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Improving Preservice Teachers' Knowledge of Response-to-Intervention (RTI): How Online Professional Development Modules Can Help?

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Abstract

Response-to-intervention (RTI) is "a multi-tier approach to the early identification and support of students with learning and behavior needs" (RTI Action Network, 2014). RTI began to be recognized around 2004, when the Individuals with Disabilities Education Act (IDEA) was reauthorized. In the midst of a national movement toward increasing uses of RTI, the development of knowledge of RTI for preservice teachers who will be engaged in its implementation is of high importance. This study examined the impact of a set of online professional development modules—IRIS modules—on preservice teachers' knowledge of RTI. Many federal dollars have been invested in the IRIS Center and these modules have been widely used. Yet, little is known about the learning outcomes for preservice teachers in response to these modules. A total of 55 preservice teachers enrolled in a special education teacher preparation program at a large Midwest public university participated in the study. Each participant spent approximately 20 hours on completing eight assigned modules. The results indicate that the experimental group performed significantly better than the control group on the *RTI-Reading Knowledge Assessment*, providing evidence that the intervention was beneficial. Implications and limitations of using online professional development modules are discussed.

Literature Review

Response-to-intervention (RTI) is known as a multi-level prevention and intervention approach (National Center on Response to Intervention, 2013). With the support of the federal laws—the No Child Left Behind Act (NCLB, 2002) and the Individuals with Disabilities Education Act (IDEA, 2004)—more than 60% of K-12 public schools nationwide are currently implementing RTI.

To prepare teachers for implementing RTI, there are several government-sponsored online professional development programs available for public use. For example, the IDEA '04 and Research for Inclusive Settings (IRIS) Center, sponsored by the U.S. Department of Education, Office of Special Education Programs (OSEP), has developed several modules about RTI. Although over 470,000 teachers and teacher educators have participated in online learning through IRIS, there is little empirical research to support its impact on preservice teachers. To fill the gap in this literature, this study examined how effective IRIS modules are for improving preservice teachers' knowledge of RTI.

Response-to-Intervention (RTI)

Typically, RTI is represented by a three-tiered triangle model with Tier 1 represented as green, Tier 2 as yellow, and Tier 3 as red (See Figure 1). According to leading RTI scholars (e.g., Fuchs and Fuchs, 2006), all students receive differentiated instruction and evidence-based instruction provided by general education teachers in Tier 1. It is expected that Tier 1 can meet 80 to 85 percent of students' needs in general classes [the percent is slightly different in different RTI models]. Students who do not appropriately respond to Tier 1 instruction will be provided with more intensive, strategic and evidence-based interventions within small groups in Tier 2. Depending on school budgets and resources, Tier 2 can be conducted by general education teachers who have been trained in RTI or conducted by intervention specialists (e.g., subject specialists, paraprofessionals, Title I teachers, or special education teachers) within or outside the general classroom. It is expected that approximately 10 to 15 percent of students who do not adequately

respond to Tier 1 instruction should make appropriate progress in Tier 2. Those who still fall significantly behind their peers will be provided with the most intensive interventions in Tier 3, which are tailored to meet the specific needs of students (Fuchs & Fuchs, 2006).
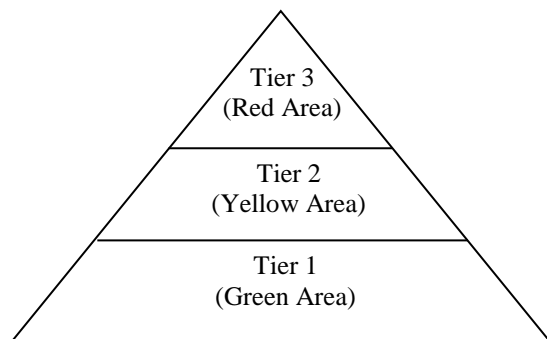

Figure 1. A typical RTI model

The IDEA '04 and Research for Inclusive Settings (IRIS) modules

As of 2013, the IRIS Center has developed a total of 53 modules for public use. These modules are categorized into different topics by the IRIS Center, including accommodations, assessment, assistive technology, behavior and classroom management, collaboration, content instruction, differentiated instruction, disability, diversity, learning strategies, math, leadership, response-to-intervention (RTI), and so on. Some modules are overlapped across topics. Each IRIS module consists of five components which are designed based on the evidence-based cycle of a learning theory created by Dr. Bransford and his colleagues (Bransford, Brown, & Cocking, 1999).

