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Student perception on acceptability and usefulness of sit-stand desks in college classrooms

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ABSTRACT

STUDENT PERCEPTION ON ACCEPTABILITY AND USEFULNESS OF SIT-STAND DESKS IN COLLEGE CLASSROOMS

by

Abiola Kuilan

Sedentariness has been proved to be a major cause of various health concerns. Given that a full-time college student in the US spends more than 15 hours per week sitting in a college classroom, it may be an ideal setting for implementation of Sit-Stand Desk (SSD) to reduce college students' sedentary time. Graduate and undergraduate students (N = 178) of NJIT were randomly recruited to complete a need based online assessment survey. Participants' mean (SD) age was 22.4(4.7) years old, 63% identified as male, 33% identified as female while 4% were of the other gender class. Among the participants, 44.3% of students self-reported to be overweight or obese according to their BMI, 76% students led an inactive lifestyle, and 63.5% students did not meet physical activity guidelines. Students' perceived acceptability of SSD in the classroom was strongly favorable. Over 70% students favored the opportunity of having a SSD in classrooms and most of the students (85% - 99%) predicted either no change or positive change (get better) in all academic factors (focus, restlessness, attention, engagement and boredom) and health factors (physical health, fatigue and back pain), if SSD in introduced in the classroom. Collectively, the findings of this study strongly support the acceptability of introducing standing desks in college classrooms. The results of this study should be useful for policy makers regarding classroom designs. Future studies are needed to test the viability and efficacy of introducing sit-stand desks in college classrooms.

STUDENT PERCEPTION ON ACCEPTABILITY AND USEFULNESS OF SIT-STAND DESKS IN COLLEGE CLASSROOMS

by

Abiola Kuilan

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Submitted to the Faculty of
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APPROVAL PAGE

STUDENT PERCEPTION ON ACCEPTABILITY AND USEFULNESS OF SIT-STAND DESKS IN COLLEGE CLASSROOMS

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This research project is dedicated to my mother. Thank you for all your love and support.

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INTRODUCTION

College students are prone to a sedentary lifestyle while trying to balance daily challenges and school workload. Sedentariness is associated with increased risk of chronic diseases – obesity, cardiovascular disease, type II diabetes and even cognitive performance (Benzo et al. 2016). The typical temporal pattern of a college student who attends class, completes homework, and relaxes via screen-based leisure, suggests college students appear to be at a high risk of too little exercise and too much sitting. (Fountaine et al. 2016).

A recent cross-sectional study of sedentary time among undergraduate students (n=102) at a Canadian University found that students spent an average of 11.88 ± 3.46 hours per day engaged in sedentary behaviors (Moulin & Irwin 2016), which is 2.48 hours more sedentary time from a sample of 883 overweight men and women (Rosenberg 2010). Moulin & Irwin (2016) identified that a major barrier for the students to engage in a less sedentary lifestyle is the amount of sitting they do when in class.

The negative impact of sedentary work has prompted increased attention to the implementation of sit-stand desks (SSD) in office settings. A SSD is one that will enable a worker to perform job tasks from either a seated or standing position. The SSD can be raised or lowered to an appropriate height depending on the workers' posture. Systematic review articles (Chembers et al. 2019, Mengistab 2018) of SSD for office workers conclude that there is evidence that SSD reduces sitting time and increases standing time for office workers. SSD does not adversely affect the worker productivity, and it is most effective in reducing discomfort in back, neck,

shoulder and arm from prolonged seating. Modest evidence was also noted for cardio-metabolic health benefits.

1.1 School-Based Standing Desk Or SSD Interventions

Systematic review of eight studies testing on school-based standing desk implantation (Minges et al. 2016) concluded that standing time increased and seating time decreased by a range of 59 to 64 minutes per day for 5-18 years school students. Some studies reported increased physical activity and energy expenditure and improved classroom behavior of the students from standing desks implementation. Based on the systematic review, they concluded that the strategy of implementing standing desks in classrooms has the potential to reduce sitting time and increase standing time among elementary schoolchildren.

To examine the influence of the SSD on classroom sitting time in primary school children in UK and Australia (Clemes et al. 2015), 30 UK and 44 Australian children were monitored using activPAL data at baseline and follow-up. ActivePal is a body worn electronic system that can monitor standing and sitting time. The outcome of this study indicated that the proportion of time spent sitting in class decreased significantly at follow-up in both intervention groups. The study concluded that incorporating sit-to-stand desks into classrooms appears to be an effective way of reducing classroom sitting in this diverse sample of children.

