

The Impact of a Window in the Classroom on Learning as  
Perceived by Students and Teachers

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## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

### **Dedication**

To my loving husband Herb,  
my partner who enjoyed this process with me.

To my three wonderful children,  
Brandon, Dara and Shawna, who learned along side me.

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### **Abstract**

Perceptions of the impact of a window in the classroom on learning at a large urban college were explored in a qualitative study involving 20 students, teachers, and administrators. Their perceptions indicated many benefits from a properly placed window and, in particular, from the light from a window. A window in the class contributed to increased concentration, alertness, and the motivation to learn. Conversely, without daylight participants found they were tired, disoriented, sad and less able to learn. The view from a window, ideally of nature, provided a mental break to help re-focus on learning, while a busy view was found to be a distraction to learning and possibly a greater distraction for auditory learners or those with an auditory dysfunction. The window was considered a possible exit that made participants feel safe, rather than trapped. An operable window was thought to control temperature and ventilation, and to provide a healthier classroom environment. A classroom without an operable window was considered unhealthy and claustrophobic. The study concluded that participants related a classroom window to a sense of health and safety that is needed for learning to take place. The findings of this study recommend providing an operable window in a classroom to provide daylighting, additional ventilation and optimally, a view of nature.

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## **Chapter 1: The Problem Defined**

### **Background Statement**

When students enter the classroom, first impressions of the learning environment are made. “Welcome to prison: We dare you to learn” stated Barbara Worth of the Council of Educational Facility Planners International (as cited in Perlstein, 2010). She said that this is virtually what we are telling our students in regards to their physical learning spaces. Not only is what we teach, and how we teach critical, but also where we teach. A window can impact a classroom by adding natural light (daylighting), ventilation, and a view, but it is questionable if a window in a classroom has an impact on learning.

The typical classroom used in this study is for teaching a general education course in a college. The Ontario Building Code (2006) does not require the inclusion of a window in classrooms for health or safety reasons. There are costs for its inclusion, both financial and environmental.

The material and installation cost of a window is much greater than that of the wall it replaces; plus it needs more costly maintenance over time (for example window caulking, cleaning, and replacement). In addition, even the best quality window will not obtain equal insulation values as a well insulated wall of equal cost. Therefore, a window in a classroom requires greater energy consumption. Not only does this extra energy have a financial cost, but at this period in time, sustainable development, ‘green building’, and energy conservation is a priority. As a result, not only are there financial benefits to construct and maintain a building without windows, but there might also be the environmental benefits. Considering not only the financial and environmental costs, but very importantly the possible influence a window might have on learning, why then, would one add a window to a classroom without careful consideration?

Some quantitative studies have shown that elementary school students learn some subjects more quickly in a classroom with windows (Heschong Mahone Group, 1999; Plympton, Conway, Epstein, 2000; Kennedy, 2007). There has also been a quantitative study that has shown a direct relationship, though non-linear, to student performance and daylighting in postsecondary schools (Herzog, 2007), as well as a study to the contrary (Veltri, Banning & Davies, 2006). Unfortunately, there has been a general lack of studies

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about the impact of a window in postsecondary classrooms. Tanner and Lackney (as cited in Tanner, 2008 p. 385) argued the following:

There is ample evidence that people need daylight to regulate circadian rhythms, a natural biological function.... Poorly lit and windowless classrooms can cause students to experience a daily form of jet lag; furthermore, forms of fluorescent lighting may affect some students and teachers negatively by causing mild seizures.

The purpose of this study is to explore the impact of a window in the classroom on learning as perceived by students and teachers at a large urban college. When Tanner and Lackney (as cited in Tanner, 2008 p. 385) argue the merits of a window in a classroom, they speak of the health benefits provided by a window. They also mention potential deleterious consequences to one's health when one is deprived of a window in a classroom. Could this have an impact on a student's performance in the classroom? The Hescong Mahone Group (1999) study speaks of the quicker acquisition of reading and math skills in a 'windowed' classroom. On the other hand, in a qualitative case study by Veltri, Banning and Davies (2006), some students in a focus group felt that windows in a classroom could be a distraction.

Windows can provide light, ventilation, and view. Though all three functions might be desirable in a building, a window is not necessarily needed for light or ventilation, nor is a view a requirement in a building. The queries arise: one, whether there is something significant about natural light compared to artificial light; two, whether an operable window is a meaningful replacement for mechanical ventilation; three, whether a view is an important addition in the function of a building, and in particular, a classroom.