- *Challenge* – a realistic scenario relevant to education professionals
- *Initial Thoughts* – questions that allow students to explore and consider what they currently know about the scenario presented in the Challenge
- *Perspectives and Resources* – nuggets of information (e.g., text, movies, audio interviews, activities) that allow students to actively

engage in learning the module's main content
- *Assessment* – an evaluation tool that offers students the opportunity to apply what they know and to evaluate what topics they need to study further
- *Wrap Up* – a summary of the information presented in the previous components

(IRIS, 2013a)

According the IRIS Center, a field test data was collected from a total of 1,744 preservice teachers. The majority of the preservice teachers were in general education (71.7%); the others were in special education (9.5%), counseling (2.5%), psychology (0.9%), and other areas of study. The results show that "the majority of students responding to the survey felt they had learned something from the module," and "most respondents rated the module as being of high quality and relevant" (IRIS Center, 2013b).

Furthermore, another two IRIS module studies were conducted during the 2004-2005 and 2005-2006 academic years. In the first study, a total of 620 students were assigned to a module group and a non-module group, respectively. The study was to examine the participants' performance on the Initial Thoughts questions (as a pretest instrument) and on the Final Thoughts questions (as a posttest instrument). The responses were scored. "To perform well, students would need to apply content that was covered by the text and/or the module" (IRIS Center, 2013b). The results indicated that "the average posttest score for students who viewed the module was significantly higher than for students who did not" (IRIS Center, 2013b). In the second study, a total of 480 students were assigned to an Independently Viewed group and the Instructor-Enhanced group. Both groups received multiple-choice and open-ended questions. The results show that "although students did gain in their factual knowledge about self-regulation [in both conditions], more involvement by the instructor did not result in enhanced performance" (IRIS Center, 2013b).

While some of the other modules continue to be embedded in coursework in different universities, and instructors and students consider the modules to be practical and helpful (e.g., Rodriguez, Gentilucci, & Sims, 2006; Smith et al., 2005), there are limited experimental or quasi-experimental studies that used a set of IRIS-RTI modules. Therefore, this study attempted to provide information about what the participants' actual performance was after using eight assigned IRIS modules.

Preservice Teacher Online Learning

Online approaches to teacher preparation have become an important issue in two- and four-year institutions. University professors in general education often integrate or infuse special education issues through online learning modules or web-based distance education (Smith, Smith, & Boone, 2000). Smith and his colleagues' (2000) quasi-experimental study showed that although preservice teachers performed equally well in traditional and online instructional settings, online learning provided "ongoing access to instruction in a flexible accessible environment," which offers "potential advantages to student comprehension and ongoing application across teacher preparation curricula" (Smith, Smith, & Boone, 2000, pp. 28-29).

Another benefit of online learning is that it can help teacher educators understand preservice teachers' reflective thinking through embedded media, such as videodisc cases (Abell, Bryan, & Anderson, 1998). Smith and his colleagues (2000) pointed out that because online learning provides more comfortable space for preservice teachers to express their thoughts, teacher educators can observe their students' reflections through online learning.

A similar technique was also found in the IRIS modules' *Initial-and-Final Thoughts* questions. Because there is little research addressing preservice teacher learning related to online learning through a set of IRIS modules, there is a need to continue studies in this area.

Methods

Participants

The participants of the present study included juniors, seniors, and interns who were enrolled in a special education teacher preparation program at a large Midwest public university. Of 140 enrolled students, 81 students (58%) voluntarily participated in this study. All participants completed the written consent forms prior to participating in the study, and they all completed a pre-assessment before the intervention of the modules. The majority of the participants were white (90%) and female (93%).

