LEARNING SPEEDS FOR MOUSE AND TRACKPAD IN ELEMENTARY SCHOOL STUDENTS WITH DEVELOPMENTAL DELAYS

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Abstract

This study compared student improvement in trackpad skills versus mouse skills. While the research focused on elementary school students with developmental delays, the information may be helpful to any school that is deciding whether to invest in mice, trackpads, or both. Improvement data was analyzed from thirty-six students ages five through ten, with moderate to severe autism or intellectual disabilities, who did not know how to use a computer mouse, to determine if they learned to use the trackpad or mouse quicker. Although no statistically significant results were noted in the overall improvement between the trackpad and mouse groups, the trackpad group's fine motor skills and the five-year-old students' trackpad use improved significantly more than corresponding mouse learners. Neither device is more appropriate than the other for all students.

Keywords

technology education, instructional technology, computer education, computer mouse, computer trackpad, computer lab, computer access, computer input devices, students with disabilities, elementary school, autism, intellectual disabilities, developmental delays, special education, students with severe disabilities

Learning Speeds for Mouse and Trackpad in Elementary School Students with Developmental Delays

Elementary school students with moderate and severe developmental delays were studied to determine if they could learn to use the computer mouse or the trackpad quicker. The speed at which students learn their devices was determined by each group's improvement after four-months of instruction. The students did not completely master the mouse or the trackpad in such a short instructional time given that the students all have significant developmental delays and only received computer instruction once a week. None of these students choose computers in their classrooms as choice time options, so all assessment and instruction took place during computer classes. A common assessment method in special education is tracking skill improvement and prompting reduction while students are working toward skill mastery.

Schools have two primary input device choices when purchasing general use computers – mice or trackpads (also called touchpads). Trackpads are more often used on laptop computers, but some companies, such as Apple, have desktop computer models that can ship with trackpads instead of mice depending on the purchaser's preference (Apple, 2019, near bottom of page). The idea for this study came from two experiences: students with concurrent developmental delays and fine motor difficulties learned to use the trackpads on laptop computers in their classrooms, and a teacher who learned to use the trackpad first still has difficulty with the mouse. The school district's instructional technology coaches have said that students with severe disabilities learn the computer mouse easier than the trackpad, but a mouse may no longer be a necessity.

Literature Review

No research comparing mouse and trackpad use amongst elementary school students with developmental delays could be located. The closest article dealt with teaching adults who already knew the mouse to use a trackpad (Cakir, Cakir, Muller, & Unema, 1995). The research of Cakir, et al., determined that there were minimal benefits for using a mouse instead of a trackpad. They stated that the small differences that they noted were not statistically significant.

Computer skills continue to be important in today's schools. For instance, students take many assessments on computers. Students need a variety of computer skills, including mouse skills and keyboarding, to achieve success with these assessments (Gullen, 2014). It is important for "teachers to individually assess and support students' technological skills" (Fink, 2015, p 37). Although these articles deal with computerized assessments, the computer mouse and other input device skills are essential in all areas of computer-based learning.

Several researchers have addressed the mechanics of teaching mouse skills. Two studies investigated teaching preschoolers with disabilities to use the mouse to move the cursor to desired items on the screen before clicking (Shimizu & McDonough, 2006; Shimizu, Yoon, & McDonough, 2010). Lane and Ziviani (2010) studied mouse use in children ages five to ten. These three reports agree that a mouse is an important tool for accessing the computer.

A trackpad can do almost everything that a mouse can except activating the roll-over effect that was once common in educational activities created in Adobe's Flash (formally produced by Macromedia). But with Flash winding down (Rodriguez, 2017), the trackpad is a viable input device for using educational software and educational websites.

Madalaine Pugliese states that students learn to control the computer best when devices are first presented in an environment that does not require them also to process language. "At Stage One, the learner is just starting to consistently focus on the screen. She begins to understand that activating her input device—switch, mouse, touchscreen, etc.—makes something happen, and that she can control the learning environment," (Pugliese, 2016, p. 14). Pugliese says that Stage One activities are a good starting place whenever any new device is introduced. As students gain mastery with the device, the language requirements and academic difficulty level can also increase.

In a previous study (Stork, 2007), it was determined that students with developmental delays due to severe autism more easily learned to use the computer when they interacted with software that was specifically designed for children with developmental disabilities rather than using general education software. A common practice at that time was to expose students in special education to the same materials as those used by general education students, making adaptations if necessary. The following passage is quoted from that paper's literature review.

