Odysseyware’s goal is to collaborate with educators like you as we transform education together.

Odysseyware is the powerful combination of rigorous, engaging, standards-based content and technology designed to deliver, manage, and monitor each student’s learning experience. Our content is robust enough to serve the initial credit needs of accredited virtual academies or on-site traditional credit, structured enough to help fill credit recovery needs nationwide, and flexible enough to serve in both course and supplemental contexts. We focus on ease of use and efficiency for educators without compromising excellence. Our content is recognized for its consistent quality and rigor, having been adopted by many states and meeting both Quality Matters (2016) and the International Association for K12 Online Learning (iNACOL, 2011) standards. This paper explores the instructional design that informs that content and the research underlying it.

This research paper also considers the diverse needs of the whole learner, in the context of the Every Student Succeeds Act (2015) or ESSA. ESSA calls for a well-rounded curriculum for all learners; whereas ESEA, previously re-authorized in 2002 as the No Child Left Behind or NCLB, focused on mathematics and reading only. This was a welcomed change, broadening opportunities and “putting music and the arts alongside reading and math” (Darrow, 2016, p. 43). Well-rounded curriculum goes beyond the core, expands offerings to learners, and considers health, fitness, and social emotional learning. Odysseyware offers hundreds of courses to meet the needs of the whole learner. Our teaching technology uses an instructional design which develops content that may be leveraged by educators and delivered to learners in the many ways schools may need to implement programs. This may include implementation models for virtual schools, summer school, blended learning environments, intervention programs, accelerated learning, alternative settings, or other programs and models. Educators may leverage standards-aligned curriculum as full courses (Odysseyware Courses), supplemental content (Odysseyware ClassPace), diagnostic learning paths (Odysseyware Individual Learning Paths), prescriptive pathways (Odysseyware SPARK), and even through learning tools interoperability (such as Canvas, Schoology, or Blackboard).

Finally, in our commitment to educators like you, it is our goal to share our instructional design to provide full transparency into why we do what we do, making us the leader in teaching technology. With this research paper we invite you to learn about our collaborative development of content that, when supported with sound strategies and instructional practices, works in education. This research-driven and evidence-based paper provides you with real-life examples of how our teaching technology leads to results, making a difference for teachers and learners. We do not aim to be known; We aim to be known for making a difference; making a difference together as your partner in education.
THE ODYSSEYWARE INSTRUCTIONAL DESIGN FRAMEWORK FOR LEARNING

Odysseyware is a leader in creating high-quality curriculum that provides a consistent learning experience through systematically organized standards-aligned content that is easily managed to differentiate for each learner. Teams of highly-qualified educators developed our instructional design framework, which we call the Odysseyware Instructional Design Framework for Learning (herein, Odysseyware Framework). Our framework embraces both seminal and current research proven to work in education. The Odysseyware Framework incorporates research which considers that different learners need various amounts of time to acquire knowledge (Guskey & Jung, 2011). These various amounts of time are guided by teacher decision-making, another important part of our framework. The design is also driven by a research-base which evidences how students learn, and whose practices lead students to secure those learning objectives. The framework (shown in Figure 1) elevates four areas of emphasis: systematic organization, backward design, and explicit instruction while leveraging technologies and resources for multimodal engagement.

Figure 1 – Odysseyware Instructional Design Framework for Learning

A predictable, structured experience with clear learning objectives, and practice informed by timely feedback promotes perseverance, learning, and the transfer of knowledge, resulting in securing that knowledge (learning).

Working backward from standards-driven goals and summative assessments to content and instruction, supported by frequent formative assessments with feedback, helps to keep students on-track toward meeting intended learning objectives.

Proven principles that help students acquire, apply, and transfer knowledge and skills. This instruction uses structured, systematic, and effective methodologies which lead to student learning outcomes.

Using multiple media types and representations in instruction reinforces ideas, provides for effective modeling of concepts, caters to multiple learning styles, and promotes engagement.
Systematic Organization

The Odysseyware Framework emphasizes systematic organization at the level of both the course and content (individual assignments or lessons that can serve as both courseware and independent resources) to promote a consistent learning experience for students. The structure helps students master skills and concepts by moving them through cycles of instruction, practice, assessment, and feedback. Figure 2 shows this for both course and content levels.

Figure 2 – The Odysseyware Framework, Systematic Organization of Content

<table>
<thead>
<tr>
<th>Courses</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Courses or each course contains a sequence of modular units to build continuous learning and skills from one unit to the next.</td>
<td>▪ Each lesson contains a predictable sequence of elements including introduction/anticipatory set, objective(s), vocabulary, instruction, guided practice, independent practice, review and closure.</td>
</tr>
<tr>
<td>▪ Each course culminates in a summative assessment (at the semester and course levels).</td>
<td></td>
</tr>
<tr>
<td>▪ Each unit includes an optional pretest that can be used to support a mastery approach.</td>
<td></td>
</tr>
<tr>
<td>▪ Each unit contains multiple groups of related assignments (Lessons, Projects) designed to build learning and skills from one assignment to the next.</td>
<td></td>
</tr>
<tr>
<td>▪ Each group of assignments culminates in a quiz strategically placed in the assignment sequence to offer formative assessment and provide feedback related to key skills and concepts.</td>
<td></td>
</tr>
<tr>
<td>▪ Each unit culminates with an assessment that is summative for the unit and formative for the larger course. These assessments can be used to determine readiness for subsequent units and whether reteaching within a unit is required. Capstone projects are included as an additional or alternative summative assessment option (in select units).</td>
<td></td>
</tr>
</tbody>
</table>

As Figure 2 presents, Odysseyware’s Instructional Design Framework for Learning provides students with a systematically organized opportunity to secure learning objectives at the level of the course, unit, and assignment and to progress further, transferring knowledge, as learning continues. While our framework is our own, it is informed by the rich history of educational research, much of which focuses on how students learn as they progress to secure knowledge. Our framework also considers research in mastery learning, of which significant contributions come from the work of educational psychologists Benjamin Bloom and Madeline Hunter. Primarily, Odysseyware draws upon the cognitive processes of learning researched by Bloom, the lesson components developed by Hunter, and systematic organization which both researchers promoted.

Much of the systematic organization of Odysseyware content is rooted in the work of Bloom. In the 1960s Bloom (1968) theorized that instruction should be systematic with clear learning objectives. Bloom used traditional organization of curriculum broken into units (a mainstay in education today) with checks for understanding as the learner progressed, adding feedback and correction, therefore introducing (formative) assessment as part of the instructional process to determine progress toward the end goal or summative assessment (Guskey & Jung, 2011). These elements are part of what he called the “Learning for Mastery Model” or later the “Mastery Model” (Adams, 2015; Bloom, 1971). Odysseyware’s use of this structure allows us to offer courses that provide the flexibility, modularity, and approach to formative/summative assessment expected in mastery learning programs.
At the lesson-level, the Odysseyware Framework also leverages much of the “Madeline Hunter Model of Mastery Learning,” which features critical instructional elements that also use a similar cycle of instruction, practice, and feedback tied to clear learning objectives. We will further explain these elements in the section on explicit instruction. Expanding on the work of Bloom (1978, 1974, 1973, 1971, 1968, 1956) and Hunter (1988a, 1988b, 1988c, 1987, 1986, 1985, 1979, 1976; Hunter & Barker, 1987; Stallings, 1985), many more contributions were made to cognitive processes of learning and mastery learning, several of which are also leveraged in the Odysseyware Framework as shown in Table 1, and new research continues every day.

