

RESEARCH REPORT FOR THE NINTH GRADE CAREER EXPLORATION
GUARANTEE PROJECT

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The Ninth Grade Career Exploration Guarantee project was part of a grant funded by the Ohio Department of Education and the Ohio Board of Regents in support of a joint effort between Sinclair Community College and the Miami Valley Tech Prep Consortium to address a perceived lack of career awareness and planning among high school students. The purpose of the project was to develop and deliver a seven-lesson web-based curriculum unit focused on using language arts skills assessed on the Ohio Graduation Test while providing career guidance for ninth grade students. The unit, called MEtaMorph, was created by a team of school career coordinators and language arts teachers from schools serviced by the Miami Valley Tech Prep Consortium. Nine Miami Valley schools piloted the new curriculum during the 2004-2005 school year. The participating teachers reported their students enjoyed completing the unit and data collected demonstrated the curriculum improved students' career awareness. This report summarizes these findings.

Key Findings

The MEtaMorph curriculum was successful at increasing career awareness among all participating groups and more successful than past practice. Posttest results for the nine participating schools and the aggregated sample demonstrated a statistically significant improvement in career awareness. MEtaMorph participants also demonstrated

more career awareness than their tenth grade counterparts. In addition, the MEtaMorph curriculum was found to be equally successful across all academic ability levels. Some variation in the amount of change in career awareness between schools was evident. Interview data revealed that the teachers in the schools with the greatest improvement in career awareness used the entire sequence of MEtaMorph curriculum activities as designed, while schools with the least improvement in career awareness skipped some activities in the curriculum sequence. Participating students in every school completed the Kuder or the OCIS career inventory, and the MEtaMorph curriculum was equally successful at improving career awareness regardless of which career inventory was used. Some teachers reported having problems with access to technology or deficits in student technology skills but neither factor affected the positive impact of the web-based curriculum.

Methodology

Research on curriculum success with students requires a mixed- method approach because the curriculum must not only address targeted learning outcomes but do so in such a way as to engage students in the required tasks. In addition, teachers' perceptions of the content value and delivery mode influence the effectiveness of curriculum. To address the various factors, a quasi-experimental research design was employed incorporating quantitative and qualitative data.

Nine high schools representing the diverse population served by the Miami Valley Tech Prep Consortium agreed to participate in the study. The curriculum was delivered via computers as part of a Freshman English class (except in School 6 which taught the

curriculum as part of a stand alone career class). Pre and posttests were administered to participating ninth graders and post-tests only to a tenth grade control group in each school. Interview data were collected from the participating teachers upon completion of the MEtaMorph unit. Testing data were analyzed using SPSS and interview data were content analyzed.

Results

Quantitative data were collected on student learning through a pre and post-test designed to assess the ninth grade students' knowledge about the aspects of career awareness addressed in the MEtaMorph unit. The test was also administered to a tenth grade control group from the nine participating schools. Data were checked for matched pre and posttest scores for each participant prior to loading the data into SPSS for analysis. A total test score was computed for each student by adding the responses for questions 1-10 on the test. Lower total scores suggest greater career awareness. (See Appendix A for test questions). Descriptive statistics, a t-test and analysis of variance were performed. These findings are discussed below. A question analysis by test type can be found in Appendix C.

The first two tables below provide descriptive statistics regarding gender and school sample sizes. The total sample (N=362) had even gender distribution (Table 1).

Table 1- Total Sample by Gender

gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	178	49.2	49.2	49.2
	male	184	50.8	50.8	100.0
	Total	362	100.0	100.0	

Table 2- Participants by School

school

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	37	10.2	10.2	10.2
	2	48	13.3	13.3	23.5
	3	41	11.3	11.3	34.8
	4	38	10.5	10.5	45.3
	5	22	6.1	6.1	51.4
	6	38	10.5	10.5	61.9
	7	70	19.3	19.3	81.2
	8	35	9.7	9.7	90.9
	9	33	9.1	9.1	100.0
	Total	362	100.0	100.0	

Table 3 provides descriptive statistics on the testing breakout for the total sample. The table shows similar aggregated pretest and control group mean scores, and a lower aggregated post-test mean score. This means that students demonstrated greater career awareness on the posttest than they did on the pretest and greater career awareness than their tenth grade counterparts.