There are sub-factors to these three functions of a window in a classroom. A window can be important to health in providing vitamin D or the regulation of one's circadian rhythm and to atmosphere by providing a view, or by rendering a room in its true colours by allowing in natural light.

Classrooms in a college are generally allocated without regard to windows. Perhaps, this allocation would be more critical if it was found that a window had a significant impact on learning.

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### **Problem Statement**

The goal of this research is to determine whether or not a window in a classroom is necessary, desirable or perhaps an impediment to learning. A window can provide natural light, control of ventilation, and a view to the outside. Past research has shown a window to have both positive and negative impacts on learning.

Some studies (Heschong Mahone Group, 1999; Plympton, Conway, Epstein, 2000; Kennedy, 2007) have shown positive results on learning in a classroom with windows. There was a particularly significant quantitative study including over 21,000 elementary school students, completed by the Heschong Mahone Group (1999), where daylighting from a window in classrooms was examined regarding its impact on learning. It found that students with the most daylighting in their classrooms progressed 20 percent faster in mathematics and 26 percent faster in reading over a period of one year, than students in classrooms without windows. This particular research study was considered definitive and was cited in a number of articles (Herzog, 2007; Kennedy, 2007; Plympton, Conway & Epstein, 2000; Tanner, 2008).

Some studies have shown that the lack of a window might cause illness (Chambers, 2004; Hastings, Fadiman, & James, 1980; Hathaway, Hargreaves, Thompson, & Novitsky, 1992; Heschong Mahone Group, 2002; Kennedy, 2007). Symptoms of jet lag, as well as mild seizures when fluorescent lighting was used to replace daylighting, were noted by Tanner and Lackney (as cited in Tanner, 2008 p. 385). If a student feels sick at school, their performance could be impaired, or they might not even attend as often. Hathaway et al. (1992) found that elementary school attendance with simulated 'natural' daylighting increased an average of about 3.2 days per year, compared to attendance in schools with other forms of artificial lighting.

Veltri et al., (2006) noted that the lack of daylight in a classroom can cause drowsiness. Students related to researchers that the lack of lighting in one classroom seemed to induce sleepiness, and their body reacted by actually falling asleep, an obviously major impediment to student learning (Veltri et al., 2006, p. 521).

A view from a window might impact a room positively or negatively depending on the function of that room. Dillard (as cited by Creswell, 2009, p. 82) alluded to the

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distraction that a window could cause in certain types of work. In her case it was writing. In a qualitative case study, some students of a post secondary school also noted that windows could be a noisy distraction (Veltri et al, 2006). On the other hand, Tanner (2008) noted that the distraction provided by a view in a classroom was a positive one. He said that when a mental break was needed, a view provided a quicker mental break than one presented by doodling and this could be valuable to the learning process.

In summary, studies have indicated positive and negative relationships between a window in the classroom and learning. There has been research indicating faster progress in mathematics and reading (Heschong Mahone Group, 1999), improved class attendance (Hathaway et al., 1992), and positive mental breaks (Tanner, 2008) with a window. Studies have also pointed to the possibility of physical ailments resulting from classrooms without windows (Hathaway et al., 1992). On the other hand, there have also been studies suggesting a negative impact on learning due to distractions from a window (Veltri et al, 2006). The questions remain: one, whether windows really have an impact on learning in a classroom; two, whether the effect of a window in a classroom on learning is positive, negative, or insignificant, and; three, whether windows in the classroom are critical to some and not others, or conceivably dependant on individual learning style. Apparent contradictions and inconclusiveness from existing studies indicate that further study is warranted.

### **Purpose of the Study**

The purpose of this study is to explore the impact of a window in the classroom on learning as perceived by students and teachers in a college. The intention is to explore whether or not there is value, particularly in relation to learning, in having a window in a classroom.

Specific classroom choices are being made all the time, based on a variety of criteria such as size, equipment and furniture. As a teacher at a college, teaching in a physical environment that is more conducive to learning would make the task of teaching and learning more successful. As an architect, the design of a school means planning the best physical environment possible for its users. If implementation of a window enhances or

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detracts from this environment, then this is valuable information for an architect to consider in the design of a school.

This study would also have value to education. New schools are not only planned to meet the space demands of students, they are also designed to complement their learning requirements as much as possible. If the presence of a window in a classroom impacts learning, then this information would be beneficial when classroom space is being allocated.