Table 1 – Expansion of Seminal Work of Bloom and Hunter

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Contribution</th>
<th>Expansion Research</th>
</tr>
</thead>
</table>
| **Paul Black & Dylan Wiliam** (King’s College London) | Assessment and Classroom Learning (1998a)  
Inside the Black Box: Raising standards through classroom assessment (1998b) | Brought global awareness to the need for formative assessment. |
| **Douglas Fisher & Nancy Frey** (San Diego State University) | Book – *Guided Instruction: How to Develop Confident and Successful Learners* (2010)  
Book – *Checking for Understanding* (2007) | Built upon Hunter’s lesson elements, expanding the **gradual release of responsibility** theory (originally coined by Pearson & Gallagher, 1983) |
Book – *The Art and Science of Teaching* (2007) | Reinforced Hunter’s essential **elements of instruction** with credit to her as the seminal researcher. |
| **Jay McTighe** (MD State Department of Ed.)  

Within the Odysseyware Framework, therefore, systematic organization is the means by which all content is organized across the Odysseyware platform and in which structural aspects of Bloom’s and Hunter’s work are applied as courses are broken into units, units are broken into lessons, and lessons consistently include critical elements of explicit instruction. The systematic organization within the framework applies general logic rules so that learners have a predictable, structured experience with clear objectives, regular practice, and timely feedback.
The Odysseyware Framework features Backward Design, a methodology built on the premise that when designing content, working backward from standards-driven learning goals and summative assessments, to content and instruction supported by frequent formative assessments with feedback helps keep students on track toward meeting intended objectives.

Design of our curriculum for each subject area begins with what students are expected to learn in the subject or content area. How do we determine what students should learn? We draw upon standards of learning. Academic content standards for “what students should learn” are determined by each state as they develop their common curriculum expectations or “state standards.” Standards serve as the critical link between our content and the requirements of the states that use it. Standards-based curriculum has been found to have statistically significant positive effect on students’ standardized assessments, as compared to traditional curriculum (Riordan, Noyce, & Pendred, 2001; Stirling, Bitter, & Skiera, 2014). Research evidences that standards-based curricula benefit learners (Fuson, Carroll, & Drueck, 2000; McCaffrey et al., 2008; Reys, Reys, Lapan, Holliday, & Wasma, 2003; Stirling, Bitter, & Skiera, 2014). Standards are identified in our product and curriculum development specification documents to make sure that our content supports the classroom teacher in helping students meet state education requirements.

Odysseyware development teams apply Backward Design first by unpacking those standards to start planning each course, unit, and lesson. Standards are then organized within the course, unit, and lesson levels. Each standard is mapped to one or more learning objectives, which roll-up to the standard as viewed in Table 2. Much of this process follows the steps of Backward Design articulated by McTighe and Wiggins (2005), including identifying desired results, determining acceptable evidence, and planning learning experiences and instruction. Afterward, an instructional design plan is written, and we begin planning the learner journey.

Table 2 – Odysseyware Framework Standards Alignment Example

<table>
<thead>
<tr>
<th>Curriculum Content</th>
<th>Standards Mapping</th>
<th>Subject Area</th>
<th>Standards Roll-Up in Backward Design (Example State of Minnesota)</th>
</tr>
</thead>
</table>
| Lesson             | Learning Objective(s) identified with a Parent Standard | Area of Circles | Lesson Objective: Calculate the Area of a Circle  
7.2.1.1 Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is Pi. Calculate the circumference and area of circles and sectors of circles to solve problems in various contexts. |
| Unit               | Parent Standard(s) mapped to Lessons | Proportional Relationships | 7.3.1 Use reasoning with proportions and ratios to determine measurements, justify formulas and solve real-world and mathematical problems involving circles and related geometric figures. |
| Course             | Set of subject area Content Standards | Grade 7 Math | 7.3 Geometry & Measurement  
Grade 7 Mathematics Standards for State of Minnesota |

The Backward Design also elevates the essentials. These essentials are “what we teach” (learning objectives) and “how we teach” (instructional design), and these are written in-detail as care is given to preparing each instructional design plan. Research
supports the elevation of learning objectives and instructional design. A broad range of literature concurs that the focus must be on these essentials (Alonso, Lopez, Manrique, & Vines, 2008; Faulconer, 2017; Hauer & Quill, 2011; Raiser, Schneider, & Warkalla, 2015; Schmoker, 2011; Schmoker & Marzano, 1999). Thus, organization of our learning objectives is driven by state standards (what we teach) and consistent instructional design (how we teach).

Explicit Instruction

Another fundamental element of the Odysseyware Framework is the use of Explicit Instruction in our lessons – proven principles that help students acquire, apply, and transfer knowledge and skills. As stated above, our framework employs the elements of instruction systematized by Hunter and expanded upon by later researchers.

Hunter’s work focused on developing a simple plan for student learning through identifying components of a lesson. This became known as the “Madeline Hunter Model of Mastery Learning” (Stallings, 1985; Wolfe, 1987). She pioneered many of the education terms still used today: anticipatory set, objective/purpose, modeling, checking for understanding, guided practice, independent practice, and closure. Our design leverages Hunter’s elements of a lesson, beginning with what students will learn (standards-aligned learning objectives), engaging the learner through the journey using a gradual release of responsibility, and ending with closure and assessment. Once demonstrating learning, students’ progress further in curriculum, such as transitioning to the next lesson or unit, transferring their knowledge to learn new skills. This will be further articulated later in this research paper with the research-base of the Elements of a Lesson and the demonstration of the Learner’s Journey.

The Odysseyware Framework embraces Explicit Instruction because research shows it is the most effective instructional method. In fact, the word “research” is included in the actual definition of Explicit Instruction:

A group of research-supported instructional behaviors used to design and deliver instruction that provides needed supports for successful learning through clarity of language and purpose, and reduction of cognitive load. It promotes active student engagement by requiring frequent and varied responses followed by appropriate affirmative and corrective feedback, and assists long-term retention through use of purposeful practice strategies (Hughes, Morris, Therrien, & Benson, 2017, p. 144).

While no “one method” works for all learners, Explicit Instruction is shown to work best for most learners. Study after study finds Explicit Instruction leads to higher student achievement (Cronbach & Snow, 1977; Kay, 2013; Kirschner, Sweller, & Park, 2006; Mayer 2004; Sweller, 2003). Mastery learning, as a systematic and explicit delivery-method, is also widely preferred over traditional methods. When comparing traditional instruction to well-designed mastery learning, classroom students consistently have a higher level of achievement (Anderson, 1994; Guskey & Jung, 2011; Guskey & Pigott, 1988; Kulik, Kulik, & Bangert-Drowns, 1990).