Table 3- Total Sample Size and Mean Test Scores*

Descriptives

total									
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
pre-test	170	30.26	5.120	.393	29.48	31.03	16	43	
post-test	170	24.29	5.337	.409	23.48	25.10	15	42	
control	192	29.95	6.052	.437	29.09	30.81	18	48	
Total	532	28.24	6.160	.267	27.72	28.77	15	48	

* lower test scores demonstrate higher levels of career awareness

An initial analysis of variance was performed to determine whether there was any significant difference between the mean scores on the three different administrations of the test; pre, post, and control. These results are presented in Table 4 and demonstrate a significant difference in mean scores between tests ($p < .05$).

Table 4- ANOVA of Effects between Tests

ANOVA

total					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3911.137	2	1955.568	63.700	.000
Within Groups	16240.066	529	30.700		
Total	20151.203	531			

Once a significant difference between tests was identified, a paired samples t-test was performed to determine whether the difference between the aggregated pretest and posttest means were statistically significant. Table 5 presents the t-test results which

revealed a highly significant t-score ($p < .05$). This indicates that students demonstrated more career awareness after completing the MEtaMorph unit.

Table 5- Paired Samples T-test

Paired Samples Test									
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	pretotal - posttotal	5.971	6.087	.467	5.049	6.892	12.790	169	.000

Then a two-way analysis of variance was conducted to determine the test type effect by school. Table 6 presents these findings. All of the factors were significant, so the school made as much of a difference as the test type.

Table 6- ANOVA of Test Type by School

Tests of Between-Subjects Effects							
Dependent Variable: total							
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power ^a
Corrected Model	5823.488 ^b	26	223.980	7.894	.000	205.257	1.000
Intercept	386962.554	1	386962.554	13639.027	.000	13639.027	1.000
school	718.437	8	89.805	3.165	.002	25.322	.968
test	4136.987	2	2068.493	72.907	.000	145.814	1.000
school * test	1140.001	16	71.250	2.511	.001	40.181	.993
Error	14327.715	505	28.372				
Total	444438.000	532					
Corrected Total	20151.203	531					

a. Computed using alpha = .05

b. R Squared = .289 (Adjusted R Squared = .252)

Table 7 presents the mean test scores for each participating school. While mean posttest scores improved in every school, a comparison of pretest and posttest means for each school provided a change score that ranged from 2 – 11 points. These mean change

scores offered a basis for comparison between school outcomes, particularly in conjunction with a discussion of the data collected in the qualitative teacher interviews (Table 8), and aided in understanding the differences in school outcomes.

Table 7- Test Score Means by School*

Descriptive Statistics

Dependent Variable: total

school	pre/post test	Mean	Std. Deviation	N
1	pre-test	31.89	4.370	19
	post-test	27.26	5.810	19
	control	30.89	5.455	18
	Total	30.00	5.530	56
2	pre-test	29.50	4.760	26
	post-test	25.62	5.154	26
	control	32.41	6.822	22
	Total	29.00	6.158	74
3	pre-test	30.24	4.647	21
	post-test	24.00	4.637	21
	control	31.05	6.840	20
	Total	28.39	6.231	62
4	pre-test	32.00	3.969	17
	post-test	28.53	4.745	17
	control	29.10	7.021	21
	Total	29.82	5.641	55
5	pre-test	31.91	6.188	11
	post-test	20.91	2.386	11
	control	29.82	6.030	11
	Total	27.55	6.969	33
6	pre-test	32.13	4.177	16
	post-test	21.88	5.987	16
	control	30.45	5.271	22
	Total	28.41	6.700	54
7	pre-test	28.65	3.689	20
	post-test	22.15	2.390	20
	control	28.30	4.423	50
	Total	27.01	4.663	90
8	pre-test	27.94	6.611	18
	post-test	25.94	6.512	18
	control	28.18	7.011	17
	Total	27.34	6.656	53
9	pre-test	29.59	6.284	22
	post-test	21.18	3.333	22
	control	32.55	6.991	11
	Total	26.82	7.175	55
Total	pre-test	30.26	5.120	170
	post-test	24.29	5.337	170
	control	29.95	6.052	192
	Total	28.24	6.160	532