### Research Questions

The primary question under investigation in this study is to determine in what ways a window in the classroom of a college impacts learning, as perceived by students and teachers. The other questions that this study will explore include:

1. What are the ways a window impacts a room?
2. What is the purpose of having a window in a classroom?
3. In what ways would a window be beneficial in a classroom, as perceived by students?
4. In what ways would a window be beneficial in a classroom, as perceived by teachers?
5. In what ways would a window be detrimental in a classroom, as perceived by students?
6. In what ways would a window be detrimental in a classroom, as perceived by teachers?

### Definitions of Terms

**Daylighting:** This is meant to describe lighting a room using natural light through windows or skylights, as opposed to using artificial lights. Daylighting and natural lighting are synonymous.

**View:** In order for a window to be considered as providing a view, it must be at viewing level. If a window is situated too high or low and if the angle of view is extreme, then the window is not providing a view (Canadian Green Building Council [CaGBC], 2004).

**Operable window:** This type of window can be manually configured to allow natural ventilation, and thus meets the three possible functions of a window, daylighting, view, and ventilation. A non-operable window can provide only daylighting and a view.

### **Limitations of the Study**

This study was limited to a sample population of students and teachers at a large urban community college in Ontario. There was a time limitation to interview students during the study term, when they were easily accessed. This determined the season that the students viewed when they looked out the window in their classrooms. The season for this study was the winter. This could have influenced the results, since looking at a view from a window in the winter in Ontario is different from other seasons and areas, and in fact, the light quality varies at different times of year. The sample group was from general education classes and included both students and teachers. Administrators were also interviewed from the same college. This specific sample population influenced the generalizability of the study.

## **Chapter 2: Review of Literature**

This study explores the impact of a window in the classroom on learning, as perceived by students and teachers at a large urban college. Classroom space in a college is generally allocated to courses without regard to whether or not there is a window in that classroom. If it was found that a window had an impact on learning, then schools may want to consider including windows in classrooms more carefully in the future.

Some studies show that the physical environment can impact student behavior and learning (Banning & Canard, 1986; Cornell, 2002; Earthman, 1996; Tanner, 2008; Veltri, Banning and Davies 2006). The physical environment, in this context, is identified as the architecture of the classroom. The scope of architectural design includes room size, shape, height, furnishings, windows, and lighting. In the article by Veltri, Banning and Davies (2006), it was noted that the physical classroom environment could influence classroom behaviours and class attendance. Cornell (2002) said that the physical space or classroom should be a place that students want to be, and this was critical for learning.

This literature review first considers learning theory. It then examines factors that impact learning. It next looks at literature relating to the influence of the physical environment on learning, the impact of windows in a classroom, and finally, the impact of windows on learning.

### **Learning Theory**

Learning can be looked at in a number of different ways. It can be thought to be a product or a process. As a product, it might be defined as an outcome or a change in behavior (Smith, 2009). Can a classroom environment affect a change in behaviour?

As a process, Roger (as cited in Smith, 2009) noted that learning might happen as a process such as acquisition learning or as formalized learning. In acquisition learning (or task-conscious learning), the learner may not be conscious of learning, but conscious of the task at hand, while in formalized learning (or learning-conscious learning), it is obvious that the intent of the activity is to learn. An example of acquisition learning might be the task of creating a song, where the task would be to produce the song. The unconscious learning might be in the writing skill acquired in the process of writing the lyrics to the song. In formalized learning, the lesson might be to consciously practice

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writing skills through an assignment that requires specific sentence structures to be written. There is overlap between the two types of learning. For example, one might be asked to create a song, but to write one verse where the lyrics in the song are in the form of questions, and another verse using imperative language. In this case there would be some conscious learning, due to the specific instructions, yet the task of song production would make it a less learning conscious experience than just being asked to write a question or an imperative sentence. This study poses the question whether the physical environment, specifically a window in the classroom, could impact either task-conscious or learning-conscious learning, and if either type of learning is influenced by a window in a classroom positively or negatively.

There are also additional learning theories. The behaviorist theory views the learning process as a change in behavior. An example would be a stimulus-response theory of learning. One would reinforce a behaviour that is desired and punish or ignore an unwanted behaviour (Smith, 1999). Could a windowless classroom be considered a punishment (or the opposite, a reward) and thus influence learning?

The cognitivist views the learning process as information processing. It would not be an event but rather a mental process. An example would be learning by discovery (Smith, 1999). In information gathering and learning by discovery, could a view from a window stimulate learning or perhaps cause a distraction to learning?