Another advantage of Explicit Instruction is the important emphasis on the teacher as decision-maker. Explicit Instruction provides teachers with opportunities to make informed decisions based on data collected during checks for understanding, then engage in corrective feedback. Another definition of Explicit Instruction expands on the teacher as the determinant of delivery procedures, “a structured, systematic, and effective methodology for teaching academic skills. It is called explicit because it is an unambiguous and direct approach to teaching that includes both instructional design and delivery procedures” (Archer & Hughes, 2011, p. 1). The teacher plays an important role as decision-maker and is in-fact a primary component of the learning as agreed upon by both Hunter and Bloom. Hunter (1988b, 1985, 1979) herself wrote that her theory is “based on the premise that the teacher is a decision-maker” (1985, p. 57).
Explicit Instruction is often used interchangeably with “direct instruction.” Direct instruction has a more “scripted” structure. When considering the two methods, they have more in common than they do different. In fact, recent research on the history and context of Explicit Instruction has cited that direct instruction was a predecessor of Explicit Instruction (Hughes, Morris, Therrien, & Benson, 2017). Since the systematic nature of both models of instruction is the cornerstone of each, this research paper considers and cites research on both.

**Multimodal Engagement**

The Odysseyware Framework builds on its Explicit Instruction by using a multimodal approach on the premise that using multiple media types and representations in instruction reinforces ideas, provides for effective modeling of concepts, caters to multiple learning styles, and promotes engagement. Through Multimodal Engagement, teachers and students have the opportunity to further experience learning using technology enhancements. Multimodality in the simplest form is a theory of communication. We apply multimodality in the context of communicating the learning objective, using a variety of engaging media, during the learner journey. Our design supports each learner’s meaning-making through consideration of mode and medium of engagement. Our dynamic learning media library includes virtual experiences, math-specific tools, short-clips, images, audio and other modes of engagement, all further listed in Table 3.

**Table 3 – Odysseyware Dynamic Learning Media**

<table>
<thead>
<tr>
<th>Medium</th>
<th>Mode of Learner Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Experience</td>
<td>360° Virtual Experience (immersing in and controlling the environment)</td>
</tr>
<tr>
<td></td>
<td>Virtual Fieldtrip (exploring a destination through a fixed tour)</td>
</tr>
<tr>
<td></td>
<td>Simulations</td>
</tr>
<tr>
<td></td>
<td>Virtual Lab Experiment (incorporating scientific inquiry)</td>
</tr>
<tr>
<td>Math-Specific</td>
<td>Equation builder</td>
</tr>
<tr>
<td></td>
<td>Graph plotter</td>
</tr>
<tr>
<td></td>
<td>Interactive Protractor</td>
</tr>
<tr>
<td>Gamification</td>
<td>Matching Problem and Solution</td>
</tr>
<tr>
<td></td>
<td>Categorizing</td>
</tr>
<tr>
<td></td>
<td>Solving for Problems</td>
</tr>
<tr>
<td></td>
<td>Selecting Correct Answer</td>
</tr>
<tr>
<td></td>
<td>Constructing Meaning</td>
</tr>
<tr>
<td></td>
<td>Sequencing Content</td>
</tr>
<tr>
<td>Short-Clips</td>
<td>Watching Instruction (explicit/direct instruction media on a single topic)</td>
</tr>
<tr>
<td></td>
<td>Viewing Animation (animated video or motion graphics)</td>
</tr>
<tr>
<td>Other</td>
<td>Listening to Text</td>
</tr>
<tr>
<td></td>
<td>Reading Text</td>
</tr>
<tr>
<td></td>
<td>Tracking Text Read Aloud</td>
</tr>
<tr>
<td></td>
<td>Referencing Transcript</td>
</tr>
<tr>
<td></td>
<td>Receiving Feedback</td>
</tr>
<tr>
<td></td>
<td>Reviewing Correct Model Feedback (checking work against correct model)</td>
</tr>
<tr>
<td></td>
<td>Listening to Audio</td>
</tr>
<tr>
<td></td>
<td>Creating a Word Web</td>
</tr>
</tbody>
</table>

As the instructional design team plans content development, decisions are made about which multimodal approach will be used for the mode and medium, and this is then written into the instructional design plan. “A mode is a socially and culturally shaped..."
resource for making meaning” (Bezemer & Kress, 2008, p. 171). This can be put in further context by thinking about how modes that represented curricular content existed historically and changed over time. For example, a textbook in the early 1900s had lots of text and few pictures. Today Odysseyware’s modern digital curriculum includes Multimodal Engagement such as audio, media clips, text-to-speech, virtual experiences, graphics, games, and much more. Society and culture are very different from the early 1900s, which impacts media development for today’s learners. Today content can be created using many different types of modes: image, layout, virtual fieldtrip, moving image, audio, color, simulation, virtual reality, icon and other modes.

Different modes are used for a learner to make meaning of the learning objective. Meaning is made through engaging the learner in multiple modes, not just one. Presenting content in a variety of modes has been shown to support learners to be more flexible in approaches to their own learning (Hazari, 2004). Students also experience deeper learning when a combination of media are used as opposed to words alone (Mayer, 2003). The mode is materialized through a medium. A medium “is the substance in and through which meaning is instantiated/realized and through which meaning becomes available to others” (Bezemer & Kress, 2008, p. 171). For example, in the arts this includes tempura on wood or ink on silk. In considering paper with print, the print is the medium and extends to the book as a medium, or together they are media.

Primary design questions our team asks during content development is, “Which mode, in social and cultural context, will be most effective to engage the learner to make meaning of the learning objective?” After the mode, which medium will then support making meaning of that objective?” Odysseyware features a variety of multimodal content as listed in Table 3 and demonstrated in Figures 3 through 6. In addition to multimodal content learners are able to “self-serve” through media engagement using instructional supports including a translation tool, text-to-speech audio, student notes, message tool, vocabulary reference, and video transcript.

**Figure 3 – Elementary Mathematics, Number Patterns and Relationships**

- **Medium:** Short-Clip
- **Mode:** Explicit/Direct Instruction
- **Learning Objective:** Use numbers in a table to represent real-life situations.

<table>
<thead>
<tr>
<th>Number of Days</th>
<th>Number of Tickets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>35</td>
</tr>
</tbody>
</table>

**Figure 4 – Elementary Science, You Grow and Change**

- **Medium:** Virtual Lab Experiment
- **Mode:** Instructional lab video guides students on how to perform their own hands-on experiment
- **Learning Objective:** Determine why chewing and stomach acids are important to digestion.
The variety of Multimodal Engagement media across Odysseyware allows learners to make sense, make meaning, and make connections; all of which lead to achieving learning objectives.

THE ODYSSEYWARE FRAMEWORK – Elements of a Lesson

In this section we will further explore the elements of lesson design in the Odysseyware Framework and the research supporting each. Lesson design applies the evidence-base of the Odysseyware Framework through implementing the most effective and well-researched practices, elevating systematic organization, explicit instruction, backward design, and multimodal engagement. Instructional designers leverage the gradual release of responsibility model, emphasizing the development of logical learning paths that initially present learners with big picture concepts and rich background knowledge. The Odysseyware Framework is then designed to systemically drill down to more granular, essential, and supporting standards with generous opportunities for practice, deeper learning, and mastery of learning objectives. Keep in mind that the Odysseyware Framework is not intended to be a linear progression. The educator as decision-maker plays a critical role, determining when re-teaching, intervention, additional practice, or other instructional decisions should occur.