Grouping

Based on the results of the *RTI-Reading Knowledge Assessment* (the instrument will be introduced later), the 81 participants were grouped into a control group and an experimental group. The participants were stratified into three subgroups: juniors, seniors, and interns. The reason for the stratification was to ensure that both the control group and the experimental group had an equal (or close to equal) number of juniors, seniors, and interns, so the impact from the coursework should have been similar. The participants were then randomly assignment into a control (comparison) group and an experimental group. In the end, 40 participants were assigned to the control group (including 13 juniors, 21 seniors, and 6 interns) and 41 participants were assigned to the experimental group (including 13 juniors, 22 seniors, and 6 interns).

Data Collection Procedures

Each participant was asked to spend two to three uninterrupted hours on each module; eight modules were assigned. All participants were provided a navigation video clip developed by the IRIS Center. After completing all the modules, the participants were given a post-assessment. This study adopted ANGEL, an online management system that assisted the researcher in collecting, monitoring, and analyzing the data. One sample of the ANGEL web pages used in this study is shown in Figure

2 (following reference pages). Because all modules were provided online, there was no risk related to the differences of interventions across conditions.

Instruments

      Pre- and post-assessment instruments. The *RTI-Reading Knowledge Assessment*, consisting of 66 Teacher Knowledge Survey (TKS) test items, 29 IRIS test items, and 25 Literature test items, was used for the pre- and post-assessment instruments. The TKS, developed by Dr. Louise Spear-Swerling and her colleagues, has been tested multiple times and the results have been published in peer-review journals (Spear-Swerling and Cheesman, 2012). The TKS includes questions in three areas: RTI, assessment, and the five components of reading. The Cronbach's alpha indicated that the test items of TKS were internally consistent and had high reliability (Spear-Swerling and Cheesman, 2012). With the permission of Dr. Spear-Swerling, the 66 TKS test items were used in the present study.

      In addition to the TKS test items, the IRIS module open-ended questions were turned into multiple-choice questions as part of the pre-assessment instrument to investigate the participants' knowledge of RTI prior to the intervention. When turning the IRIS module's open-ended questions into multiple-choice questions, it was more likely that the participants would complete the pre-assessment within two to three hours. These multiple-choice questions may not test exactly what each initial IRIS module open-ended question intended to test. However, these questions could still provide an initial understanding of the participants' knowledge of RTI before they received the intervention of the study.

      Furthermore, 25 questions, involving essential knowledge related to RTI, such as cultural diversity (Donovan & Cross, 2002; Klingner & Edwards, 2006; Orosco and Klingner, 2010; Rinaldi & Samson, 2008; RTI Action Network, 2014) and teacher quality (Cochran-Smith, 2003; Brownell, Sindelar, Kiely, & Danielson, 2010; Fenstermacher &

Richardson, 2005; Fuchs, Fuchs, & Compton, 2012; Murawski & Hughes, 2009) were developed. By including the TKS and Literature questions, the *RTI-Reading Knowledge Assessment* assessed participants' knowledge of RTI more comprehensively.

      The 54 multiple-choice questions (29 IRIS test items and 25 Literature test items) were reviewed by three writing consultants at a university writing center, using Wollack's (2003) criteria to examine each of these multiple-choice questions. The criteria include:

- Each item should be concise and uncomplicated.
- The answer to each question should be really correct and not just the best answer among all options.
- Each item should be independent from other items, so the examinee cannot get the answer from the alternatives of another item or from the clues.
- Each item should have only one objective to avoid being misunderstood by the examinee.
- Questions should use positive statements and avoid trickery.

      Two university faculty members who were knowledgeable about RTI also critically reviewed these questions. Changes and adjustments were made based on discussions. For the pre-assessment ($n = 81$), Cronbach's Alpha indicated that the internal consistency of the pre-assessment items within each sub-area (TKS, IRIS, and Literature) was adequate. The internal consistency was .828 for TKS, .762 for IRIS, and .710 for Literature. The *RTI-Reading Knowledge Assessment* is available upon request.