In a pilot study by Hinckson et. al (2013) on acceptability of standing workstations in elementary schools, the children spoke enthusiastically of the standing workstations. A total of 30 children (14 boys, 16 girls), mean (SD) of age 10 (1) years) from three elementary school classrooms in Auckland, New Zealand participated in the study. The outcome of the study

revealed that Standing workstations can be successfully integrated in classroom environments and appear to decrease overall sedentariness.

Dornhecker et al. (2015) studied the effect of a stand-biased desk among 2nd, 3rd, and 4th grades students. The academic engagement of 282 participants was observed during one academic year. Stand-biased desks did not seem to result in adverse effects on academic engagement when used in elementary classrooms. The results suggested that stand-biased desks can be introduced in the classroom to combat childhood obesity through increasing energy expenditure without affecting academic engagement.

The above studies collectively indicate that the introduction of SSD, standing desks or standing biased desks collectively seemed to produce promising results for school children in terms of acceptance, reducing sedentariness, increasing standing time, and increasing energy expenditure without affecting academic engagement. Reducing sedentariness has a promise of reducing obesity among school children.

1.2 Reducing Sedentariness Among College Students

Limited number of studies were found that investigated the effect of reduction of seating time for the college students. A study (n=96) by Finch et al. (2017) found that standing at a desk did not impair (or enhance) performance on reading comprehension or creativity tasks relative to sitting at a desk, regardless of participants' level of regular physical activity, sedentary behavior, BMI, or prior experience with standing desks. The outcome of the study suggested that "...if university students choose to use standing desks in an effort to reduce sitting time or promote health, doing so may increase their short-term task engagement without undermining work performance".

A recent randomized, crossover trial conducted by Butler et al., (2018) assessing healthy college students (n=21) who attended at least two courses per week (a minimum of 5 hours) in a specified university building with standing desks was studied. The participants were randomly assigned to the phase of intervention of which they should start (sitting or standing) , and concluded that a standing desk in the classroom paradigm was found to significantly improve cardiometabolic health throughout a short 3 weeks' time span. Increasing standing time in the classroom, and therefore lessening weekly sedentary behavior, could be a potential wide-scale, effective strategy for primordial prevention of cardiometabolic diseases.

Given that a full-time college student in the US spends more than 15 hours per week sitting in a college classroom, it may be an ideal setting for implementation of SSD to reduce college students' sedentary time. Through literature search, we found only two studies (Benzo et al. 2016; Jerome et al. 2017) reported by researchers with affiliation in the same large Midwestern University, who investigated and tested SSD use in college classroom settings.

Benzo et al. (2016) conducted a survey among the students (n=993) to explore the acceptability and feasibility of introducing standing desks in classrooms. The findings of this study indicated most students (83%) currently sit for the entirety of their college classes due in large part to the lack of access to standing desk options. The large majority of students (95%) reported they would prefer the option to stand in class. More than half of students predicted having access to standing desks in class would improve student's physical health, attention in class, and restlessness in class.

Jerome et al. (2017) reported equipping one classroom with 25 standing desks and comparing student sitting and standing behavior with a classroom with standard seating desks, over a 12-week period. The standing desks were height adjustable and inexpensive ($ 240 each)

with a stool to sit on. A signage ("Do you know standing burns up to 50 more calories per hour than sitting") was used to encourage standing. They used a crossover design, students switched from seating desks to SSD in the middle of the study period. Seating and standing times of students (n=496) were measured by analyzing video recordings of over one class period during the sixth and twelfth week of the study. When provided access to SSD, students stood 6.2 min/hr./student ($p < 0.001$) more compared to when they had only access to a seated desk. At the end of the twelfth week, students participated (n=143) in a post intervention online survey and reported strongly favorable responses for perceived change engagement (reduction in restlessness, boredom, fatigue and joint pain) and affective outcomes (increased attention, class participation) while using the SSD.