As stated earlier, our framework employs the elements of Explicit Instruction systematized by Hunter and expanded upon by later researchers. The elements listed in Table 4 have been identified and credited to educational researchers over time and published in *Explicit Instruction: Effective and Efficient Teaching* (Archer & Hughes, 2010). Odysseyware instructional designers, writers, and subject matter experts use these elements of Explicit Instruction where applicable, taking into account that the teacher, as decision-maker, is the most significant element of the Odysseyware Framework.

All the components of our lessons, therefore, are aspects of Explicit Instruction. Hunter’s elements are subsumed under this larger model. The colored cells in Table 4 highlight the overlap of core elements of Hunter within overarching strategies of Explicit Instruction identified in the research.
Table 4 – Elements of Explicit Instruction (Archer & Hughes, 2010, p. 2-3)

| 1. Focus instruction on critical content. | 5. Begin lessons with a clear statement of the goal and expectations. | 9. Provide an adequate range of examples and non-examples. | 13. Provide immediate affirmative and corrective feedback. |

We will now examine the elements of a lesson beginning with anticipatory set, learning objective, vocabulary, and lesson instruction. We will then transition into guided practice, leading to independent practice, and ending with review and closure. Then, this research paper will walkthrough a lesson from the perspective of the learner in The Learner’s Journey – A Lesson Walkthrough.

**Anticipatory Set**
The anticipatory set establishes the stage for the topic by presenting its relevance in an engaging way. Often, this includes a review of prior skills and background knowledge and facilitates a transfer of knowledge through linking the new skill(s) with secured skills (Archer & Hughes, 2010). The set is designed to get the student involved in an activity that is part of the lesson.

**Learning Objective**
Each lesson has clearly defined, measurable academic goals, with a statement to students about what they are expected to learn. The framework elevates the importance of the learning objective, as the body of research strongly emphasizes this as a critical component, which must be well-designed and clearly communicated with the learner (Eberly Center for Teaching Excellence 2015; Mager, 1997; Marzano 2009). As the lesson progresses, instructional designers use Multimodal Engagement to facilitate meaningful interaction between learner and objective.

**Academic Vocabulary**
Each lesson introduces academic vocabulary to the learner. This includes a vocabulary section with emphasis on the key terms with definitions, supported by activities (games, matching exercises, etc.). Vocabulary is also reviewed and emphasized throughout the lesson. This instruction is important because research in vocabulary has repeatedly shown that there is a strong relationship between vocabulary and these three things: 1) the ability to comprehend new information (Chall, 1958), 2) intelligence (Davis, F.B., 1944; Spearitt, 1972; Thorndike & Lorge, 1943), and 3) socioeconomic status (Sticht, Hofstetter, & Hofstetter, 1997). For low-achieving learners, focusing on vocabulary instruction as a method of intervention has proved to be one of the most effective strategies (Becker, 1977). Furthermore, the Explicit Instruction used to deliver academic vocabulary for all learners is found to be effective in increasing student achievement (Stahl & Fairbanks, 1986).
Lesson Instruction
Lesson instruction focuses on delivering the academic content students must know and apply to meet their learning objectives. In addition to organizing lessons around the Hunter elements, Odysseyware instructional designers, writers, and subject matter experts carefully sequence instruction, break it into manageable chunks, use clear language and informative headings, models, demonstrations, passages, examples/nonexamples, and other scaffolding strategies as shown in Table 4.

Guided Practice
Students are then provided with low-stakes (ungraded) opportunities to practice while receiving feedback. This approach allows the learner to interact with the content, which increases meaningful student interaction with the learning objective (Faulconer, 2017). Guided practice is often completed using game-play and other gamified media to allow for attempts and rework as students progress through the concepts of the lesson. Within guided practice both scaffolding and feedback occur.

Independent Practice
Once students have worked through lesson instruction and guided practice, they work through a variety of auto- and manually graded problems (multiple choice, matching, short answer, essay, etc.) designed to hold students accountable and assess progress toward meeting lesson objectives. Problem feedback aids both teacher and student in identifying areas where reteaching/review may be required.

Research tells us that mastering a skill requires practice. Students need to be exposed to practicing a learning objective many times. A learner will require more time to practice when the new skill is introduced with decreasing time required as practice progresses; described as “fine tuning,” noting that speed and accuracy increase over time (Marzano, Gaddy, & Dean, 2000). For this reason, students can return to earlier components of the lesson for re-teaching or review.

(Note: Depending on scope, some Odysseyware lessons use multiple cycles of instruction, guided practice, and independent practice.)

Review and Closure
Closure occurs in earlier elements of the lesson when content is summarized or reviewed; however, final and more-formal closure reinforces the predictable organization of each lesson; students know what to expect when they use Odysseyware. Through review and closure the most important information is summarized and students are reminded of what skills and concepts they have attained. Lesson closure supports the learner’s ability to organize and store information (Reese, 2014). At lesson closure, the learning objective is often the last thing the student will see before exiting the lesson.

THE LEARNER’S JOURNEY – A Lesson Walkthrough
We will now go inside a lesson to identify its elements in action. This example, including Figures 7 through 21, represents the anticipatory set, learning objective, vocabulary, explicit instruction, guided practice, independent practice, and review and closure for a Grade 7 Mathematics lesson on area of circles. Within these elements of a lesson many best practices and educational measurements are applied during instructional design. Some of these practices and measurements are obvious such as transfer of knowledge or word count, where others are not, such as metacognition, readability, or pacing. For this reason, “The Learner’s Journey – A Lesson Walkthrough” highlights some best practices and measurements and a separate section of this research paper “Wrapping the Learner Journey in Educational Research” examines the research more deeply.
Lesson Element - Anticipatory Set
The setting of the stage, or anticipatory set, is shown in Figure 7. The stage is set as the learner is presented with a real-life problem: Fido the dog has a 20 ft. leash in the backyard, but his owner Carter is concerned that is not enough space for him. The Fido-problem is designed to get the learner involved in the activity of solving for Carter’s dilemma.

Figure 7 – Setting the Stage

Lesson Element - Learning Objective
After the anticipatory set, the learner scrolls down to reveal what we know to be most-important; “what we teach” or the learning objective is presented to the learner, as shown in Figure 8. The start of each lesson clearly states the learning objective or objectives. Here the objective is to “calculate the area of a circle.” Objectives are presented with a “target” icon.

Figure 8 – Clearly Stated Learning Objective

Lesson Element – Academic Vocabulary
Following the lesson objective(s) are key academic and domain-specific vocabulary for the lesson, viewed here in Figure 9. Vocabulary words are easily identifiable and accessible. The first instance of vocabulary is indicated by an “open book” icon and includes words, definitions, and audio support.
Vocabulary is emphasized and reinforced throughout the lesson. In addition to the words, definitions, and audio, a variety of support options such as games or matching exercises (Figure 10) provide the student opportunity to pause, study, and reflect on each vocabulary term and the definition. As the learner proceeds to the lesson instruction, the vocabulary terms are often highlighted and defined again in context.