* lower test scores demonstrate higher levels of career awareness

Telephone interviews were conducted with each of the nine participating teachers who piloted the MEtaMorph unit. The teachers were asked twelve questions ranging from classroom achievement level to delivery of the lessons (See Appendix B for interview questions). Interviews lasted 20-55 minutes. Teachers consistently reported that the MEtaMorph materials were valuable, helpful in developing students' language arts skills, and that student's enjoyed working on the materials.

All the teachers reported delivering the curriculum in the designed sequence. About half of the schools completed the Kuder and the other half completed the OCIS with no apparent impact on posttest scores. Examination of the mean change scores suggests that both career profiling tools were used by schools with high and low change scores. No teacher had their students complete every optional activity offered for each lesson, but some teachers skipped selected activities and other parts of lessons as well. Examination of posttest change scores in relation to lesson parts skipped revealed that schools with higher change scores completed the entire curriculum as designed and only skipped optional items in the unit (See Table 8).

All achievement levels were included in the study and achievement level did not appear to be a factor in change scores. In fact, the three schools with the highest change scores had students representing each of the different types of ability level; School 5 was low ability, School 6 was average ability level, and School 9 was high ability level. It is interesting to note the counter-intuitive finding that reported problems with computer availability or technology skills did not appear to be a factor influencing the learning demonstrated in the mean change scores. Table 8 summarizes key information obtained by the teacher interviews.

Table 8- Interview Data by School and Test Change Score*

School	Chg Score	Ability Level	Parts Skipped	Computer Availability/ Tech skills	Kuder Used
1	4.63	AVERAGE	Several things	GOOD	YES
2	3.88	AVERAGE	Some journals	2-3 DAYS/WK	YES
3	6.24	MIXED	Options, reflections & 2 flowcharts	GOOD	NO/OCIS
4	3.47	MIXED	Journals, links & options	GOOD	NO/OCIS
5	11.00	LOW	Some options	PROBLEMS	NO/OCIS
6	10.25	AVERAGE	Some options	EXCELLENT	YES
7	6.50	HIGH	Some options	PROBLEMS	YES
8	2.00	LOW	Some activities in each lesson	PROBLEMS	PARTS
9	8.41	HIGH	Some options	GOOD	YES

* the larger the change score the larger the improvement in career awareness

During the interviews teachers reported having used a combination of self-paced and whole or small group instruction. Most teachers reported using a process of introducing lessons to groups of students as they were ready and then letting them work individually at their own pace within the lesson. Teachers also made suggestions that a checklist of activities, more teacher training, and recommended resources be offered to better prepare them to deliver the MEtaMorph unit. Many of the teachers' comments can be captured in the statement by the teacher from School 5 who reported that the MEtaMorph unit "created student ownership of their careers, gave them a plan and created excitement about the future".

Implications

The quantitative and qualitative research findings from this study suggest that the MEtaMorph curriculum was successful at improving career awareness. The curriculum was well-received by participating teachers and students, and improved career awareness regardless of academic ability level. Statistical analysis of pre and posttest scores revealed a significant improvement in career awareness following completion of the MEtaMorph unit. Not only were the mean posttest scores lower* in every school but they also demonstrated significantly more career awareness than their tenth grade peers in the control group. (* lower test scores indicate higher career awareness)

Schools demonstrating the most change in career awareness from pre to posttest included students from all three ability levels and did not appear to be affected by the career inventory used, computer access problems, or deficits in technology skills. However, schools that completed the entire MEtaMorph curriculum as designed had larger change scores than did schools that skipped parts of lessons. This suggests that the MEtaMorph unit was most successful when all lessons were included and only optional activities were omitted.