1.3 Objective Of This Study

Based on the evidence supporting SSD as a means for reducing sitting time in office setting and precollege setting, and the lack of the SSD studies in college classrooms, especially in a technological school, the objective of this study is to explore students' perceived impact on future SSD introduction in NJIT classrooms. The primary purpose of this study is to focus on the acceptability of sit-stand desks in college students. The outcome would provide a baseline measure of college students' sedentary habits, physical inactivity and activity levels, acceptance level of SSD in classrooms, and perceived effect of SSD on their health and educational outcomes.

CHAPTER 2

METHOD

Graduate and undergraduate students at New Jersey Institute of Technology were recruited to complete a needs-based assessment survey. The survey was designed to measure the sedentariness of students and explored their beliefs and opinions of introducing SSDs in college classrooms. Participants of this study were randomly selected using their students' email addresses and were not categorized according to their races and ethnic backgrounds. A recruitment email was sent out to randomly selected 600 students to participate in the voluntary online questionnaire survey. The invitation included informed consent, eligibility criteria and the opportunity for all participants to be included in a lucky raffle draw to win one of twenty, fifty-dollar ($50) Amazon gift cards (Appendix A).

The survey questions were estimated to be about 5 minutes for every participant to complete. All the survey questions were made mandatory. By clicking on the survey link embedded in the form, all participants acknowledge that they are at least 18 years old and willing to provide information required for the purpose of the research study. The form was designed in a way to prevent multiple submission by restricting only one response per participant, and none of the participants will be able to submit the google form until all the questions are answered. This does not imply that respondents are bound to fill out all fields. If participants do not want to fill out any question, they could opt out by choosing not to submit the survey. That will be the same as stopping participation and exiting the facility in a physical sense.

The partially filled surveys were not useful for the study. Thinking about the busy schedules of many students, it is assumed that they may not complete the whole survey carefully

before they click on the submit button, unless the fields are made mandatory. Making the fields mandatory is a simple way to remind the student if they miss some fields. The survey questions asked were simple, not objectionable to anyone. However, if any participant has an objection, he/she can always withdraw by not clicking on the submit button.

The initial email request, two reminders were sent to the students who did not participate up to that point of time. At the end of the third survey request, after which a sample size was reached or no more submissions were expected, the survey was considered closed.

Risk attributed to physical human contact pertaining to this research study is nonexistent. There was no physical contact with the subjects. All information was received over the internet via a questionnaire survey. The questionnaire has minimal risks that are similar to that one experience when discussing personal information with others. The survey results were treated as confidential and only accessible by the research team.

2.1 The Survey Questionnaire

The questionnaire was divided into four sections. The first section includes five basic personal questions, second section includes three questions on Physical Inactivity and Sedentary behavior, third section has two questions on vigorous and moderate physical activity, and the fourth section is for participants to provide personal opinion about availability of SSD in the classroom. The question type includes multiple choice, dichotomous, Likert scale, demographic, and text questions.

The questionnaire was prepared to obtain student perception and feedback using an online survey via google form. The survey was reviewed and approved by the University Institutional Review Board (2203018692) before it was sent out to the students (Appendix B).

The demographics part of the questionnaire included age, gender, height, weight, class status, and full-time/part-time student status. From the self-reported height and weight, Body Mass Index (BMI) was calculated.

Sedentary behaviors were estimated using a tool based on the Rapid Assessment of Disuse Index (RADI) which has been demonstrated as a reliable measure of sedentary behavior (Shuval et al. 2014, Benzo et al. 2016). Sedentariness is assessed by two questions on daily activity, moving around and climbing stairs, and one question on daily inactivity, sitting down. Participants were asked to estimate their daily activity and inactivity levels resulting in a possible score of 3-14. Higher sedentariness score has been significantly correlated with increased sedentary time, fewer sedentary breaks and reduced physical activity (Nader et. al 2008). Based on the RADI literature, a score of 9 or higher is indicative of sedentary behavior and should benefit from reducing sedentariness and increasing physical activity level.