> J. B. Carroll's article *Human Cognitive Abilities: A Survey of Factor Analytic Studies* listed several characteristics of students with cognitive disabilities that make using computers difficult: "(a) language, communication, & auditory reception, (b) reasoning, idea production, & cognitive speed, (c) memory and learning, (d) visual perception, and, (e) knowledge and achievement" (as sited in Wehmeyer, Smith, Palmer, & Davis, 2004, p 8). In addition, Wehmeyer, *et al* stress that when the concepts of Universal Design are applied to technology hardware and software, scaffolding to assist learners with cognitive disabilities needs to be included, but is often left out. This assistance includes easy to operate devices, simple directions presented in "multiple modes" (spoken, print, & graphic), & "tolerance for error" (p 12). Wehmeyer, *et al* conclude by stating that teachers need to consider "student characteristics and universal design features" (p 16) when matching learners with appropriate technologies.

Technology is playing an increasing role in the educational and personal successes of people with disabilities (Germann, Broida, Kaufman, Broida, & Thompson, 2001; and Langone, Clees, Rieber, & Matzko, 2003).

Hypothesis

Students in elementary school with moderate to severe developmental delays who have not yet learned to use the computer will demonstrate no statistically significant difference in the speed at which they learn to control the computer using the mouse versus using the trackpad.

Method

Timeline

The baseline data were collected from November 5th through November 9th, 2018. The instructional phase of the study took place from November 12, 2018, through February 15, 2019. The concluding data were collected from February 25 through March 1, 2019.

Participants

Thirty-six students with moderate to severe autism or intellectual disabilities who had not yet learned to control the computer effectively were studied. The students could attend to the computer activity by watching the computer screen's presentation and listening to the accompanying music and sound effects, but they could not yet use any input device to functionally control the computer. None of the students had aggressive or work-avoidance behaviors that were severe enough to prevent them from demonstrating progress. The students could use either hand; ambidextrous students were allowed to switch hands. Six students for each age five through ten were randomly selected then randomly divided into the control group who continued to work on mouse skills and the experimental group who was taught to use a trackpad, with three students per age assigned to each group. All of the students participated in computer classes for a minimum of two months before the baseline assessments. The paraprofessionals (teaching assistants) who work with the students were not told which students were in the study to prevent educational bias.

Setting

The students all attend computer class in a specialized computer lab with a teacher who has New York State teaching licenses in both special education and instructional technology. At least one teaching assistant was in the room with the students and the teacher. Each instructional session lasted approximately forty-five minutes, with thirty-minutes of intensive direct-instruction in mouse or trackpad use. During the thirty-minutes of instruction, the students in the study were individually taught by one staff member to maximize the available instructional time.

Materials

Apparatus. The computer lab generally has two iMac computers per table (one table has one computer and a printer). The tables and chairs are at four different heights to accommodate the students' sizes. Staff can place cardboard dividers on either side of students who have difficulty focusing on their own computers and to reduce afternoon glare from the windows.

Supplies. The students in the mouse group used mice with the right button disabled to prevent confusion over which mouse button to use. Teaching left and right click skills are outside the purview of this study and too advanced for these particular students. Dark gray trackpads provided visual contrast against the light computer tables. The trackpad gestures were simplified so that the students were not confused by accidentally activating the advanced multi-touch functions. The photos on the next page show a modified mouse and a trackpad in the lab.

Figure 1: mouse, right click disabled (Stork, 2016, circle added)

Figure 2: dark trackpad contrasts with lighter table (Stork, 2019b)

Software. Students used software specifically for students with developmental delays who are learning to control their computer input devices: Ablenet's Classroom Suite (no longer produced, originally by IntelliTools) and www.helpkidzlearn.com (subscription required). Both packages have simple engaging cause-and-effect and mouse learning activities. Students start with a simple click that produces an audio-visual effect on the monitor (cause-and-effect) then progress to moving the cursor to an object on the screen before clicking on that object. Both Classroom Suite and HelpKidzLearn also have activities that teach click-and-drag skills. The students used a wide variety of highly motivating activities that combined animation with music as rewards for properly using the input device and worked equally well with the mouse and the trackpad.

Research Design

This study is a School Based Action Study with an Imperfect Experimental Design. The experimental design is imperfect because a true randomization process was not used to ensure that each age-cohort was distributed evenly throughout the control and experimental groups. This adjustment eliminated age as a factor in the outcome and allowed comparisons to be made between trackpad and mouse improvement in same-aged students. The school-based designation is because the study was conducted only at one school. As an action study, recommendations could be made for this school and for schools with similar students based on experimental data.