Lesson Element – Instruction

Having worked through the lesson preliminaries that set the stage at the start of the lesson, the learner now proceeds to the lesson instruction in the net section and following. In “Area of Circles” the learner engages in and listens to a short-clip of instructional media for two minutes and twenty-three seconds, with optional closed captioning available. The learner may stop, go back, replay, or pause the media if desired. The learner may also view a transcript of the instruction. Figure 11 previews the start of the short media clip for this instruction.
In Figures 12 through 15 we see that the short-clip “Area of Circles” is like a mini-lesson embedded in the larger sequence of instruction. In Figure 12 we see an on-set instructor presenting information and accessing background knowledge by referencing prior learning of area of a triangle. This action also supports the transfer of knowledge, which occurs between Figure 12 and 13.

In Figure 12 the instructor cites the problem-- a circle does not have base or height like a triangle or rectangle--and poses the solution by introducing the formula to solve for the area of a circle, pi times the radius squared. After this, Figures 13 and 14 walkthrough some (not all) of the components of the explicit instruction.

**Figure 12 – Access Background Knowledge**
The teacher continues by presenting many real-life problems and solutions for the area of a circle and engages the learner in solving problems together. Figure 14 shows the example of a problem-to-solve-for, in which a farmer is using center-pivot farm irrigation.

Using Explicit Instruction, the teacher then personalizes an example (Figure 15) to solve for when the learner’s family orders pizza. The costs are $9.50 for a 9” pizza and $19.00 for an 18” pizza. One family member argues that it works out the same since two nine-inch pizzas are the same as an 18-inch pizza. Is he right? The problem is presented step-by-step and solved.
After the learner is presented with the short-clip on how to determine the area of circles, the Fido problem introduced in the anticipatory set is repeated and then visually reinforced and rearticulate with a six-second view of Fido walking in a circle (Figure 16).

The learner is taken through the Fido-the-dog solution step-by-step and then provided several more problem and solution examples which are solved step-by-step.

**Scaffolding**

Throughout the instruction, scaffolding occurs to provide support for learners. For example, in the area-of-a-circle examples, as steps are presented the learner is provided with guidance and feedback through call-outs such as “Be Careful” (Figure 17), designed to support the learner and overcome misconceptions.
Scaffolding may take many other forms as well, making use of the strategies of explicit instruction listed in Table 4. For example, in the Area of Circles lesson, the lesson is broken into multiple sections, using clear headers and labels. Vocabulary is supported with audio and activities. Instruction and skills are sequenced so that they build on each other. The lesson includes multiple demonstrations, shows multi-step processes in manageable stages, uses call-outs and cues such as “This might help!” (Figure 18), and more. Additionally, students can control their pace as they work through lesson content, whether revisiting previous sections, replaying a video, or using learning management system features like text-to-speech, note-taking tools, and more. Scaffolding provides needed support so that students are able to make connections between what they know and the instructional goal they are working toward (Rosenshine, 1997).

Lesson Element - Guided Practice
Following the lesson instruction, the student is provided with low-stakes (ungraded) opportunities to practice while receiving feedback. This also allows the learner to interact with the content, which increases meaningful student interaction with the learning objective (Faulconer, 2017). Guided practice is often completed using game-play and other gamified media to allow for attempts and rework as students progress through the concepts of the lesson. Within guided practice both scaffolding and feedback occur.

In the “Area of Circles” lesson, the learner engages in ungraded practice by playing an interactive game of “Concentration,” (Figure 18) solving for area of circle problems then matching a given radius of a circle to the area solution. Matching is shown to be a learning activity which provides opportunity for students to have meaningful engagement with the learning objective (Faulconer, 2017).
Lesson Element - Independent Practice

After learning that Fido’s yard leash is long enough, engaging in more step-by-step problem solving, and practicing through game play, the learner is presented with a set of graded problems to demonstrate level of ability to meet the objective independently. Both the learner and teacher can view the correct/incorrect responses. In this lesson, the learner is presented with 12 questions, 2 of which are shown (Figures 19 and 20). These items target the learning objective and illustrate the transition from simpler to more complex as the learner is expected to shift from making straightforward calculations to applying the skill in a real-life situation (Figure 20). Each assessment item is also developed using the WebbAlign® Depth of Knowledge Framework.

**Figure 19 – Independent Practice Area of a Circle**

**Question #6**

*Multiple Choice*

A quarter has a diameter of approximately 24 millimeters. What is the area of the quarter? *Approximate \( \pi \) as 3.14.

- 452.15 mm\(^2\)
- 75.36 mm\(^2\)
- 1,808.64 mm\(^2\)
- 150.72 mm\(^2\)

**Figure 20 – Independent Practice Area of a Circle**

**Question #12**

*Math Essay*

A homeowner is building a circular fire pit in his backyard. He plans to outline the pit with bricks and cover the space inside the pit with sand. The homeowner has decided to build the pit with a diameter of 3 feet.

1. In order to know how many bricks to buy, the homeowner must know the distance around the outside of the pit. Calculate both the exact distance and the approximate distance.

2. In order to know how much sand to buy, the homeowner must know how much space needs to be covered inside the pit. Calculate both the exact area and the approximate area.

**Feedback**

Feedback is provided to learners in both guided practice and independent practice. This immediate and continual feedback throughout the learning process is beneficial for gaining understanding of difficult concepts, as well as triggering retrieval mechanisms and correcting misconceptions (Thalheimer, 2008). Students can return to the Explicit Instruction and instructional media for re-teaching and progress through guided and independent practice again if needed.

**Formative Assessment**

Since Bloom (1968) identified formative assessment in his earlier theories, Hunter (1979) included it in the learner journey toward mastery, Black and Wiliam (1998a, 1998b) brought global attention to it, and Popham (2008) renewed focus during this century, the importance of formative assessment is irrefutable. Formative assessment is a critical point of teacher decision-making; the moment when educators determine which students may need more time to master a learning objective and determine what corrective action should be taken to support that learner.
While the learner engages in independent practice the teacher can examine results to determine level of understanding. If a learner is not successful with these items, the teacher is able to provide corrective feedback, direct the learner to review the lesson, and re-set the formative assessment so the learner may experience success. Repeated unsuccessful attempts may result in a teacher decision for allocation of additional resources or intervention. In this example, the teacher could assign other content for area of circles, providing further curriculum and instruction with formative assessment. The teacher plays a significant decision-making role in feedback. Research shows teachers who embrace error encourage trusting student-to-teacher relationships, resulting in learners who are not in fear of negative reactions from their teachers (Hattie, 2012).

Lesson Element - Review and Closure
As a lesson comes to a close, a review is provided to emphasize what has been presented with a focus on the most important concepts tied to the learning objective.

Continued Example Area of Circles Lesson

After the learner progresses through the lesson, the formula for how to find the area of circles is reviewed with key learning points summarized (Figure 21).

Figure 21 – Review and Lesson Closure

**AREA OF CIRCLES - SECTION 3**

Let's Review!

Make sure that you understand the main points of this lesson:

- The area of a circle is the product of pi and the square of the radius: 
  \[ A = \pi r^2 \]
- Given the diameter or circumference of a circle, you must first find the radius before calculating the area of the circle.
- Area is always measured in square units.