Physical activity and fitness level were estimated by using a validated five item single response questionnaire (PA5) on their exercise habits (Jackson et al. 2007). The outcome of this questionnaire is positively correlated to cardiorespiratory fitness levels. A physically active individual is classified as performing minimum 20 minutes of vigorous exercise 3 days a week or performing minimum 30 minutes moderate exercise 5 days a week. Vigorous physical activity includes activities like jogging, running, aerobics, swimming laps, fast cycling, singles tennis, and racquetball. Any activity that makes one work as hard as jogging at least 20 minutes at a time are considered vigorous physical activity. These types of activities increase one's heart rate

and make one sweat or out of breath (not including weightlifting exercise). Moderate physical activity includes activities such as brisk walking, gardening, slow cycling, dancing, double tennis, or yard work around the house. Any activity that makes one work as hard as brisk walking in bouts of at least 8-10 minutes accumulating to at least 30 minutes a day. Performing vigorous physical exercise at least 3 days a week or performing moderate exercise at least 5 days a week for the last one month or more is considered to be a physically active individual (Jackson et al. 2007).

Students' opinions about SSD in classroom were explored by two questions: (1) if SSD was made available in their classrooms, would you prefer to sit or stand in the class, and (2) the percentage of class time they would stand if SSDs were available in their classroom. Students who don't want to stand at all would be considered to have unfavorable opinions about SSD.

Students' opinion about on educational outcomes (focus, restlessness, attentions, engagement, boredom, and academic performance) and health outcomes (physical health, fatigue, and back pain) if SSD was available in the classroom were assess in terms of "get worse", "no change" and "get better".

2.2 Survey Sample Size

The total number of estimated students enrolled in the fall semester 2022 at NJIT was estimated to be approximately 11, 652; where 9,084 were enrolled in undergraduate programs, and 2,568 students were enrolled in graduate programs. By gender, 8,478 male and 3,154 females are currently enrolled. All data for the purpose of this survey were collected between September and October 2022.

Research Sample Size

Expected sample size for this research study was calculated using the Sample size calculator with the following data:

Approximate Student Population Size = 11,652

Confidence Level = 90%

Margin of Error = 5%

Sample Size = 267

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

N = population size • e = Margin of error (percentage in decimal form) • z = z-score

Figure 2.1 Formula for Sample size calculation.

Size Calculation: "https://www.surveymonkey.com/mp/sample- size-calculator"

CHAPTER 3

RESULT

A total of 178 undergraduate and graduate students participated and completed the survey for this study. Participants' mean (standard deviation) age was 22.4(4.7) years old, 63% identified as male, 33% identified as female while 4% were of the other gender class. See Table 3.1

Participants self-reported their height and weight as part of the questionnaire. The mean (standard deviation) of male and female students' heights were 69.2(3.0) and 64.1(2.3) inches, respectively and weights were 169.7(30.0) and 140.4(30.0) lbs., respectively.

The Body mass index (BMI) is a person's weight in kilograms divided by the square of height in meters. Mean (standard deviation) of male and female participants' BMIs were comparable to each other, 24.9 (4.0) and 24.0 (4.9) respectively. A two tailed t-test determined that the difference in the mean BMI for male and female students are not statistically different ($p=0.25$), and the mean (standard deviation) of BMI of the student population was 24.7 (4.4). According to the BMI weight category, 6.3% of the respondents were underweight, 49.4% healthy weight, 32.4% overweight, and 11.9% obese.

Given the fact that the majority of NJIT students are full time students, 94% of participants who took the survey attend NJIT as full-time students, while the remaining 6% attend as part-time students. The distribution of student class status among the respondents were evenly distributed to represent the NJIT student body - freshmen 15.3%, sophomore 18.6%, junior 19.2%, senior 15.8%, and graduate students 31.1%.

Table 3.1 Participant's Demographics Expressed in Means (Standard Deviation) or Percentages

Descriptive	Responses (n = 178)
Age (years)	22.4 (4.7)
Gender	
Male	63%
Female	33%
Other	4%
Male height (inches)	69.2 (3.0)
Female height (inches)	64.1 (2.3)
Male weight (Lbs.)	169.7 (30.0)
Female weight (Lbs.)	140.4 (30.0)
Male BMI (kg/m^2)	24.9 (4.0)
Female BMI (kg/m^2)	24.0 (4.9)
BMI of combined male and female students	24.7 (4.4)
Underweight (below 18.5)	6.3%
Normal Weight (18.5-24.9)	49.4%
Overweight (25.0-29.9)	32.4%
Obese (30.0 and above)	11.9%
Full-time student	94%
Part-time student	6%
Student class status	
Freshmen	15.3%
Sophomore	18.6%
Junior	19.2%
Senior	15.8%
Graduate	31.1%

RADI	
Active lifestyle	24%
Inactive lifestyle	76%
Average score	9.8 (1.9)
Physical activity level (PA-5)	
Met physical activity guideline	36.5%
Did not meet physical activity guidelines	63.5%
Average score	3.3 (1.1)

The majority of the students (76%) were classified as leading an inactive or sedentary lifestyle, having RADI scores of more than 9. The average (standard deviation) of the RADI score was 9.8(1.9).