The humanist view looks at learning theory as a personal act to fulfill potential. An example would be learning that engages the whole person. This would include personal involvement, self initiation, and self evaluation (Smith, 1999). In learning that engages the whole person, might the physical environment also take a role and be influential in impacting the person, and therefore learning?

Finally, the social and situational theory of learning is thought of as interactions in social contexts. An example of this type of learning would be participating in a community of practice (Smith, 1999). In social and situational theory, Merriam and Caffarella (2009) noted that the locus of learning is in the relationship between people and the environment. Could a window in the classroom open up the classroom environment to embrace a more inclusive exterior environment to encourage this type of

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learning? In this particular study, examining the impact of a window on learning looked at the specific aspects of the environment where learning can take place, including the classroom. The learning in this classroom might be acquisition learning, formalized learning or something in between.

Literature on learning theory did not specifically say that a window has an impact on learning. Depending on the type of learning taking place, some suggested that a window in a classroom environment may be more or less conducive to learning.

### **Factors that Impact Learning**

There are various factors that can impact learning. John Hattie (1999) synthesized meta-analyses related to learning and achievement. Hattie (2009) examined the 'innovations' of 'physical attributes of the school' and 'class environment'. He studied the influences on student learning through effect-sizes. An effect-size was his unit of measurement and it indicated the influence of a particular 'innovation' with achievement in learning. An 'innovation' with an effect-size of 1.0 was associated with a two grade advancement in a General Certificate of Secondary Education (GCSE), which is an academic qualification awarded in a specified subject. An effect size of 0.5 would equate to one grade advancement in a GSCE (Hattie, 1999).

Over the ten years that he had been accumulating studies, his data represented "337 meta-analyses, 200,000 effect-sizes from 180,000 studies, representing approximately 50+ million students, and covering almost all methods of innovation" (Hattie, 1999, p. 5). This report was very significant in regards to factors impacting learning since it synthesized such a large quantity of related studies. The 'innovation' that had the largest impact on learning as determined by its effect size of 1.13 was reinforcement which included feedback (Hattie, 1999).

Other 'innovations' or factors that had significant positive impacts on learning according to Hattie's meta-analyses were: Students prior cognitive ability 1.04, Instructional quality 1.00, Class environment 0.56, Peer tutoring 0.50, Mastery learning 0.50, Parent involvement 0.46, and Homework 0.43 (Hattie, 1999, p. 8). The lowest effect-size that he recorded was retention (holding the student back). Retention had an effect-size of -0.15 which indicated a negative effect-size (Hattie, 1999).

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The 'innovations' of 'physical attributes of the school' and 'class environment' came closest to relating to a window in the classroom, examined in this study. The 'innovation' of 'physical attributes of the school', included areas such as the architecture of school, timetabling differences, and working conditions (Hattie, 2009, p. 33). A window may be considered in this 'innovation' of 'physical attributes of the school' under the component of architecture of the school, but it was not isolated. Hattie (2009) said that this 'innovation' was not a significant influence on student achievement, but the category was not specific to windows. It had an effect-size of -0.5, which indicated a negative influence.

The other 'innovation' that Hattie analyzed that might be related to the study of the impact of a window on learning, is 'class environment'. The class environment included such goals as "...providing a safe, caring environment..." (Hattie, 2009, p. 33). It was not identified in this study whether a window in the classroom contributed positively or negatively to the class environment. Class environment was calculated to have an effect-size of 0.56, which is very significant. It would relate to a grade advancement in a GSCE of more than one grade (Hattie, 1999). If it was found that a window in the classroom enhanced the classroom environment by helping to provide a safe, caring environment, (or the lack of one contributed to an unsafe classroom or claustrophobic atmosphere) then a window might be considered a significant factor influential to learning and achievement.

In Hattie's (1999) meta-analyses, sometimes it was difficult to get an accurate answer in regards to a particular impact on learning, since in many cases numerous different factors were combined in the same analysis. The one single item being investigated, the window, could not be separated to examine its effect-size independently.

According to Maslow's (1943) often cited theory on the "Hierarchy of Needs," the lower level needs (of five levels) must be met before the higher-order needs influence behaviour. Physiological needs such as air, food and sleep are the lowest level needs (level 1). Level one needs and level two needs, safety needs such as security and health must be met before the higher level needs can be met. Level three is belongingness, including friendship, and level four is esteem including respect, while the highest level

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(five), self-actualization includes problem solving and acquiring knowledge. According to Maslow's (1943) theory, students will be most ready to learn (level five), when levels one to four needs are satisfied.