R O X O	**R** = Randomized Groups, **O** = Observation (pretest and posttest in this study)
- - - - - - -	**X** = Treatment (trackpad instruction), control (mouse) group does not have an X
R O O	**- - - - - - -** means modified randomization was used (adjusted to balance ages)

Mouse and trackpad improvement data were analyzed to determine if there is a significant difference between the improvements of the two groups. The mouse group took the control group position because that is the traditional graphical user interface input device used in computer labs. The trackpad group thus became the experimental group. The comparison between these two groups became the keystone of this study.

Procedure

The students were given a pretest to determine baseline data in mouse/trackpad skills. Student were rated on a scale of one through five for eight skills, as seen in the rubric on the following page. The numbers for each skill represented the prompting level needed. For instance, students would receive a “5” for each skill they completed independently. Each student’s overall score is the total of the scores for all eight skills in the rubric.

After twelve weeks of instruction, the rubric was used to collect posttest data. Student improvement was determined by posttest minus pretest equals improvement. This formula was used for each individual skill, on the rubric as a whole to determine overall improvement, for related skills to determine fine motor and cognitive skills' improvement, and to compare students within each age cohort (ages five through ten).

Table 1: Rubric Used for Pretests and Posttests to Determine Student Improvement

Skill	1	2	3	4	5
Press Mouse Button or Trackpad then Release Pressure	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence
Press and Hold Pressure for a Minimum of Five Seconds	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence
Move Cursor by Moving Mouse or with One Finger on Trackpad	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence
Press Mouse Button or Trackpad Only at Appropriate Times	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence
Move Cursor to Desired Target	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence
Move Cursor to Desired Object Then Click on Object	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence
Press, Move an Object, then Release	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence
Press, Drag Object to Desired Target, then Release	Required Physical Assistance	Required Gentle Physical Taps as Physical Prompts	Both Verbal and Gestural (modeling) Prompts	Either Verbal or Gestural (modeling) Prompts	Complete Independence

An individual student's average improvement is the sum of improvement scores divided by the number of skills. A student's average fine motor improvement would be determined by adding together the individual skills' improvement scores for the first four items in the rubric then dividing by the number of skills, four in this instance. It could look like (2+2+1+0) / 4 = 1.25 average fine motor improvement for a hypothetical student.

The average improvement of each group (trackpad and mouse) was figured by adding together the improvement averages for each student in the group then dividing by the number of students in each group (eighteen students when comparing trackpad versus mouse groups or three students when comparing age cohorts). Average improvements for the entire mouse and trackpad groups, as well as for each age cohort, were determined for the entire rubric, individual skills, and related fine motor and cognitive skills using this method. Spreadsheets have an average function that reduces the number of steps necessary to reach these results.

The average improvement scores were then compared using the standard T-Test for small groups to determine the probability (p-value) of any significant differences between the trackpad and mouse groups. Average improvement within specific skills, skill subsets, and age cohorts were also analyzed using the T-Test method. The spreadsheet's T-Test function was used to obtain all p-values. P-values were compared against the standard p-value of $p < .05$ to determine significance. All p-values that are less than .05 are significant and indicate that the hypothesis (which is also the null hypothesis) has a high probability of being ruled out. Whenever the p-value is equal to or greater than .05, the results are not significant, and it is likely that the null hypothesis is supported by the data. Whenever the hypothesis (the null hypothesis) is not supported by the data (p is less than .05), something else is probable such as the students in the study learning either the trackpad or the mouse quicker.

Results

Hypothesis Testing: Instructional Growth

The trackpad group improved slightly more than the mouse group. The students learning the trackpad improved an average of 1.27 points on the rubric, while the mouse learning group improved an average of 1.16 points. This slight edge of the trackpad students is not statistically significant (p-value of .243 is not significant at $p < .05$). A PDF of the spreadsheet's tables is available online (Stork, 2019a).

Fine motor skills

The trackpad group improved an average of 1.74 rubric points when the combined scores of all four fine motor skills were analyzed. The mouse group's fine motor skills improved by an average of 1.38 points. The trackpad students' fine motor improvement is significant when compared to the fine motor improvement of the students learning the mouse (p-value of .002 is significant at $p < .05$).

The press & release and press & hold skills were the only individual skills with statistically significant differences in improvement (with p-values of .002 and .015). For press & release, the trackpad group improved 2.11 points, and the mouse group improved 1.44 points. With press & hold, the trackpad group improved 1.78 points, and the mouse group improved 1.22 points. The only area where the students averaged two or more improvement points was the trackpad learners' press and release skill improvement.