In terms of PA-5 instruments, 63.5% of the students did not meet the physical activity guideline. On a scale of 1-5, a score of 4 or more meets the guideline for physical activity. The average (standard deviation) PA-5 score was 3.3(1.1).

Students' opinions regarding preference for Sit stand Desk in College classrooms were assessed using the survey questionnaire (Table 3.2). More than half, 69% of the students reported a preference to have the option to sit part of the time and stand part of the time, as opposed to 29% preferred to sit the entire class time, while 3% preferred to stand the entire time. Overall, over 70% of the students opted for an opportunity to have the ability to alternate between sitting and standing the entire class time.

If SSD were made available in a class that students are currently taking, only about 11% participants preferred not to stand at all during the class time, and 89% students preferred to stand for at least 10% of class time.

Table 3.2 Students' Opinion And Acceptability of Sit-stand Desks in Classrooms

Questions	Responses (n = 178)
If given the option by your instructor, would you prefer to sit or stand in the class?	
Sit entire class time	28.7%
Sit part of the time and stand part of the time	68.5%
Stand entire class time	2.8%
If sit-stand desks are made available in a class you are taking, what percentage of class time do you predict you would stand on an average?	
0% of time	10.7%
25% of time	44.9%
50% of time	31.5%
75% of time	10.1%
100% of time	1.7%
Other (10%, 20%)	1.2%

Students' prediction of changes in academic and health outcomes if SSDs were made available in college classrooms was assessed as part of the survey questions. Most of the students predicted either no change or positive change (get better) in all academic and health factors (Table 3.3). 66% projected that restlessness during class time will get better, focus during class will get better with 49% response rate, 55% of participant's attention during class time will increase, 46% believe engagement during class will be increased. The boredom rate

during class time will get better with 55% response rate, fatigue normally experienced by students is projected to improve by 47%, and academic performance levels will increase by 46%. 82% of participants agreed that overall physical health will get better while 76% will see a reduction in the level of back pain experienced by students.

However, engagement of students with sit- stand desks in college classrooms might not be significantly changed with 51% response projecting implementation of Sit-Stand Desks may not have an impact on level of student's engagement during class time. 14% of students do anticipate that the level of fatigue may get worse, while 38% projected no changes will be felt if a sit- stand desk is introduced in the classroom.

Table 3.3 Students' Predicted Changes in Academic And Health Outcomes If SSD Were Made Available in Classrooms

Factor	Students (n = 178)		
	Get worse	No change	Get better
Focus	7.9	43.3	48.9
Restlessness	10.7	23.6	65.7
Attention	6.2	38.8	55.1
Engagement	3.4	50.6	46.1
Boredom	7.9	37.1	55.1
Academic Performance	2.8	51.7	45.5
Physical Health	1.1	16.3	82.6
Fatigue	14.6	38.2	47.2
Back pain	9.6	15.2	75.3

Note: All results are presented as percentages.

CHAPTER 4

DISCUSSION

This is a study on the acceptability and preference of students' usage of Sit-Stand Desks in College Classrooms. The outcome of this study is largely in favor of the introduction of SSD in college classrooms. Results indicated that over sixty percent of students will prefer the option to have an adjustable sit-stand desk in college classrooms, 89% of the students would prefer to stand for at least 10% of class time, thus providing opportunities to reduce the pattern of sedentariness often observed in college students without interfering with the regular class activities.

This study further builds on previous studies conducted to explore the acceptability of Sit-Stand Desks both in kindergarten and college classrooms. (Benzo et al., 2016; Clemes et al., 2015; Raulli 2017). Assessment of student's health and academic changes if sit-stand desks were provided in college classrooms which include restlessness during class time (65.7%), attention during class time (48.9%), physical health (82.6%) and back pain reduction (75.3%) were all projected to get better with over fifty percent uniform responses.