WRAPPING THE LEARNER JOURNEY IN EDUCATIONAL RESEARCH

The Odysseyware Framework includes application of what we know to be effective for learning. This includes a variety of measures and best practices rooted in proven research. Research is of critical relevance to education, specifically in proving student outcomes. Education research is in its infancy; the formalization of it can be traced back to the founding of the American Educational Research Association (AERA) in the year 1916. Today the organization has a vision to advance education research and serve the public good. Staying abreast of current research is at the top of our internal professional development goals. In considering “education research” the formal definition is as follows:
Education research is the scientific field of study that examines education and learning processes and the human attributes, interactions, organizations, and institutions that shape educational outcomes. Scholarship in the field seeks to describe, understand, and explain how learning takes place throughout a person’s life and how formal and informal contexts of education affect all forms of learning. Education research embraces the full spectrum of rigorous methods appropriate to the questions being asked and also drives the development of new tools and methods. (AERA, n.d.)

Within the Odysseyware instructional design we embrace AERA’s definition of education research, especially the innovative aspect of developing new tools and methods. The era of ESSA has brought renewed commitment to education research and Odysseyware has committed to partner research with school districts and sponsorship of research at universities. The Odysseyware Framework is responsive to the ever-expanding field of education research. As we wrap the learner with research, we also consider both educational measurement and evidence-based best practices. The educational measures in our model are the metrics used to determine developmentally appropriate content. Best practices are strategies we know work, based on efficacy research, that must be considered during instructional design.

Educational Measurement in the Developmental Process
Educational measurement takes many forms which are both quantitative and qualitative. Our model leverages research in educational measurement through incorporating measures into the instructional design. For example, we assure that content is appropriate through applying measures within our design processes, so that learners are not exposed to content outside of their zone of proximal development (Vgotsky, 1978). The framework considers everything from the number of minutes we anticipate for a learner to complete a lesson or assignment to the ability level appropriate to the learner.

Readability
Readability is a feature of the relationships among paragraphs, sentences, and the words that comprise them. Assessing readability requires attention to grammatical complexity, semantic complexity, and concept load; all of which are monitored during instructional design. Grammatical complexity is the measure of the number of sentences per paragraph and average sentence length. Semantic complexity is measured by the average number of characters per word in a passage. Concept load, also called density, is the concept that the greater the number of ideas discussed in a passage, the greater the demand on the student. The Odysseyware Framework targets the cognitive development and comprehension abilities of the students who will be using the content or course. Instructional text is written one half to one year below the grade level using paragraphs and sentence structures that balance the complexity of the discussion with simplicity of expression.

Readability scores are only one aspect of making a text accessible. Accessibility also relies on clearly stated goals, focused instruction, a warm, engaging voice, and age-appropriate examples. Within the Odysseyware Framework content with instructional texts goes through a readability check using the Flesch-Kincaid Readability Assessment (Kincaid, Fishburne, Rogers, & Chisson, 1975) as well as text analysis using MetaMetrics Lexile Scale.

Odysseyware curriculum is also designed to provide teachers with opportunities to scaffold instruction for students while equipping them with more complex texts to challenge students who are ready. Odysseyware works closely with MetaMetrics® to ensure students have access texts at varying levels of complexity.

Literary and Informational Text Balance
The importance of embedding literacy across courses, lessons, and content cannot be emphasized enough. Under-developed literacy skills are the number one reason why students are retained, placed in special education, given long-term remedial services and why they fail to graduate from high school (Ferrandino and Tirozzi, 2004, p. 9). Furthermore, authentic literacy is...
an essential focus area for learning, defined as “purposeful reading, writing, and discussion as the primary modes of learning both content and thinking skills” (Schmoker, 2011, p. 26). Authentic literacy is an essential skill in preparation for college, careers, and citizenship.

A standards-based distinction between the two types of texts, literary and informational, arose with the publication and adoption of the Common Core State Standards (CCSS). While not all states use CCSS, the Odysseyware Instructional Design Framework for Learning aims to find the “right” balance of instruction for these types of texts. Our content is developed with emphasis that both text types are important and that students read and work with informational/non-fiction texts in courses beyond English language arts.

Math-ability
Math-ability is a feature of the relationship between a student’s ability and developmental age. The Quantile Framework for Mathematics™, also from MetaMetrics, uses a common scale and metric to assess a student’s mathematical achievement level and the difficulty of specific skills and concepts. The Quantile Framework describes a student’s ability to solve mathematical problems as well as the demand of the skills and concepts typically taught in kindergarten mathematics through Algebra II, Geometry, Trigonometry, and Precalculus. Odysseyware subject matter experts use this framework data to inform instructional design, as well as map mathematical concepts to support construction of an instructional path that best fits students’ unique abilities. Essentially, this means that we develop content that is appropriate to the learner’s zone of proximal development.

Measures of Rigor: Depth of Knowledge
Depth of knowledge is a language system used to describe the content complexity of learning expectations, instructional materials and assessment items. Odysseyware curriculum team members are trained in depth of knowledge (DOK) through a professional learning partnership with WebbAlign®, an organization founded by Dr. Norman Webb from the University of Wisconsin-Madison, Wisconsin Center for Education Research. The DOK Framework includes four levels of content complexity—DOK 1, DOK 2, DOK 3, and DOK 4. In contrast to Bloom’s Taxonomy for Learning, the DOK Framework focuses on assessment; whereas Bloom’s research was broader.

Odysseyware’s Framework uses Webb’s classification system as a metric of complexity alignment between the standards targeted and the assessment items used to verify academic movement toward mastery or securing the learning objective. Trained curriculum team members identify the DOK of objectives and assessment items. Part of this process includes examination of alignment between the assessment and the state’s curriculum standards.

The WebbAlign process includes examination of assessment item difficulty and complexity. The two are related, yet different. Difficulty and complexity should mirror their relationship. For example, requiring a student to use basic computation skills to solve a math problem that uses larger numbers can be a difficult task. However, it’s not complex. Students are being asked to do basic computation. In the Odysseyware Framework if difficulty is low, complexity should be low; if difficulty is high, complexity should be high.

Beyond difficulty and complexity assessment items are categorized into the DOK levels. Each level has a definition, articulated to allow content developers and educators to better evidence the alignment of standards to the items being used for assessment. For example, a standard that levels at a DOK 2 on the complexity scale should be assessed by a DOK 2 item. This means that, in certain grades and disciplines, there will appropriately be a higher proportion of DOK 1 and 2 items while, in others, there may be a more representative balance across each category.
Pacing (Time in Minutes)
Pacing is an important quantitative component to manage best practices used in design. Appropriate pacing helps manage cognitive load and the gradual release of responsibility. The length of a lesson is determined by the estimated time needed for completion. As an approximation rule: High school (9-12) lessons are no more than 50-minutes in length, middle school (6-8) lessons are no more than 45-minutes in length, elementary (3-5) lessons are no more than 35-minutes in length, and primary (K-2) are no more than 20-minutes in length. Time-in-minutes is also managed in Odysseyware with consideration to how students learn. For example, pedagogical agents, such as instructional media short-clips are brief, generally not exceeding three minutes.

Best Practices
In addition to educational measures used in the Odysseyware Instructional Design Framework for Learning, many evidence-based best practices in education research are applied. Education research is constantly evidencing what works in education, which is why the Odysseyware Framework is a framework, not a linear progression. It is not a sequential order of operations; it is designed to be flexible and embrace or incorporate new research findings, teacher decision-making, and varying time required for students to secure or master learning objectives.