The graphs on the next page show each student's improvement in the fine-motor skills of press and release; press and hold (minimum of five seconds); move the cursor; and press, move the cursor, then release (dragging). Improvement points are numbered 0 through 4. Each student has a letter-number code; E is the experimental/trackpad group, and C is the control/mouse group. The code E1.5 is student Experimental One who is a five years old trackpad learner, while C18.10 is student Control Eighteen who is a ten years old mouse learner. These graphs show that student E2.5 is the only student to improve four points in any skill.

Figure 3: Experimental Group (Trackpad): Fine Motor Skills Improvement

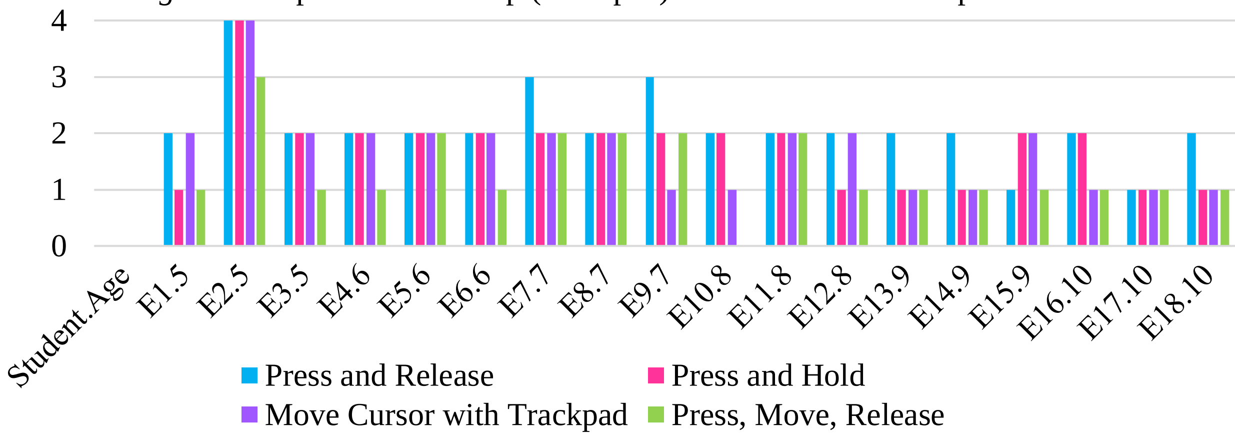
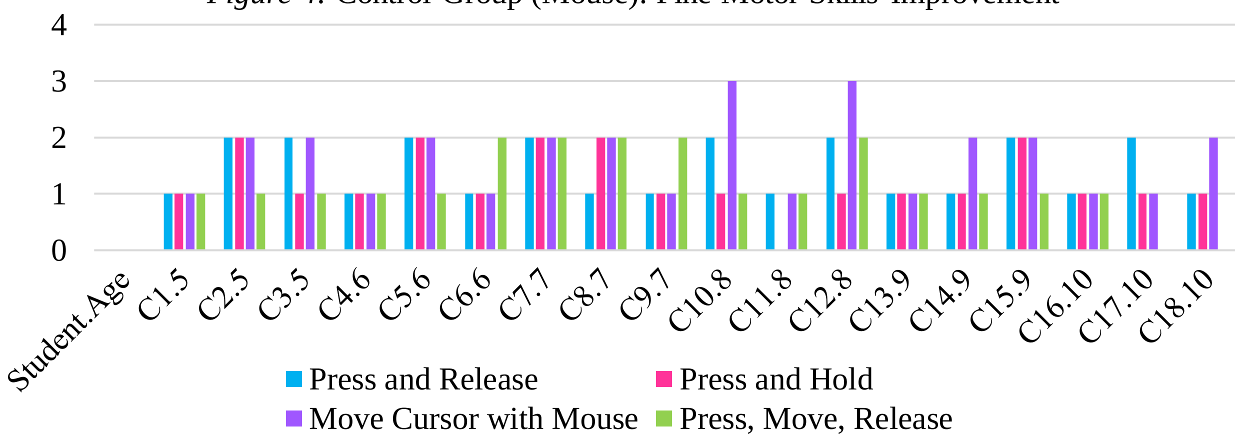


Figure 4: Control Group (Mouse): Fine Motor Skills Improvement



Cognitive skills

No statistical significance was found between the improvement of the trackpad group and the mouse group in the combined cognitive skills area. When individual cognitive skills (press when appropriate -- no repetitive clicking or unnecessary delays, move the cursor to the desired object, click on the desired object, and drag an object to the desired location on the screen) were compared neither the trackpad group nor the mouse group demonstrated significant improvement over the other group. The mouse group's improvement (0.95 points) was slightly higher than the trackpad group (0.81 points), but the difference was not significant (p-value of .272).