In this study, 49.4% of the students maintained a healthy BMI status according to the BMI weight category, 32.4% were projected to be on the border line while a lower percentage (11.9%) were obese. However, physical activity and fitness level estimated using the PA-5 instruments indicated that 63.5% of students who participated in this study are not considered to be physically active.

The perception that proposed introduction of Sit-stand desks in college classrooms will greatly improve physical health (82.6%), especially back pain alleviation (75.3%) which is often caused

by prolonged sitting and sedentariness observed in college students. Students' mood improvement and expectations to be more proactive during class would be greatly improved with 55.1% expecting that with the introduction of Sit-stand desks in college classrooms, the boredom rate will get better.

4.1 Study Comparison

In a study by Benzo et al. (2016), the findings suggest both students and instructors were largely in favor of introducing standing desks into college classrooms, while this study only focused largely on the student's population with projected acceptance rate of 68.5% in favor of introduction of Sit-stand desk in college classrooms.

In comparison to the research study conducted by Jerome et al., (2017) with reported outcome that "Introducing sit-stand desks may have resulted in improvements in several engagement and affective outcomes as well. Notably, more than half of all participants reported increased "attention" and decreased "restlessness" during class. More than one-third reported increases in "focus" and "engagement" and declines in "fatigue" and "boredom" during class". It is important to note the preference for sit-stand desks for college students generally which was also proved in this study with a projected high reduction rate of feelings of fatigue and high increase in overall academic performance of students.

Students' population in previous studies conducted by Benzo et al., (2016) in a university for college students had a larger percentage of freshmen (51.5%) that participated in the study, while in this study the higher percentage of students that responded and participated were graduate students (31.1%). This proved that the preference for Sit-stand desks in college classrooms is not limited to a particular group of student's population or type of school attended,

rather it is becoming universally acceptable. “Changing the classroom into an environment that reduces sitting has the potential to increase overall physical activity levels, reduce sedentary time, and consequently improve health outcomes for children throughout the lifespan” (Hinckson, E.A et at., 2013).

The study strength includes randomization of the participants which ensured that all races, ethnic groups, and genders were given the same opportunity to participate in the study.

There are some limitations to this research study conducted, the survey conducted was limited to one semester, the responses obtained may not represent the overall percentage of students enrolled in the university; the weight and height were self-reported and not physically measured for accuracy; and the survey was limited to only students, none of the instructors were involved.

CHAPTER 5

CONCLUSION

Students are adaptive to changes especially if it is going to help improve their physical health. Overall projected acceptance rate was high, this proved that provision of a sit-stand desk in college classrooms will be beneficial for college students. The outcome of this study indicates that if given the opportunity, 68.5% of students who participated in this study will choose to sit part of the time and stand part of the time with the provision of Sit-stand desks in college classrooms, while about 82.6% of them will be expecting their overall physical health to improve greatly. It is imperative not to encourage a sedentary lifestyle pattern in college students. Future research studies may focus more on Pilot study in some NJIT classrooms after implementing SSD in the classrooms to see the physical outcome and observe students' perception.

APPENDIX A

INVITATION EMAIL TO STUDENTS REQUESTING TO PARTICIPATE IN THE INTRODUCTION OF ADJUSTABLE SIT-STAND DESKS IN NJIT CLASSROOMS SURVEY

Dear Student,

We invite you to participate in a research study entitled "**Student Perception on Acceptability and Usefulness of Sit-Stand Desks in College Classrooms.**" Our research team from the **Mechanical and Industrial Engineering Department** of NJIT wants to learn about NJIT students' receptiveness, belief, and opinion to the opportunity of having adjustable sit-stand desks in college classrooms. To gather this information, we invite you to take part in this online questionnaire survey. If you decide to participate, you will be asked to complete the online questionnaire which will take less than 5 minutes of your time and **YOU WILL BE INCLUDED IN A RAFFLE DRAW TO WIN ONE OF THE TWENTY, $50 AMAZON GIFT CARDS**. Your decision to participate will not affect your current or future dealings with NJIT.

We assure you that all information you give will be kept completely confidential and that none of it will be released in any way that would permit identification of you. All data obtained from the survey will be used solely for research purposes. Personal identifiers will not be published or presented. While all precautions have been taken to protect the security of your responses, the internet does not allow for absolute and total security.

We anticipate a minimal risk to you from your participating in this study. These risks are similar to those you experience when discussing personal information with others.