Recommendations

Schools participating in the Ninth Grade Career Exploration Guarantee project clearly benefited from the focus on career awareness and planning in the MEtaMorph curriculum. Students demonstrated greater career awareness and planning knowledge on posttests taken after completing the web-based lessons and activities. Additionally, teachers reported they found the material valuable, not only in developing career

awareness but also in developing students' language arts skills. The success of the MEtaMorph curriculum suggests that the content and activities are well-designed and should not be modified. The evidence of greater success when used without skipping parts or activities suggests the curriculum should be used as a whole in the sequence originally designed. Areas where adjustments and improvements can be made include offering a checklist for teachers to distribute to students to help keep track of progress, training for teachers to familiarize them with the materials, and additional resources for teachers who need them. These changes, while not affecting the content of the MEtaMorph curriculum could aid teachers in more efficient use of the materials and improve the overall experience for all users.

Recommended next steps include expanding the use of the MEtaMorph curriculum to a broader audience within the Miami Valley and for additional research with populations not represented in the Consortium. There is also great potential for better understanding the long-term impact of increased career awareness on high school course selections, career planning, and post secondary schooling and training decisions through a longitudinal study with this pilot population. The continued use and study of the MEtaMorph curriculum can offer important insight into the vital components necessary for a successful career trajectory, and may well contribute to the much-needed reframing of high schools to better meet the needs of students' in contemporary society.

APPENDIX A

METAMORPH CAREER INTEREST SURVEY QUESTIONS

1. Which career cluster best matches your career interests?

1. Arts and Communication
2. Business and Management
3. Industrial and Engineering Systems
4. Human Resources/Services
5. Environmental and Agricultural Systems
6. Health Services
7. I don't know/ I haven't thought about it
8. None of the above

2. Which high school program of study best matches your career goals?

1. Tech Prep
2. Career Tech
3. College Prep
4. General Education
5. I don't know/I haven't thought about it
6. None of the above

3. Which path do you plan to take to accomplish you career goals after you complete high school?

1. Work, apprenticeship or on- the- job training
2. Military Service
3. Continue Tech Prep or Two-year college program
4. Four-year college program and/or beyond
5. I don't know/I haven't thought about it
6. None of the above

4. Do you know how you will finance your career/educational path?

1. I have the finances worked out.
2. I have most of the finances worked out.
3. I am working out the finances.
4. I haven't worked out the finances.
5. I don't know/ I haven't thought about it.
6. None of the above

5. Are you participating in extracurricular activities, volunteer work, and job opportunities that will help you in planning for and progressing toward your career goals?

1. I am doing it all, my activities rock!

2. I am participating in a few activities.
 3. I do not participate much, but I'd like to be more involved.
 4. I don't want to participate.
6. What resources are available to help you in career planning?
1. I have access to multiple resources (internet, non-internet, people).
 2. I can identify one or two resources
 3. I don't know/ I haven't thought about it.
 4. None of the above
7. How many of these six opportunities are you familiar with?
Tech Prep Programs, Career Center or Vocational School opportunities,
Post-Secondary Enrollment Options (PSEO), Online and Distance learning
opportunities, Summer Academies and Enrichment programs, Open Enrollment
Opportunities
1. All six of them
 2. More than half
 3. One or two
 4. None
8. Are you familiar with the Kuder System?
1. I have used the Kuder system with my own username and password.
 2. I have seen a demonstration of the Kuder system but I have not used it myself.
 3. I have heard of the Kuder system but I'm not really familiar with it.
 4. I don't know anything about the Kuder System.
9. Have you taken a career interest survey?
1. I took a career interest survey and it helped me focus on my career goals.
 2. I took a career interest survey but it wasn't helpful.
 3. I have not taken a career survey but I would like to take one.
 4. I don't know/ I haven't thought about it.
10. Have you accessed and evaluated research information on the web?
1. I have accessed and evaluated research information on the web and feel confident that I can do it whenever I need to in the future.