      Pre- and post-survey questionnaires. The pre-survey questionnaire collected information about the participants' demographic characteristics. The post-survey questionnaire used a Likert scale with sixteen questions to

obtain descriptive data related to social validity for the intervention. The sixteen questions are presented in the result section where participants' acceptability and satisfaction with the intervention are reported.

Data Analysis

Pre- and post-assessment instruments.
The paired *t*-test, independent *t*-test, and multivariate analysis of variance (MANOVA) were conducted for the within-group comparison and the between-group comparison regarding the pre- and post-assessment outcomes.

Pre- and post-survey questionnaires.
A hierarchical multiple regression analysis was conducted to examine the relationships between the participants' demographic characteristics and their assessment scores.

Table 1 (see Appendix) summarizes how data was collected and analyzed to address the research questions of this study.

Intervention and Comparison Conditions

After taking the online pre-assessment, the participants in the experimental group completed eight IRIS modules related to RTI-Reading assigned in a designated order. The modules used in the experimental group were under the topic of RTI as grouped by the IRIS Center. The control group completed another eight IRIS modules assigned by the researcher. The modules used in the control group met two selection criteria. First, they were *not* under the topic of RTI grouped by the IRIS Center. Second, they did not have a focus on RTI in the academic domain of reading interventions. Except for using different modules, the comparison conditions were exactly the same as the intervention conditions. Because the control group also received a treatment just like the experimental group did, they could still improve their knowledge through the modules, but that was not attributable to the actual intervention. The modules used for the experimental group and for the control group were shown in Table 2 (see Appendix).

Results

Equivalence Examination Before the Intervention

An independent *t*-test was run to examine whether the control and experimental groups were equivalent in terms of their mean scores on the pre-assessment. A *t* value of .549 ($p = .584$) indicated that there was no significant difference between the control group and the experimental group. That is to say, the two groups were equivalent for the purpose of this study. Furthermore, a *t* value of .294 ($p = .772$) indicated that there was no significant difference between the juniors' mean scores in the control group ($n = 13$) and in the experimental group ($n = 13$). A *t* value of .272 ($p = .787$) indicated that there was no significant difference between the seniors' mean scores in the control group ($n = 21$) and in the experimental group ($n = 22$) ; and a *t* value of .792 ($p = .448$) indicated that there was no significant difference between the interns' mean scores in the control group ($n = 6$) and in the experimental group ($n = 6$). In short, the control group and the experimental group, including the subgroups, were equivalent.

Attrition

Attrition refers to the dropout of participants from a study. In this study, there were 55 participants who completed the study (completion rate: 68%). A review of the email messages from the participants who decided to withdraw from the study indicated that the dropouts were not due to factors that were directly related to the study. These participants explained that because of other obligations that had come up, they could not complete the study as they had planned. Although the dropouts seemed not to cause any validity issues for the study, it is still important to know whether the dropouts had any significant impact on the initial equivalence status. Therefore, an independent *t*-test was used to evaluate the equivalence.

A *t* value of 1.469 ($p = .150$) with an effect size of .70 indicated that there was no significant difference between the remaining

participants' ($n = 29$) and the dropout participants' means ($n = 11$) in the control group; and a *t* value of 1.857 ($p = . 071$) indicated that there was no significant difference between the remaining participants' ($n = 26$) and the dropout participants' means ($n = 15$) in the experimental group. In addition, a *t* value of .726 ($p = .471$) indicated that there was no significant difference between the remaining participants in the control group ($n = 29$) and in the experimental group ($n = 26$). The results showed that the control group and experimental group remained equivalent after attrition.

Research Question 1: Participants' Performance on the *RTI-Reading Knowledge Assessment*

According to the ANGEL user matrix records, more than 90% of the participants spent approximately 20 hours on completing eight assigned modules in three weeks. Approximately 10% of the participants spent a month on completing the eight modules. On average, each participant spent 2.5 hours on each module.

Cronbach's Alpha indicated that the internal consistency of the post- assessment items within each sub-area were adequate. For the post-assessment ($n = 55$), the internal consistency was .885 for TKS, .820 for IRIS, and .733 for Literature.