These graphs show student's improvement in the cognitive skills. The same high-achieving five-year-old student (E2.5) continued to be the only student who scored four improvement points in any of the skills.

Figure 5: Experimental Group (Trackpad): Cognitive Skills Improvement

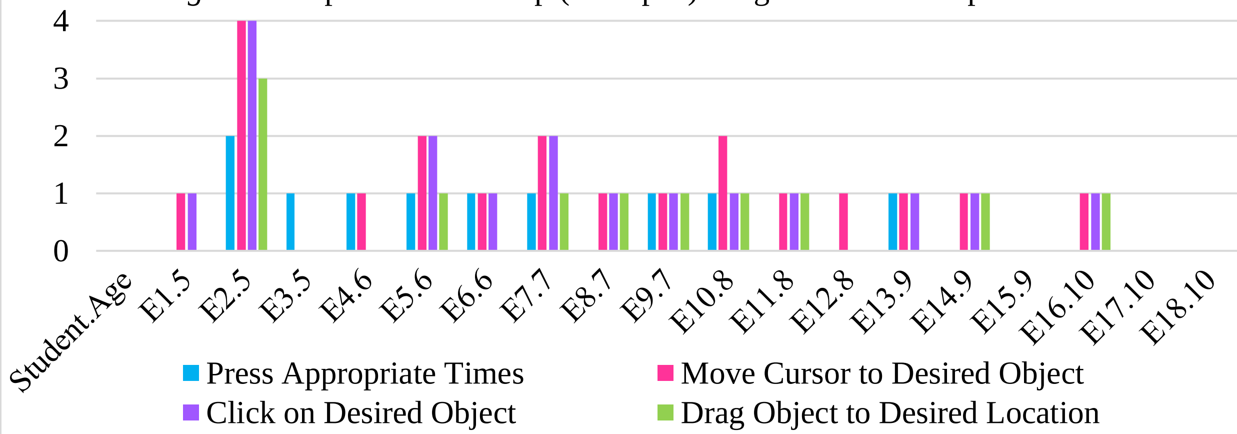
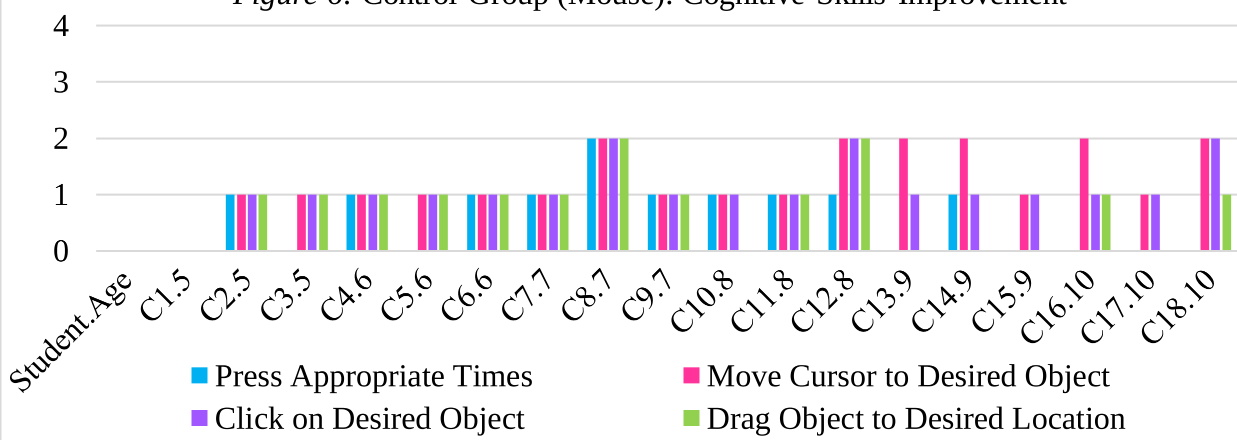


Figure 6: Control Group (Mouse): Cognitive Skills Improvement



These computer skills were classified as cognitive skills because students process information about when to use the device, the cursor's location and movements, and the position and movements of other images on the computer screen while they use their devices. These are more advanced skills that lead directly to the functional use of the computer. The difference in students' cognitive skills improvement is closer than with the purely fine motor tasks.