If you have any questions about the research procedures, or if you feel you are harmed by this research, please contact the principal investigator at: Dr. Arijit K. Sengupta, (973) 642-7073; sengupta@njit.edu

Contact the Institutional Review Board (IRB) if you have questions regarding your rights as a research participant. Also, contact the IRB if you have questions, complaints, or concerns which you do not feel you can discuss with the investigator. The NJIT IRB may be reached by phone at (973) 596-5275 or by email at irb@njit.edu

By clicking on the survey link below, you are acknowledging that you are at least 18 years old, you have read the information in this consent form, and you are volunteering to participate in this study.

Survey Link

Thank you for your time and consideration in taking part in this research project.

APPENDIX B

QUESTIONNAIRE SURVEY OF STUDENT RECEPTIVENESS OF ADJUSTABLE SIT-STAND DESKS IN NJIT CLASSROOMS

Please read the questions carefully and give your response as accurately as possible.

* Required

1.Email *_____

Personal details

2. Your age in years *

3. Your gender *

Female

Male

Prefer not to say
Other:

4. Your height in feet and inches *

5. Your weight in lbs. *

6. Student class status *

Freshmen

Sophomore

Junior

Senior

Graduate student

Other:

7. Full-time student *

Yes

No

8. Your email address *

Physical Inactivity and Sedentary Behavior

9. About how many hours a day do you typically spend moving around on your feet? *

less than 1hour a day

1 to 3 hours a day

4 to 5 hours a day

6 to 7 hours a day

More than 7 hours a day

10. About how many flights of stairs do you typically climb up each day? (let 10 steps = 1 flight) *

1 - 4 flights a day

4 - 8 flights a day

9 -12 flights a day

13 or more flights a day

11. About how many hours a day do you spent typically sitting (include sitting at work/classes/home, watching TV etc.) *

12 hours or more a day

8 to 11 hours a day

4 to 10 hours a day

3 to 5 hours a day

5 Less than 3 hours a day

Physical Activity

12. Vigorous physical activity includes activities like jogging, running, aerobics, swimming laps, fast cycling, singles tennis and racquetball. Count any activity that makes you work as hard as jogging at least 20 minutes at a time. These types of activities increase your heart rate and make you sweat or feel you out of breath – *Don't count weightlifting. Select one response to describe your vigorous activity level*

I don’t do vigorous exercise and I don’t plan to start in near future

I don’t do vigorous exercise regularly now, but I have been thinking about starting

I’m doing vigorous exercise fewer than 3 days a week.

I’ve been doing vigorous exercise more than 3 days a week for the last 1 to 6 months

I’ve been doing vigorous exercise more than 3 days a week for the last 7 months or longer.

13. Moderate physical activity includes activities such as brisk walking, gardening, slow cycling, dancing, double tennis, or yard work around the house. Count any activity that makes you work as hard as brisk walking in bouts of at least 8-10 minutes accumulating to at least 30 minutes a day.

Select one response to describe your moderate activity level

I don’t do moderate exercise and I don’t plan to start in near future

I don’t do moderate exercise regularly now, but I have been thinking about starting

I’m doing moderate exercise fewer than 5 days a week.

I’ve been doing moderate exercise more than 5 days a week for the last 1 to 6 months

I’ve been doing moderate exercise more than 5 days a week for the last 7 months or longer.

Your opinion about sit-stand desks in classroom

14. If given option by your instructor, would you prefer to sit or stand in the class

Sit entire class time

Sit part of the time and stand part of the time

Stand entire class time

15. If sit-stand desks are made available in a class you are taking, what percentage of class time do you predict you would stand on an average

0% of time

25% of time

50% of time

75% of time

100% of time

Other:

16. Indicate your prediction of changes in health and academic outcomes, if sit-stand desks are made available in college classrooms. **Select one option from each row.**

Mark only one oval per row.

	Get worse	No change	Get better
Focus during the class	⬭	⬭	⬭
Restlessness during the class	⬭	⬭	⬭
Attention during the class	⬭	⬭	⬭
Engagement during the class	⬭	⬭	⬭
Boredom during the class	⬭	⬭	⬭
Physical health	⬭	⬭	⬭
Fatigue	⬭	⬭	⬭
Back pain	⬭	⬭	⬭
Academic performance	⬭	⬭	⬭

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