The paired *t*-test was conducted to examine if there were statistically significant differences between the participants' performance on the pre- and post-assessment in the experimental group ($n = 26$). The *t* value of 5.155 ($p = . 000$) with an effect size of . 82 revealed that the experimental group's post-assessment outcomes were significantly higher than their pre-assessment outcomes. An independent *t*-test was conducted to examine if there was any significant difference existing between the two independent groups' post-assessment outcomes. The *t* value of 2.032 ($p = .047$) with an effect size 1.19 revealed that the experimental group' post-assessment outcomes were significantly higher than the control group'

post-assessment outcomes, providing evidence that the intervention was beneficial.

To avoid the accumulation of Type I errors from using a *t*-test, a repeated measures MANOVA test was conducted to test the intervention effect on the experimental group's and control group's knowledge of RTI. The results showed that there was a significant difference in terms of time (pre vs. post) and group (experimental vs. control) in the participants' knowledge of RTI, $F(3, 51) = 8.147$, $p = .000$, $\eta^2 = .324$, observed power =. 987. Univariate tests further indicated that there was a significant intervention effect on the IRIS test items, $F(3, 51) = 18.948$, $p = .000$, $\eta^2 = .263$, observed power = .990. However, there was no significant intervention effect on the TKS test items $F(3, 51) = .251$, $p = .619$, $\eta^2 = .005$, observed power = .078 and on the Literature test items $F(3, 51) = .162$, $p = .689$, $\eta^2 = .003$, observed power= .068. The results, as seen in Table 3 (see Appendix) showed that the experimental group outperformed the control group, particularly on the IRIS questions, after the intervention.

Research Question 2: Predictors and Participants' Post-Assessment Outcomes

The results of the hierarchical multiple regression revealed that the variable "group (experimental vs. control)" contributed significantly to the regression model, $F(1, 32) = 4.050$, $p < .05$) and accounted for 7.2% of the variance in the post-assessment outcomes. Introducing the variable "prior knowledge (pre-assessment score)" explained an additional 42.6% of the variance in the post-assessment outcomes, and this change was significant, $F(1, 51) = 23.324$, $p < . 001$. Adding the variable "GPA" to the regression model explained an additional 6.1% of the variance in the post-assessment outcomes, and this change was significant, $F(1, 50) = 21.128$, $p < . 001$. In short, the three independent variables (i.e., group, GPA, and prior knowledge) were significant predictors of the post-assessment outcomes, and all together they accounted for 55.9% of the variance in the post-assessment outcomes. The results of the regression statistics are reported in Table 4 (see Appendix).

Research Question 3: Fidelity of Implementation

Social validity questionnaires provided information about the participants' acceptability and satisfaction with the intervention that they had received. Table 5 (see Appendix) shows the participants' satisfaction with the modules.

The participants in the experimental group rated the questions that were related to the RTI-Reading modules as more relevant. This might be due to the fact that they were assigned to work on the modules related to RTI-Reading intervention. They rated the questions that were related to the behavioral intervention modules as less relevant. It is likely this has resulted from the fact that they were not assigned to work on any modules that were related to the behavioral intervention. In contrast, the participants in the control group rated the questions that were related to the behavioral intervention modules as more relevant. It is likely that such responses emerged due to the fact that they were assigned to work on the modules that were related to the behavioral intervention. Consistent with the results found in the experimental group, the participants in the control group rated the questions that were not related to the modules assigned to them as less relevant. In sum, the participants were satisfied with the modules they received regarding the improvement of their knowledge.

Although there were statistically significant differences between the responses of the participants in the two groups related to RTI-Reading and behavioral intervention questions, there were no statistically significant differences in the questions related to teacher quality, high-quality reading instruction, and participants' confidence in using RTI.

Summary and Discussion

Previous research on IRIS modules mainly used self-report data, learning outcomes from one single module, or one single-group with a pretest-and-posttest designed to address the impact of IRIS module (Montrosse, 2012; Rodriguez, Gentilucci, & Sims, 2006; Smith, et.

al, 2005). While such research methods are meaningful and important in the educational field, there is a need to have empirical data to compare and contrast with the existing literature. Additionally, unlike self-report data, in which participants tend to report positively on their beliefs, knowledge, and abilities (Cook & Campbell, 1979), this quasi-empirical study provided information about what the participants' actual improvement was after the intervention. It is important to note that although the participants significantly improved their knowledge of RTI after the intervention, whether they can actually implement RTI is an empirical question in future studies.