Age Cohorts

Each age cohort's trackpad versus mouse improvement was compared to determine if there were any significant differences between the mouse learners and the trackpad learners of the same age. The ages listed are the starting ages for each student; some students had birthdays between the beginning and conclusion of the study.

The seven-year-old students showed the most improvement with an average combined increase of 1.54 points. The trackpad group progressed more than the mouse group (1.58 points versus 1.50 points). The difference between the trackpad and mouse groups is only 0.08 points, so the two groups made almost identical gains.

The average improvement of all five-year-old students was 1.42 points. The difference between the trackpad group (1.83 points) and the mouse group (1.00 points) was 0.83 points, the largest difference of any age cohort. This age cohort had the second highest overall improvement rate and was the only age cohort with a significant variation between trackpad and mouse groups (p-value of .013).

The six-year-old and eight-year-old cohorts tied for the third highest improvements with average improvement scores of 1.25 points each. The six-year-olds had higher trackpad scores than mouse scores (1.38 with the trackpad versus 1.13 with the mouse), and the eight-year-old cohort had slightly higher mouse improvement scores (1.33 mouse, 1.17 trackpad).

The average improvement scores for the nine-year-old students was 0.98 improvement points. This cohort averaged 1.04 mouse and 0.92 trackpad improvement points and ranked fifth in overall improvement.

The ten-year-old students had the least combined improvement with an average of 0.85 points of growth. The mouse was also slightly favored by this cohort with 0.96 improvement points compared to 0.75 trackpad improvement points.

Discussion

Hypothesis Testing: Instructional Growth

This current study supports the hypothesis that students in elementary school with moderate to severe developmental delays who have not yet learned to use the computer will demonstrate no statistically significant difference in the speed at which they learn to control the computer using the mouse versus using the trackpad. The data shows that there was no statistically significant difference in the overall improvement rates of the students who received instruction in the trackpad versus the mouse (at $p > .05$). Even though the trackpad group demonstrated greater improvement in fine motor skills, it was not enough of a difference to make the overall improvement significant when considering all areas of improvement.

All of the age cohorts except for the five-year-old students showed very close improvement levels between the trackpad and the mouse. One five-year-old student learned how to use the trackpad then learned to use the mouse. Once he understood how to activate the trackpad, he discovered the relationship between the trackpad, the pointer on the screen, and activating what he wants on the screen. He became proficient at using the trackpad to click on desired items on the screen. Then he learned to move the cursor and to click on desired objects with the mouse. He is not yet able to independently drag an object to a desired location on the screen with either device, that skill is expected to develop as he gets older. This student did not learn to use the computer mouse in the two months of instruction before the beginning of this study, yet he learned to use the trackpad in about a month. It is highly likely that the trackpad was a better beginning device for him. The other five-year-old students in the trackball group also averaged more progress than the five-year-old mouse group students.

The younger students, ages five through seven, averaged more progress with the trackpad than with the mouse. The older students, ages eight through ten, on average improved more with the mouse. It could be that the stationary surface of the trackpad was easier for smaller hands to manipulate than having to move a mouse. Although younger students generally progressed more with the trackpad, improvement rates were too close in most of the age cohorts to draw any conclusions about the validity of this observed trend beyond the five-year-old students.

The older students all have severe developmental delays that impacted their ability to learn to use the mouse when they were younger. The younger students may have demonstrated more improvement because their cohorts could have included students with less severe disabilities who lacked mouse skills due to inexperience with computers. For instance, a five or six-year-old student who does not know how to use a mouse has received fewer years of training than a ten-year-old student who still has not learned how to use a mouse even after being in computer class once a week for the past five years. This rationale might explain the general trend toward the younger students progressing more than the older students after the same twelve weeks of instruction, but the possible difference in actual developmental delays does not explain the younger students' aptitude for learning the trackpad more than the mouse.

Direct observation of the students supports that the larger and more uniform surface of the trackpad made it an easier device for learning the fine motor skills associated with beginning to control the computer. Even with direct instruction, prompting, and tactile aids, many students in the mouse group occasionally pressed the wrong part of the mouse. A small side experiment with a one-button mouse and a programmable mouse (all buttons set to left click) were tried with several students who were not in the study; little difference in their ability to click was noted compared to the mice that was physically adapted by disabling the right click button. Both this research study and the small side-investigation support that the trackpad is the better device for young students and for any student whose primary objective is beginning to understand that a device can control the sights and sounds on the computer and is learning basic fine motor skills.

