Katalyst Pilot Study: Using Interactive Activities in Anatomy and Physiology to Teach Children the Scientific Foundation of Healthy Lifestyles

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ABSTRACT

Objective: To evaluate the effectiveness of the Katalyst pilot study, a fifth grade experiential learning program designed to promote healthy lifestyle behaviors in elementary aged children.

Methods: The Katalyst pilot study took place in November 2017 at an elementary school located in Appalachia. Fifth grade students participated in an interactive curriculum comprised of four, 60-minute learning modules based on the following organ systems: digestive, nervous, circulatory, and respiratory. Modules combined classroom discussion with hands-on activities to teach basic physiology principles with an emphasis on preventing chronic disease through diet, nutrition, increased physical activity, and abstinence from drug and tobacco use. Prior to delivery of the program, students completed a 37-item survey to assess their baseline knowledge and perceptions of healthy lifestyle behaviors. At the end of the intervention, students completed the same survey. Additionally, teachers completed a post intervention survey to provide feedback on the program. Frequency analysis and paired t-tests were conducted on student responses. Content analysis was performed on teacher feedback.

Results: Students had a correct response rate of 66.58% at baseline (n=74) and a correct response rate of 71.67% at post-test (n=65) representing an overall improvement of 5.09% (p=0.0019). The question with the largest improvement (27.15% increase) was “What does eating too much salt do?” and the largest reversal (17.96% decrease) was in response to “How much should fifth-graders exercise each day?” Furthermore, there was an increase in students strongly agreeing that they are “interested in careers that deal with the human body and diseases” from 27.40% at baseline to 45.31% at post-test. Teacher feedback (n=8) showed that all teachers believed that Katalyst was effective in meeting state educational standards and that students benefitted from the program more than “reading about the body systems in a textbook or health magazine.”

Conclusion: The Katalyst intervention improved children’s knowledge of how their lifestyle decisions affect their body, health, and disease. Moreover, Katalyst heightened interest in health-related careers. Finally, Katalyst aligned with state educational standards and was beneficial to students.

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INTRODUCTION

- The KATALYST program is designed as a 5th-grade experiential learning program.
- KATALYST has 3 main goals in the development of the youth program.
  - to teach students about the human body
  - to inspire students to explore future careers in the health sciences, research, or engineering (STEM fields).
  - to promote healthy lifestyle choices to students.
- The objective was to evaluate KATALYST’s impact on student knowledge and interest in STEM as well as teachers perceptions of the program.

METHODS AND MATERIALS

Katalyst Curriculum

- Four interactive lessons on the anatomy and physiology of the body systems.
- Science behind how lifestyle choices impact disease development in the human body.

Respiratory and Musculoskeletal	• Build-Your-Own Lungs Activity and Body Map • Lifestyle Behavior Lesson: Tobacco products
Gastrointestinal	• Chef Activity and build your own plate • Lifestyle Behavior Lesson: Healthy meal options
Neurological	• Brain Ball Game and Brain Hat • Lifestyle Behavior Lesson: Protect the Brain/Impact of Drugs
Cardiovascular and Endocrine	• Build-Your-Own Heart Activity • Lifestyle Behavior Lesson: Salts, fats, cholesterol and sugars

- Lessons led by 1-2 medical students and 2-3 undergraduate students.

School Recruitment

- Emails to local principals (n=8).
- Three schools consented to participate, with one failing to participate due to West Virginia teachers strike.
- Lessons occurred across 2 days at each school

Measures

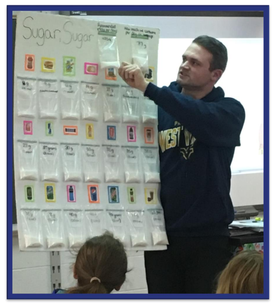
- 5th Grade students completed pre-post surveys to assess knowledge of the six Katalyst curriculum topics and interest in STEM.
- Scored for correct and incorrect response to assess increase in knowledge.
- Teachers and Katalyst student volunteers provided feedback on the curriculum.

RESULTS

Knowledge

School 1

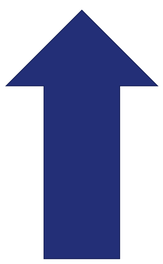
- Correct response rate of 66.6% at baseline (n=74).
- Correct response rate of 71.7% at post-test (n=65).
- Overall improvement of 5.1%
- Significant paired t-test improvement (p=0.0019)
- Largest increase (27.2%) increase in correct response: “What does eating too much salt do?”
- 18.0% decrease in correct response to: “How much should fifth-graders exercise each day?”



School 2

- Correct response rate of 68.4% at baseline (n=49)
- Correct response rate of 77.7% at post-test (n=46)
- Overall improvement of 9.3%
- Significant paired t-test improvement (p<0.0001)
- Largest increase (39.1%) increase in correct response: “How much should fifth-graders exercise each day?”
- 7.4% decrease in correct response to: ”True or False. If parents are obese, then the child will become obese?”

STEM Interest



“Interested in careers that deal with the human body and diseases” increased.

- 17.9% increase at School 1
- 3.2% increase at School 2

Teacher Feedback

- Teacher feedback from both schools (n=8) showed that all teachers believed that Katalyst was effective in meeting state educational standards
- Covered health standards that often get missed due to lack of time

Student Benefits

- Students benefitted from the program more than “reading about the body systems in a textbook or health magazine.”
- Provided “useful information in a way that 5th graders could understand as well as know that they can impact their bodies in positive ways.”
- Student’s continued to talk about lessons learned through Katalyst after the team left.

Recommendations for Improvement

- Shortening the time of stations, two-hours is hard for 5th graders to sustain attention
- Depth of content – specifically drug substances – too advanced for 5th grade

Student Volunteer Feedback

- Medical students (n=10) and undergraduate volunteers (n=22) participated across 2 schools.
- 80% of medical students and 81.3% of undergraduates believed Katalyst reinforced their school curriculum.

CONCLUSIONS

- The Katalyst intervention improved children’s knowledge of how their lifestyle decisions affect their body, health, and risk of disease.
- Katalyst heightened interest in health-related careers.
- Katalyst aligned with state educational standards and was beneficial to students.
- Revisions are being made to address teacher recommendations to the curriculum.
- Further testing of Katalyst in other diverse geographical locations is needed.

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- Try This WV

LIFESTYLE INTERVENTION
OLFERT RESEARCH LAB