Level one needs, physiological needs include air, which can be obtained from a window. Some students might feel that a window is necessary to provide that need even though ventilation can obviously be provided without one. Level two needs, safety needs including security and health may also be seen to be satisfied only by a window for some students. Vitamin D from the sunlight, some degree of temperature control, and a potential exit from a window might give a sense of security to a percentage of students in a classroom. Level three needs, belongingness and friendship, maybe enhanced by the atmosphere in a classroom with a window. According to Maslow (1943), the needs from levels one through four should be met for level five to best take place. If a window impacts lower level needs, it is possible that a window influences the highest level needs pertaining to learning.

Hattie's (2009) class environment, which included providing a safe and caring environment, was credited to having a very significant affect on learning, according to his meta-analysis. This same definition is also included in Maslow's (1943) level two, safety needs, which Maslow indicated must be satisfied before higher level needs, self-actualization (level five needs which includes problem solving and acquiring knowledge) could be successfully accomplished. Therefore, both Hattie (1999) through his meta-analysis, and Maslow's (1943) through his hierarchy of needs, recognized the feeling of safety as an important criteria affecting learning. According to these studies on the factors that impact learning, a window is not stated directly as such a factor, but it is possible that it contributes to a safe classroom environment that impacts learning.

### **The Impact of the Physical Environment on Learning**

There have been studies specifically examining the impact of the physical environment on learning. According to Earthman (1996), student performance can be separated into two variables: student achievement and student behaviour. Earthman (1996) noted that student achievement will affect student behavior, and conversely, that student behaviour will affect student achievement. Earthman (1996) alleged that if the

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physical environment affects student behaviour, it will then affect student achievement. His study examined the relationship between school buildings, student achievement, and student behavior (Earthman, 1996). He noted some strong links between specific physical factors and student performance. Strong links to improved student performance were found in particular in regards to control of the thermal environment, illumination, adequate space and furnishings especially in the area of science (p.12).

On examining the impact of the physical space, in general, and its impact on learning, Banning and Canard (1996) noted that if the physical environment was not being used to augment student development, it was most likely not because it was felt that the physical environment is unimportant, but rather because its influence on learning was unknown to the decision makers. Banning and Canard (1996) did determine that the actual features of the physical environment can encourage or discourage the process of development significantly. Rapoport (as cited in Banning & Canard, 1986) said that this environment can give out important silent messages. A non-verbal message might be that the student is not valued (or not respected). On the other hand, messages that do show support can enhance the student's ability to cope with college stress (Banning & Canard, 1986). Maslow (1943) also included respect in the level four category of esteem. He considered it a precursor to a level five need of acquiring knowledge. According to Maslow (1943), a person that does not feel valued or respected, would not have a level four need fulfilled and that could be an impediment to learning. These studies raise the possibility that various aspects of the physical environment of a classroom can influence student behavior and student achievement.

### **The Impact of Windows in a Classroom**

The aspect of the physical environment to be explored is the window in the classroom. As noted by Banning and Canard (1996), the actual features of the physical environment can encourage or discourage the process of development. There have been some interesting studies on the implications of windows in classrooms and student performance. The studies in the literature often address three different issues regarding windows: light, ventilation, and view. The literature that is relevant to this study are those that relate these issues to student performance in the classroom. In some of the articles

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these elements are examined separately, and in some, in combination. Tanner and Lackney (as cited in Tanner, 2008) looked at a combination of impacts a window might have that could affect the health of a student in a classroom. They argued the following:

There is ample evidence that people need daylight to regulate circadian rhythms, a natural biological function.... Poorly lit and windowless classrooms can cause students to experience a daily form of jet lag; furthermore, forms of fluorescent lighting may affect some students and teachers negatively by causing mild seizures. (as cited in Tanner, 2008 p. 385)

This health issue was also corroborated by others (Chambers, 2004; Hastings, Fadi.man, & James, 1980; Hathaway et al., 1992; Heschong Mahone Group, 2002; Kennedy, 2007).

Many studies separated and studied specific attributes of a window on learning, health, and attendance. The most prevalent research was that dealing with daylighting. A particularly influential quantitative study in relation to daylighting was completed by Hathaway et al., (1992).