Gradual Release of Responsibility
A major goal of education is for students to experience true independent learning (Fisher & Frey, 2008a; 2008b). This is promoted in Odysseyware through the gradual release of responsibility. The gradual release of responsibility is the process through which the lesson begins as instructor led, transitions to instructor providing support, modeling, scaffolding, and feedback, and eventually releases the learner to practice on his or her own, then complete a graded assignment. Our design supports “I do, we do, you do” throughout the lesson structure. This systematic process is supported by research that tells us the release must be purposeful, while remaining gradual, as learning responsibility moves from teacher to student (2008b). This also encourages exactly what we know works based on human nature. People, by nature, imitate other people (Winerman, 2005). In Odysseyware the gradual release of responsibility begins with Explicit Instruction, transitions to guided instruction and practice incorporating scaffolding and feedback, and finally the student works independently.

Transfer of Knowledge
Several opportunities in Odysseyware provide for the transfer of knowledge. Transfer theory asserts that acquired knowledge effects the understanding of related concepts afterward (Royer, Mestra, & Dufresne, 2005). Our instructional design supports research which evidences how transfer of knowledge occurs. Transfer of knowledge is facilitated at the beginning of each lesson when background or prior knowledge, stored in each long-term memory schema, is accessed and then bridged or connected into working memory as new knowledge (the learning objective). Transfer occurs as the learner progresses through the lesson, eventually transferring the new knowledge into practice until that knowledge is secured. At this time, the new knowledge is part of the schema, stored in long-term memory. In addition, learning objectives are framed in real-world context, which is shown to be effective in promoting transfer (Nagle & Styers, 2015). Table 4 explains the broader application of transfer of knowledge from lesson-to-lesson, lessons-to-unit, and more.
**Metacognition**

Metacognition is the knowledge and awareness of one’s own thinking, as well as the regulation of it (Wilson & Conyers, 2016). Research shows there is a relationship between students’ metacognition and their performance (Romainville, 2006). More recent research found a relationship between motivational strategies and cognitive learning (Park & Yun, 2017). Hunter and Barker (1987) framed this within attribution theory, commenting that a “student must accept the fact that much of what happens to them is a result of what they do” (p. 52).

Within the Odysseyware Framework metacognition is promoted for the learner through the gradual release of responsibility and user features that communicate expectations and progress with the learner. Learners are able to view their progress and their assignments within each Odysseyware product. Figure 22 demonstrates how the learner views work “To-Do” and “Completed” along with the ability to choose which lessons he or she will work on in ClassPace. In addition, the learner has options to go back and replay or re-read content, providing a flexible environment so that students can exercise their metacognition.

**Figure 22 – Learner View of Teacher-Assigned Work**

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**Cognitive Load**

Managing cognitive load throughout the curriculum, instruction, and assessment within Odysseyware is done through careful and thoughtful instructional design. Cognitive load consists of the working memory, the long-term memory, and brain schemas (Paas & Sweller, 2014; Sweller, 2005). These three components work together to facilitate the transfer of knowledge, leading to secure learning objectives. Research shows cognitive load must be managed carefully so that working memory is not burdened (Wouters, Pass, & van Merrienboer, 2008). Working memory can handle a limited amount of information (Low, Jin, & Sweller, 2013; Sweller, 2014), which is generally estimated to be 5-9 chunks of information.
Second, everything done in creation of Odysseyware content is intentional with the goal of managing cognitive load. Expert designers at Odysseyware avoid overloading cognitive processes through focused design that elevates the learning objective(s). Items that are not relevant to the learning objective are not a part of the design. For example, we do not include distractions such as irrelevant or unrelated visuals, content, assignments, or busy-work. Everything in our framework is intentional while remaining flexible. It is systematic and explicit, based on research shown to be effective to lead to learning.

Fairness and Sensitivity
Content developed for and used in the Odysseyware platform is designed with fairness in mind; and goes through a bias and sensitivity check by trained reviewers. The Standards for Educational and Psychological Testing (AERA, American Psychological Association, National Council on Measurement in Education, Joint Committee on Standards for Educational and Psychological Testing, 2014) includes several standards specific-to “fairness.” However, this publication cites challenges to even define “fairness.” The chapter titled Fairness in Testing highlights the broad goal of “achieving equality of opportunity in our society” (p. 49). Indeed, the equal opportunity for all students to learn is a cornerstone of educational reform since the inception of ESEA in 1965. Odysseyware’s goal in fairness is also to develop valid curriculum, instruction, and assessment for intended uses.

Bias and sensitivity checks support learners through providing content that appropriately ensures the opportunity to learn and be fairly assessed, regardless of differences. These differences may include socioeconomic status, sexual orientation, religion, English language proficiency, regional background, disability status, ethnic group, and gender. While the Standards for Educational and Psychological Testing publication is intended to apply to standardized tests or assessment items, it can also be applied across curriculum and instruction. Bias and sensitivity checks are applied during development and also monitored after content is released. Continued monitoring is essential because global events, political climate, or mainstream media could all impact perceptions of what is construed to be sensitive information.

Bridging the Learning Progression - Assess and Transfer
Assess and transfer bridge the learning progression. The lesson example above demonstrated formative assessment, while within assess and transfer the Odysseyware Framework considers summative assessment. Summative assessment is included in Odysseyware Courses as unit and semester tests and in Odysseyware SPARK post-tests. Transfer occurs when the learner has demonstrated mastery, moving new knowledge to long-term memory, where it may be recalled. During transfer the knowledge is recalled as background knowledge and connected to make meaning of new knowledge. In the lesson walkthrough example provided in this research paper, the learner did not have summative assessment because the student was working at the lesson-level. The transfer of knowledge (Table 5) also occurs as students move through a lesson, as well as from lesson-to-lesson, lessons-to-unit, and units-to-course or course-to-course such as completing the course English I before beginning English II.

Table 5 – Odysseyware Assessment and Transfer of Knowledge Bridges

<table>
<thead>
<tr>
<th>Odysseyware Product</th>
<th>Summative Assessment</th>
<th>Transfer of Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td>End of Unit</td>
<td>Lesson-to-Lesson, Lessons-to-Unit, Units-to-</td>
</tr>
<tr>
<td></td>
<td>End of Course</td>
<td>Course-to-Course, Course-to-Next-Course</td>
</tr>
<tr>
<td>ClassPace</td>
<td>None</td>
<td>Lesson-to-Lesson</td>
</tr>
<tr>
<td>Individual Learning Paths</td>
<td>None</td>
<td>Lesson-to-Lesson</td>
</tr>
<tr>
<td>SPARK</td>
<td>Post-test</td>
<td>Lesson-to-Lesson</td>
</tr>
</tbody>
</table>
THE ODYSSEYWARE FRAMEWORK IN MULTIPLE CONTEXTS

The Odysseyware Framework supports research on effective online learning environments, which has shown the need for differentiation through using evidence-based principles (Buzzetto-More, 2007; Oblinger, 2005; Orellana, Hudgins, & Simonson, 2009). Essentially, this research tells us a framework for learning must be flexible to embrace the teacher as the decision-maker and the differentiation needs of learners.