Research Results Validity

The data collected and the analyses completed are valid as a School Based Action Study with an Imperfect Experimental Design. This study is an honest assessment of how these students behaved. Similar results may be reached in other schools, but it would be unfair to assume that all elementary school students with developmental disabilities would show the same types and rates of progress without a broader based study. Enough data was collected for this study to test the hypothesis and to compare results for different student ages. The T-Tests used to analyze significance probability were designed for small sample sizes. The findings are valid and contribute to the general body of academic knowledge.

Corresponding Evidence

Improved behavior can lead to improved academic achievement (Chitiyo, Makweche-Chitiyo, Park, Ametepee, & Chitiyo, 2011). Behavioral data showed that neither the trackpad group nor the mouse group had a greater reduction in interfering behaviors. Teacher and student attitudes toward using technology in schools also can affect achievement (Christensen, 2002). Surveys and interviews showed that the students and staff are almost equally divided between trackpad and mouse preferences. The appendix contains additional behavior and affective details.

Conclusion

As proposed in the hypothesis, there is no statistically significant improvement between learning the trackpad and learning the mouse in elementary school students with moderate to severe developmental delays who have not yet learned to use the computer. The five-year-old students demonstrate significant improvement when compared to five-year-old mouse learners. Trackpad students also show a significant increase in a combination of all fine motor skills. These gains were not high enough for the trackpad group to demonstrate statistically significant improvement overall. Neither the trackpad nor the mouse is always the answer; neither device is more appropriate than the other for all students.

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Appendix

Behavioral growth

Research has shown that positive improvements in behavior are a factor in academic improvement (Chitiyo, et al., 2011). Concurrent behavioral data were studied to determine if students had a greater reduction in interfering behaviors with either the mouse or a trackpad. A rubric was developed to rate interfering behaviors on a scale of one through five, with one being violence or complete refusal to participate and five being an absence of the negative behavior. The participating students did not have any behaviors with a one rating at the start of this study.

No significant differences between the trackpad group and the control group or were noted in overall behavior improvement or any of the four behavior categories (work avoidance, aggression toward supplies, aggression toward self, and aggression toward others). Both groups improved slightly in all four areas, but the average behavioral improvements were nearly identical. The trackpad group's average increase on the rubric as a whole was 0.36 points, and the mouse group's rubric average gain was 0.38 points. Behavioral improvements increased with age cohort so that older students had greater behavioral improvements than younger students, but the behavior improvements remained equivalent between the trackpad and the mouse learners at all ages.

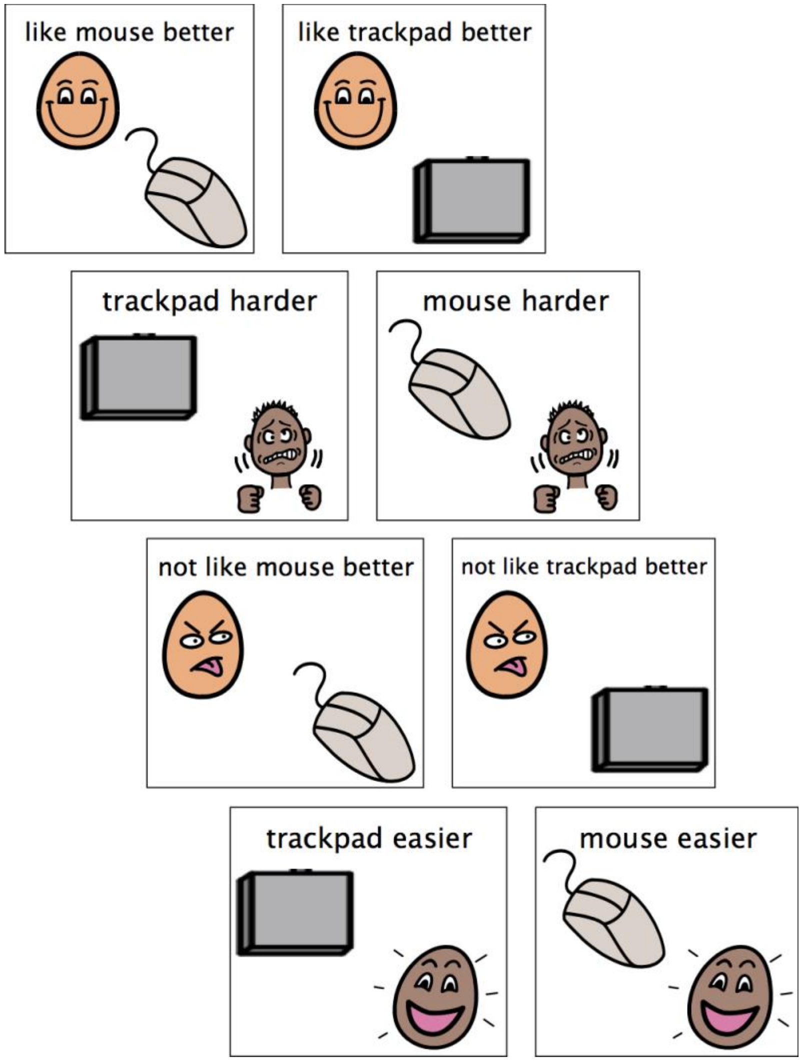
Table 2: Behavior Rubric Used in Pretests and Posttest to Determine Behavioral Improvement