This study by Hathaway et al., (1992) examined the effects of different lighting systems on the performance of elementary school children (and also on their physical development) in a two year study. Hathaway et al., (1992) used simulated natural daylighting that used the full spectrum of lighting, to replicate natural light (both the visible and ultraviolet (UV) spectrum). It was concluded that full spectrum lighting, similar to natural lighting, produced many positive effects. These students had "...fewer dental cavities and had better attendance, achievement, and better growth and development than students under other [conventional] lights" (Hathaway et al, 1992, p. 11). The study concluded that natural light was extremely important not only to the health, but also the well being of people. Significantly, it was mentioned that there was an impact on the student in both achievement and attendance. This study only included only grade four students. No similar study was found that considered the college student. These issues were also cited by others (Chambers, 2004; Hastings, Fadiman, & James, 1980; Heschong Mahone Group, 2002; Kennedy, 2007).

As mentioned, Hathaway et al. (1992) in this study of daylighting in elementary schools, looked carefully at school attendance. They noted the differences in the rate of

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school attendance in students in schools with and without the simulated natural daylighting. It found that attendance in schools with simulated natural daylighting increased an average of about 3.2 days per year compared to attendance in schools with other forms of artificial lighting. It was not clear if attendance was poor without natural light because of student illness, unwillingness to attend, or other reasons. In the study by Hathaway et al. (1992), full spectrum lighting was used to replicate natural light. Though some aspects of daylighting would be replicated by this, the study did not account for the gradual variation of lighting that occurs in an actual day. Still, with this daylighting approximation, a significant impact on attendance was recorded. Veltrie et al. (2006) also noted a link between the physical classroom environment and student attendance.

In a quantitative study of office buildings and daylighting, absenteeism and productivity were also issues that came up in relation to the presence of windows. It was determined that there was greater productivity when daylighting was provided (Abdou, 1997; CAGBC, 2004) and that there was both greater productivity and less absenteeism when operable windows were used, that allowed control personal control of ventilation (CAGBC, 2004). Though the reason was not altogether clear why having the ability to control ventilation manually, rather than by an automated system was important, the study was clear that there was both greater productivity and less absenteeism when a window was available and manually operable (CAGBC, 2004).

### **The Impact of Windows on Learning**

Other studies have been done that examined the specific impact of a window on learning. There was a particularly significant quantitative study completed by the Heschong Mahone Group (1999) where daylighting from a window in classrooms was examined only in regards to its impact on learning. This article described a study of over 21,000 students. It was found that students with the most daylighting in their classrooms progressed 20 percent faster in mathematics and 26 percent faster in reading over a period of one year, than students having less daylight in their classrooms. This particular research study was considered definitive and was repeatedly cited in many articles (Herzog, 2007; Kennedy, 2007; Plympton, Conway & Epstein, 2000; Tanner, 2008). The original Heschong Mahone Group study was later re-evaluated and confirmed (Heschong

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Mahone Group, 2002). Similar studies were corroborated, (Hathaway et al., 1992; Plympton et al., 2000) and one evaluated science and reading separately also supporting the improved academic performance with a window (Tanner, 2008). These studies were all quantitative and examined elementary and high school students, not college students.

Furthermore, some research has been done regarding the effect of a view through a window. A good view through a window was shown to affect performance positively in some studies (CAGBC, 2004; Tanner, 2008), while the study by Veltri et al. (2006) found that a window could be a distraction. In this study by Veltri et al. (2006), it was mentioned that a student noted a distraction from the wind causing window blinds to bang (p. 521). On the other hand, the study by Tanner (2008) reported that when a student needed to take a break from learning, it was easier to get back on track after taking a quick look outside at a pleasant view than after doodling on paper. It was easier to re-focus on the lesson after a glance out a window than the longer time that it took to complete a doodle. Tanner (2008) qualified these views and indicated that not all views through windows were beneficial. He differentiated those views indicating that while a view of a wall or parking lot was not desirable, “unrestricted views of nature add to the well being of students and teachers” (p. 387).

In addition to the view from the window, Earthman (1996) found that the personal control of the thermal environment in combination with proper illumination were some of the factors found to positively influence learning. Similarly, in Maslow’s (1943) study, it was determined that physiological needs such as air and temperature, (which could be satisfied by a window), needed to be fulfilled before learning takes place. An operable window in the classroom gives some ability to control both temperature and ventilation. These same factors were noted as important in work performance in studies put forth by the CAGBC (2004).