Diverse learners’ needs are met through instructional design that supports best practices such as flexible learning through customization of instructional content, activities, or media (Colis & Moonen, 2001). To meet these diverse learning needs Odysseyware harnesses the power of our standards-based curriculum in a manner which can be consumed in a variety of ways. Figure 23 provides a view of the Odysseyware products and implementation options that make use of our courses and content. Whichever implementation model is used, differentiation for groups or individuals is fast-and-easy using seamless standards and topics searches, allowing generation of content on-demand. Figure 24 shows the power of searchable standards across those products.

**Figure 23 – The Power of Content + Learning Paths + Diagnostic Placement + Courses = Odysseyware**

<table>
<thead>
<tr>
<th>ClassPace</th>
<th>Individual Learning Paths</th>
<th>Courses</th>
<th>SPARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blended Learning Lessons and Projects for Practice or Progress Monitoring</td>
<td>Individual Learning Path options based on student’s NWEA™ MAP® Score and assigned through Teacher-Selection of Content</td>
<td>Curriculum organized as Units with Lessons, then Summative Assessment to demonstrate Mastery</td>
<td>Prescriptive Learning Paths driven by Diagnostic Assessment</td>
</tr>
</tbody>
</table>

**Figure 24 – The Power of Searchable Standards-Aligned Curriculum**
In addition to the multiple implementation models of Odysseyware, educators can provide students with flexibility. There is flexibility in terms of opportunity for engagement; rethinking the learning environment in terms of time, location, instructional pace, and learner entry all supported by research (Ahmed, 2010; Carter et al., 2012; Johnson, Smith, Willis, Levine, and Haywood, 2011).

CONCLUSION – A Partnership with Educators
The Odysseyware Instructional Design Framework for Learning includes courses and content that are developed in partnership with educators. Educators are part of the framework; our partners in every design, participating throughout from beginning (product and curriculum development) to end (outcomes and efficacy research). Odysseyware is not a stand-alone product and does not embrace a philosophy of placing a student in front of an online device, such as a computer or tablet, as they progress independently. Nothing in education research supports learning without a teacher—nothing. The teachers, as educational leaders in America’s schools today, play the most critical role in a successful Odysseyware implementation. Taking the importance of the teacher further, Stanford Professor Linda Darling Hammond, known for her education policy work on equity, quality, and teaching, argues that “the single most important determinant of success for students is the knowledge and skills of that child’s teacher” (Goldberg, 2001, p. 689). As you’ve read in this paper, with which seminal researchers Hunter and Bloom concur, the teacher is the decision-maker.

Knowing the importance of teachers, in addition to on-going collaboration with educators throughout all our development processes, sets our instructional design framework apart from others. Placing the educators into the Odysseyware Framework while elevating Systematic Organization, Backward Design, Explicit Instruction, and Multimodal Engagement is what makes us the leader in teaching technology.

Beyond the teacher as part of our framework, our stakeholders are educators and advisors who are experienced in education. Odysseyware curriculum development team members are former teachers and school administrators. Odysseyware has an Advisory Board consisting of 14 practicing teachers and school district administrators across the nation who volunteer and meet face-to-face with us each April and November. We understand our partnering role with educators, as our implementation specialists work directly with teachers throughout product adoption to support positive student outcomes.

When Odysseyware implementations occur, it is important for us to empower educators with knowledge about how our products can be used for student learning outcomes. Many educator resources, on-demand webinars, and research papers such as this additionally support educators in gaining the knowledge needed to effectively use Odysseyware. Finally, we learn from educators every day and maintain memberships in professional organizations such as iNACOL, Association for Supervision and Curriculum Development, International Society for Technology in Education, and others. Through our continued partnerships with organizations and educators we are able to learn from each other and strive to always be better.

With understanding of the importance of the teacher, the Odysseyware Instructional Design Framework for Learning applies research-based best practices in curriculum, instruction, assessment, and educational technology. We apply research that has been proven to lead to student learning outcomes. Our courses and lessons are consistent in design. We know students are most successful when participating in a predictable, structured learning experience with clear objectives, vocabulary instruction, and practice that is informed by timely feedback which promotes their perseverance, learning, and transfer of knowledge. At Odysseyware, instructional design is deliberate and systematic, while not drawing unreasonable boundaries that would compromise excellence or be counterproductive to continuous improvement. By this we mean the whole learner is not viewed with one-size-fits-all methodologies. There is no place for one-size-fits-all in education today. Today, we aim to partner with you to make a difference for each learner; not to “be known,” but to be known for making a difference together.
ABOUT THE AUTHORS

Dr. Adam Hartley is a volunteer member of the Odysseyware Advisory Board and Superintendent of Fenton Area Public Schools in Michigan. He founded GearUp2Lead, a leadership development organization located in Flint, Michigan with the mission of educating and inspiring youth and adults through Growth Mindset. Dr. Hartley completed his 21st year in public education, where he has been a teacher, building principal and an Assistant Superintendent, where he “moved the school experience from compliance to learning.” He is an adjunct professor at Arizona State University and holds a Doctor of Education – Educational Leadership and Administration.

Dr. Shannan LaMalfa is the Director of Product Research and Efficacy at Glynlyon. Prior to coming to Glynlyon she led the Renaissance Star Assessments product line after being recruited from her then-position as a director of curriculum and instruction. Dr. LaMalfa also has experiences as an elementary school principal, school counselor, and teacher. In her current role she facilitates university relationships in which Odysseyware sponsors research, collaborates directly with school districts for quasi-experimental and experimental study participation, and authors research publications. She has earned a Doctor of Education – Educational Leadership and Administration, Master of Science – Educational Leadership, and Master of Education – Educational Counseling.
REFERENCES


Stephens, S. M. (2011, April 30). *Teaching Isn't As Simple As It Appears*. Columbus OH: Columbus Dispatch.


EFFICACY RESOURCES

Odysseyware Courses


- Effect — Study results support Odysseyware as an effective math intervention for post-secondary students with behavioral disorders.


- Effect — Evidences growth of sixth grade learners participating in Odysseyware Individual Learning Paths, as measured by the NWEA™ Measure of Academic Progress (MAP).


- Effect — Evidences increased high school graduation rate through focus on student achievement, instilling a culture of success and college readiness, and leveraging instructional technology.


- Effect — Demonstrates prescriptive individual learning pathways lead to efficient, successful remediation and credit recovery at middle and high schools.


- Effect — Evidences increased high school graduation rate after implementing an alternative education program.


- Effect — Evidences an increase in credits earned and high school graduation, and a decrease in discipline referrals.


- Effect — Evidences an increase from pre-to-post test for short-term incarcerated youth.

- Effect—Evidences an increase in high school graduation.


- Effect—Demonstrates the research foundations of curriculum, instruction, assessment, and technology design of digital curriculum.


- Effect—Evidences an increase in high school graduation.

**Odysseyware ClassPace**


- Effect—Demonstrates the research foundations of ClassPace.

**Evidence-based Programs that Odysseyware Technologies May Complement**


- Effect: Positive impacts for staying in school, progressing in school, and completing school for youth already one to two years behind academically during middle school.


- Effect: Career Academies were found to have potentially positive effects on completing school.