In addition, there are external factors that can contribute to a person's progress after an intervention. Without a control (comparison) group, previous research on IRIS modules may not be able to determine whether a user's progress results from the intervention itself or results from other factors. This study included both within-group comparison data and between-group comparison data, thereby adding a more robust design to explore whether the IRIS-RTI modules could serve as an intervention tool to improve preservice teachers' knowledge of RTI.

The average mean score for the experimental group on the post-assessment showed that the experimental students got 56% of the questions correct on the post-assessment, and the greatest growth in knowledge about RTI was in those questions developed based on the content from the IRIS modules. While it is not surprising that participants showed little improvement on questions that were indirectly or absent in the assigned IRIS modules, there is ample room for the improvement of teacher preparation programs regarding preservice teachers' knowledge of RTI, given the fact that their mean scores on the post-assessment of the TKS test items and Literatures test items were still low. Moreover, the results implied that one-time exposure to the assigned modules might not be sufficient to help the participants get familiar with the topic. Thus, allowing time to re-revisit these modules is needed.

Suggestions for teacher preparation programs using IRIS modules are addressed in the following. First, regarding the learning objectives of the classes, when teacher educators identify preservice teachers' strengths and weaknesses based on the results of pre-assessment(s), they can assign appropriate modules to assist individual students' learning. Second, teacher educators can provide sub-assessments, including both pre- and post-assessments, for each module. These sub-assessment questions can be developed based on the assessment questions or *Initial-and-Final Thought* questions embedded in each module. Next, teacher educators can debrief individual students' progress before and after taking the modules to inform their instruction. These procedures will help preservice teachers build solid knowledge of RTI through the assistance of IRIS modules.

In conclusion, the IRIS modules have been widely used in teacher preparation programs in the United States and around the world. Recent publications in the field of special education recommend IRIS modules as a high-quality online resource for teacher preparation programs (Billingsley, Israel, & Smith, 2011). While these modules provide important resources in helping preservice teachers understand RTI, examining the impact of IRIS modules through a comprehensive assessment measure is highly recommended because it can help teacher educators understand if the modules selected are sufficient to help preservice teachers build solid knowledge of a specific area. In the midst of a national movement toward increasing uses of RTI, the development of knowledge of RTI for preservice teachers who will be engaged in its implementation is of high importance. This study could inform teacher preparation programs using IRIS modules. Future studies could additionally examine the impact of IRIS modules on teaching practice and use mixed models of IRIS modules, including stand alone, IRIS + lecture, and IRIS tied to field-based practicum.

Limitations of the Study

There were several areas in the research design that could have been strengthened. First, internalized knowledge could have been assessed through a follow-up assessment using all or a portion of the *RTI-Reading Knowledge Assessment* one to two months after the conclusion of the study. The time demands of the intervention made this impractical for this group of participants. Second, the sample size of the present study was still considered to be small ($n = 55$). Thus, examining the *RTI-Reading Knowledge Assessment* with a larger sample size in future studies is recommended. Finally, because it was difficult for the participants of the study to complete all 53 IRIS modules, only eight IRIS modules related to RTI in the domain of reading interventions were used for the present study. It is possible that the participants would have performed better on the *RTI-Reading Knowledge Assessment* if they also completed all other IRIS modules. However, due to the fact that each module takes users approximately 2.5 hours to complete and some overlapping modules across topics, it was meaningful to examine if the eight IRIS modules related to RTI in the domain of reading interventions could help preservice teachers understand RTI and reading interventions. If not, the other modules may be spread out throughout their teacher preparation programs in different courses, such as literacy methods and cultural diversity.