Herzog (2007) also found some relationship, but did not find the same definitive relationship in his study to improved learning by the addition of windows. In Herzog’s study, there were many variables which created difficulties in identifying which factors were the influential ones affecting student achievement. For example, though it was determined that student performance was impacted by the physical environment, it was

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difficult to determine whether it was perhaps the window, the time of day, both or neither, that influenced the students' performance in his study.

Most studies examined the impacts of the various different elements of a window in a classroom, such as daylight, view, or ventilation. There was one case study that looked specifically at the windowless classroom (Larson, 1965). It had found that a windowless classroom had no impact on the kindergarten to grade three children studied. This contradicted the more current, large studies by the Heschong Mahone Group (1999; 2002) which indicated significant improvement in math and reading skills with daylighting amongst grade two to grade five students. It is possible that the difference in age groups could explain the difference in results. There is a lack of current studies on this at the postsecondary level.

In a number of studies, students' perceptions were successfully used to acquire insights and opinions in post-secondary school research regarding preferences in regard to learning (Daley et al., 2001; Shuell & Farber, 2001; Veltri et al., 2006). One qualitative case study by Veltri et al. (2006) studied students and the community college classroom environment. This study tried to identify aspects of a classroom that might enhance or inhibit learning as perceived by students in a rural college. They were questioned in focus groups. Teachers were not considered. The study did not give results as to the impact of a specific physical feature on learning. Veltri et al (2006) did conclude though, that a qualitative study, using students as subjects, to examine their perceptions of the impact of a classroom's physical environment on learning, could be meaningful.

Most of the literature has been on primary and secondary schools (Hathaway, Thompson, & Novitsky, 1992; Kennedy, 2006; Kennedy, 2007; Heschong Mahone Group, 1999; Plympton, Conway, Epstein, 2000). Although that information is valuable, it cannot necessarily be generalized to postsecondary schools and only a limited amount was found on postsecondary schools (Herzog, 2007; Temple, 2008; Veltri et al., 2006).

Temple (2008) said that there is a need to further explore this relationship between learning and the physical environment. He noted the significance of understanding university spaces and recognized that they should be welcoming and should support learning. He mentioned the possibility of design features that can encourage new ideas

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and creativity, and noted the physical school environment is under-researched and further research in this area is important.

### **Scope and Limitations**

There were limitations to the scope of the literature reviewed. The primary literature search was on the impact of a window in the classroom as perceived by students and teachers in a college. Little information was found on teachers in a college in this regard. The type of literature that was researched was limited mainly to Canada and the United States. This was not intentional, but that was all that could be found. There does not appear to be an abundance of international research specifically in this area. It is possible that some other international studies might be discovered, but then it is also possible that climate and cultural differences could bias those studies. The literature search was initially focused on colleges and universities. There were very few studies completed at this level, but many more at the primary and secondary school level. It was for this reason that research was also examined at the primary and secondary school level. The search was to address the relationship between windows in the classroom and its impact on the college student and teacher, but it was also felt necessary to obtain some information on the impact of windows to the occupants of a room in general.

### **Conclusion**

There have been studies that have looked at the impact of a window in the classroom. These studies have found some relationships in regards to student achievement, health, attendance, and behavior and a window in the classroom. Some studies have looked at the window in terms of light, ventilation, and view, either separately or in combination. Most studies were quantitative, examining elementary school children, and there were a few examining office workers. Few were qualitative studies and few involved college students or teachers or universities. More information is needed to determine the impact of a window on learning as perceived by students and teachers in a college.

The remaining chapters include the methodology, data analysis, and summary presenting conclusions and recommendations. The chapter on methodology describes the qualitative study completed. The data analysis indicates the results of the study where

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themes are identified. Finally a summary and conclusion is provided and recommendations made.

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### **Chapter 3: Methodology**

The purpose of this study was to explore the impact of a window in the classroom on learning as perceived by students and teachers in a college. Specific classroom choices are being made all the time, based on a variety of criteria such as size, equipment and furniture. If a window in a classroom is perceived to impact learning, then that could be another consideration for classroom choice. Teaching in a physical environment that is more conducive to learning can perhaps make teaching and learning more successful. This would also be valuable information for an architect in the design of a school.

#### **Research Questions and Objectives**

##### **Main Question**

In what ways does a window in the classroom of a college impact learning, as perceived by students and teachers?

##### **Supporting Questions**

1. What are the ways a window impacts a room?
2. What is the purpose of having a window in a classroom?
3. In what ways would a window be beneficial in a classroom as perceived by students?
4. In what ways would a window be beneficial in a classroom as perceived by teachers?
5. In what ways would a window be detrimental in a classroom as perceived by students?
6. In what ways would a window be detrimental in a classroom as perceived by teachers?