Behavior	1	2	3	4	5
Work Avoidance	Refused to work (noncompliant).	Worked less than one third of the class.	Worked approximately one third to one half of class time.	Worked approximately one half to two-thirds of the class.	Remained on task for two-thirds or more of the class.
Aggression Toward Supplies	Broke one or more supply or required physical intervention to avoid breaking anything.	Attempted aggression three or more times but responded to directions to stop.	Attempted aggression once or twice but responded to directions to stop.	Tapped supplies repeatedly, put headphone wire in mouth without biting, etc. Responded to directions to stop.	Behaved appropriately toward supplies.
Aggression Toward Self	Bite, hit or pinched self; head-banged, etc. (left mark or required physical intervention to avoid mark).	Attempted aggression three or more times but responded to directions to stop.	Attempted aggression once or twice but responded to directions to stop.	Gently taped self, bite nails, flapped hands, put his or her hands in mouth without biting, etc. Responded to directions to stop.	Behaved appropriately toward himself or herself.
Aggression Toward Other People	Bite, hit, pinched, or kicked, etc. others, (left mark or required physical intervention to avoid mark).	Attempted aggression three or more times but responded to directions to stop.	Attempted aggression once or twice but responded to directions to stop.	Talked, made loud noises, touched others, but did not try to hurt anyone. Responded to directions to stop.	Behaved appropriately toward other people.

Student and Teacher Attitudes

Student achievement with technology is affected in part by the attitudes of the students and the teachers (Christensen, 2002).

Student survey. Students took a simple survey, folded so that they only saw one line at a time. Picture communication symbols and hearing each question asked aloud helped some students to answer the questions. All of the students, including the ones who knew how to read, were surveyed using this multi-modality approach. Four of the students provided consistent answers, with two students preferring the trackpad and two students preferring the mouse.



Staff survey. The staff who preferred one device for their students were split almost evenly between favoring the trackpad (7 people) and favoring the mouse (6 people). The majority of the respondents felt that both options should be available to students (21 out of 35 people). One person was undecided. The results were consistent regardless of the staff members' positions (teacher, therapist, paraprofessional, etc.), the ages of the students with whom the staff members worked, the students' disabilities (autism, intellectual disability, multiple disabilities, etc.), or whether the students knew the mouse, trackpad, both, or neither device.

Staff interviews. Three people were interviewed for this study who do not provide direct services to students now but have in the past. The interviews gave them the opportunity to provide additional information on their attitudes concerning mice versus trackpads. Opinions were evenly divided. One staff member each thought that children with developmental delays could more easily learn the mouse or the trackpad, and one staff member felt that the proper device depends on each student's individual abilities.

The first staff member thought that trackpads would become more popular as schools purchase more laptops, but students should continue to learn mouse skills to prepare them for all computers. She said trackpads would not become the desktop computer's primary input device because mice are more precise and provide tactile and auditory feedback that help students to know what they are doing and when it is finished; students feel and hear the click better on the mouse than on the trackpad. This feedback helps students with developmental delays.

The second staff member said that laptop computers were becoming more popular in middle schools and that laptops would soon be the most used middle school computer. Teaching students to use trackpads helps prepare them for the future.

The third staff member felt that each student's occupational therapist should choose the appropriate device. That person said that no single computer input device could meet the educational needs of all students with developmental disabilities.

All three people saw merit in both the trackpad and the mouse and thought that both input devices would become important as students move into middle schools, but they held different opinions about which device should be the primary focus in elementary school settings for students with developmental delays.