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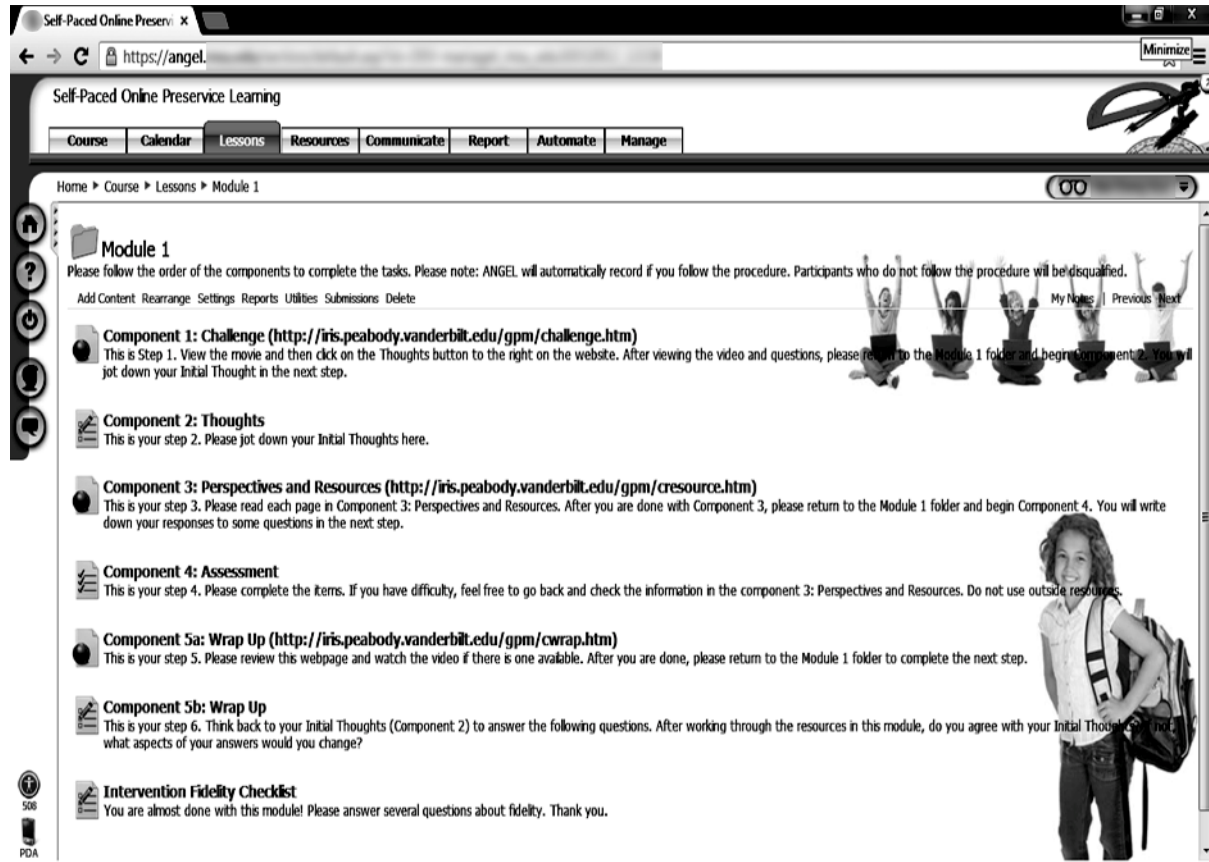
Figure 2. The ANGEL web pages – Module 1 (as an example). Note. The text is meant for visual reference only. This figure helps readers see how the ANGEL web pages look like in the present study. Each web page has seven *icons* to represent different components of the module.