2. I have accessed research information on the web, but haven't really evaluated it.
3. I haven't accessed or evaluated research information on the web but I could.
4. I do not know how/ I haven't thought about it.

11. What is your gender?

1. Female
2. Male

12. What school do you attend?

1. Belmont High School
2. Kettering Fairmont High School
3. Centerville High School
4. Greenville High School
5. Northridge High School
6. Stebbins High School
7. Bellbrook High School
8. New Miami High School
9. Franklin High School

13. What grade are you currently in?

1. 9th
2. 10th
3. 11th
4. 12th

APPENDIX B

TEACHER INTERVIEW QUESTIONS

1. What was the class size?
2. What was the classroom achievement/ability level?
3. What was your class time length?
4. Describe any difficulties scheduling technology/ computer lab times.
5. Did you deliver the lesson sequentially?
6. Did you skip parts of the lessons? What parts?
7. Was the delivery self-paced, as a group, or a combination?
8. Did you use the Kuder? If not, why?
9. Did you deliver each lesson uninterrupted or did you do some of the lesson and come back to it days later?
10. Were there any other obstacles you encountered in delivering the lesson?
11. Were computer skills an issue with your students? If so was this isolated or a larger group problem?
12. Any additional comments?

APPENDIX C

Question analysis for each test type

Statistics

		pre1	pre2	pre3	pre4	pre5
N	Valid	170	170	170	170	170
	Missing	192	192	192	192	192
Mean		4.34	3.44	3.54	3.89	2.48
Median		4.00	3.00	4.00	4.00	2.00
Std. Deviation		2.561	1.282	1.172	1.294	.912
Minimum		1	1	1	1	1
Maximum		8	6	6	6	4

Statistics

		pre6	pre7	pre8	pre9	pre10
N	Valid	170	170	170	170	170
	Missing	192	192	192	192	192
Mean		1.72	2.76	3.50	2.17	2.41
Median		1.00	3.00	4.00	2.00	2.00
Std. Deviation		.936	.809	1.028	1.015	1.035
Minimum		1	1	1	1	1
Maximum		4	4	4	4	4

Statistics

		post1	post2	post3	post4	post5
N	Valid	170	170	170	170	170
	Missing	192	192	192	192	192
Mean		3.55	2.95	3.68	3.32	2.38
Median		3.00	3.00	4.00	3.00	2.00
Std. Deviation		2.044	1.323	1.035	1.248	.955
Minimum		1	1	1	1	1
Maximum		8	6	6	6	4

Statistics

		post6	post7	post8	post9	post10
N	Valid	170	170	170	170	170
	Missing	192	192	192	192	192
Mean		1.60	2.01	1.68	1.49	1.62
Median		1.00	2.00	1.00	1.00	1.00
Std. Deviation		.852	.945	1.133	.771	.897
Minimum		1	1	1	1	1
Maximum		4	4	4	4	4

Statistics

		cont1	cont2	cont3	cont4	cont5
N	Valid	192	192	187	192	191
	Missing	170	170	175	170	171
Mean		4.44	3.57	3.78	3.85	2.39
Median		4.00	3.00	4.00	4.00	2.00
Std. Deviation		2.572	1.523	1.126	1.316	.927
Minimum		1	1	1	1	1
Maximum		8	6	6	6	4

Statistics

		cont6	cont7	cont8	cont9	cont10
N	Valid	192	191	191	191	192
	Missing	170	171	171	171	170
Mean		1.59	2.48	3.49	2.26	2.26
Median		1.00	3.00	4.00	2.00	2.00
Std. Deviation		.916	.826	.967	1.096	1.035
Minimum		1	1	1	1	1
Maximum		4	4	4	5	4