Appendix

Table 1: Profile of ID people who received CBR services

Variable/ ID	Borderline ID (IQ>70)	Mild ID (IQ 69-50)	Moderate ID (IQ 49-35)	Severe ID (IQ 34-20)	Profound ID (IQ<20)
Population					
Tribal	1(0.38%)	42(16.0%)	57(21.7%)	5(13.3%)	5(1.9%)
Non-Tribal	4(1.5%)	37(14.1%)	43(16.4%)	28(10.7%)	10(3.8%)
Gender					
Female	3(1.1%)	39(14.9%)	46(17.5%)	31(11.8%)	5(1.9%)
Male	2(0.8%)	40(15.3%)	54(20.6%)	32(12.2%)	10(3.8%)
Socio Economic Status*					
Very Poor	0(0.0%)	30(11.5%)	36(13.7%)	28(10.7%)	3(1.1%)
Poor	2(0.8%)	35(13.3%)	43(16.4%)	20(7.6%)	5(1.9%)
Middle	3(1.1%)	12(4.6%)	19(7.2%)	14(5.3%)	6(2.3%)
Upper	0(0.0%)	2(0.8%)	2(0.8%)	1(0.38%)	1(0.38%)
Parent Education					
None	1(0.38%)	58(22.1%)	80(30.5%)	52(19.8%)	9(3.4%)
Primary	0(0.0%)	12(4.6%)	4(1.5%)	1(0.38%)	0(0.0%)
Middle school	3(1.1%)	6(2.3%)	8(3.0%)	4(1.5%)	0(0.0%)
High School	1(0.38%)	1(0.38%)	0(0.0%)	5(1.9%)	3(1.1%)
Bachelor	0(0.0%)	2(0.8%)	8(3.0%)	(0.38%)	3(1.1%)

Table 2: Major outcome of the CBR at the 9th year of the program

Variable/ ID	Borderline ID (IQ>70)	Mild ID (IQ 69-50)	Moderate ID (IQ 49-35)	Severe ID IQ 34-20)	Profound ID (IQ<20)
Inclusion					
No	1(0.38%)	25(9.5%)	81(30.9%)	63(24.0%)	15(5.7%)
Yes	2(0.8%)	54(20.6%)	18(6.9%)	0(0%)	0(0%)
Disability Certificate					
No	0(0%)	14(5.3%)	17(6.4%)	6(2.3%)	0(0%)
Yes	5(1.9%)	65(24.8%)	83(31.6%)	57(21.7%)	15(5.7%)
Parent Training					
No	2(0.8%)	13(4.9%)	24(9.1%)	15(5.7%)	4(1.5%)
Yes	3(1.1%)	66(25.1%)	76(29.0%)	48(18.3%)	11(4.1%)

Table 3

The Independent Samples Statistics of the Pre- and Post-Assessments

	Group	N	Mean	Std.	t	Sig.	Cohen's *d*
Pre-Assessment (TKS)	Experimental	26	31.539	9.140	.668	.507	0.18
	Control	29	30.000	7.937			
Post-Assessment (TKS)	Experimental	26	36.346	10.763	.961	.341	0.26
	Control	29	33.655	9.993			
Pre-Assessment (IRIS)	Experimental	26	10.731	5.008	.482	.632	0.13
	Control	29	10.103	4.639			
Post-Assessment (IRIS)	Experimental	26	18.307	5.097	4.427	.000***	1.19
	Control	29	12.345	4.886			
Pre-Assessment (Literature)	Experimental	26	10.039	3.862	.830	.410	0.22
	Control	29	9.172	3.864			
Post-Assessment (Literature)	Experimental	26	12.192	3.919	1.083	.284	0.29
	Control	29	10.931	4.636			

Note: Some missing values were found in the control group. One participant in the control group only completed 62 questions; the other participants in the control group all completed the *RTI-Reading Knowledge Assessment*. These missing values were coded as "exclude cases analysis by analysis." No missing value was found in the experimental group. The significant levels were at .05 (*) and .001 (***), respectively.

Table 4

Summary of Hierarchical Regression Analysis for Variables Predicting Post-Assessment Outcomes

Variable	Beta	t	R	R^2	R^2 Change	F
Step 1			.269	.072	.072	4.050*
Group (exp. vs. control)	.269	2.012*				
Step 2			.706	.498	.426	25.324***
Group (exp. vs. control)	.204	2.044*				
Pre-assessment score	.656	6.581***				
Step 3			.748	.559	.061	21.128***
Group (exp. vs. control)	.235	2.472*				
Pre-assessment score	.613	6.393***				
GPA	.252	2.624*				