##### **Research Design**

A qualitative study was completed to discover and gain an understanding of the impact of a window on learning as perceived by students and teachers in a college. Since phenomenology emphasizes the lived experience from the individual's perspective, this approach was particularly applicable to this study by researching the experience of students and teachers. Data was triangulated from the perspectives of three groups of participants: students, teachers, and administrators. Individual interviews were completed to avoid the possibility of one participant influencing another.

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A qualitative approach allowed the researcher to be the key instrument. It was understood that since the researcher was being used as the interviewer, there would be some subjectivity that could have resulted in both positive and negative consequences. As the researcher becomes more involved, it becomes more likely that the degree of subjectivity increases, but with this, there are also increases in insights and the depth of understanding (Gay & Airasian, 2000). The researcher remained acutely aware of this bias during the interviewing. The qualitative study permitted the understanding (rather than the measurement) of factors that could influence learning in a classroom.

When the researcher is the key instrument, it is unusual to rely on questionnaires or instruments designed by others (Creswell, 2009). A relevant questionnaire could not be found that would enable the specific research questions of this study to be comprehensively answered. In order to design the interview questions, questionnaires of related studies were examined. In Veltri, Banning, and, Davies's (2006) study, questions were asked in a focus group format. One of the three questions from their study was relevant, and was used as a prototype for this study. The question was, "How do students assess the classroom's physical design impact on their learning?" (Veltri et al., 2006, p. 254). The final version of the questions was pilot tested.

### **Site and Participant Selection**

The sample population for this study was taken from a large urban college in Toronto, Ontario and was comprised of 320 students, 25 teachers, and four administrators. Students and teachers from General Education courses were invited to participate in the study to provide a mix of students and teachers from varied programs. Eight students, eight teachers, and four administrators participated in the study. Interviews took place in private or vacated offices and classrooms.

The participants were chosen as they volunteered; the first four female and male students and teachers who volunteered were selected. The decision to choose an equal number of male and female participants was to determine whether there were issues that altered with gender. The students' ages varied from 18 to 35 years old. The teachers' ages were not requested. Their teaching experience ranged from four to 25 years.

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College administrators were invited to volunteer in this study to gain an understanding of their perception of students' and teachers' requirements regarding a window in the classroom. Two of the administrators were chosen because of the upper-level positions that they held in the college's administration, in combination with their many years of college experience including teaching. The third administrator that was chosen had a leadership position amongst math teachers and the fourth, amongst English and communication teachers. The decision to invite participants based on their math and English expertise was grounded in a study by the Heschong Mahone Group (1999) which examined daylighting in a classroom, and indicated improved student results, in mathematics and reading.

### **Data Collection and Recording**

For the recruitment of teachers, the chairperson of the General Education Department sent an e-mail (Appendix A) to teachers inviting them to participate in the research project. Attached to the e-mail was the Letter of Information and Informed Consent (Appendix B). The faculty members were invited to contact the researcher to arrange an interview. There were 25 teachers invited and the researcher arranged an interview with the first four male and female teachers who responded to the email.

For recruiting students, the college's General Education Department's chairperson also sent out an e-mail (Appendix C) to the same teachers inviting them to contact the researcher about inviting their students to participate in the research project. Eight teachers out of 25 (corresponding to a combined 320 students) responded positively by asking the researcher to come to the class to distribute the invitation flyers (Appendix D). The researcher confirmed the arrangements and distributed the flyers with the Letters of Information attached (Appendix E). In the flyer the students were asked to contact the researcher if they were willing to participate in an interview. The first four male and female students who contacted the researcher were sent an email to schedule an interview (Appendix E).

After recruiting administrators, the researcher chose four and emailed them (Appendix A) to invite them to participate in an interview. A Letter of Information and Informed Consent (Appendix B) was attached. The administrators were invited to contact the

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researcher if they were interested. All four of the invited administrators contacted the researcher, responded positively, and arranged an interview.

One-on-one, 30 to 60 minute interviews with the 20 participants who responded were arranged in private rooms. Interviews began by ensuring the participant read, understood, and signed the two consent forms. The participant kept one and the researcher kept the other. The question sequence was designed such that the first short question sequence identified factual background questions, including gender and their program of study. This functioned as an ice-breaker. The questions progressed from the general to the specific. As the questions became more specific, they also became slightly more complex.

The first few interview questions asked the participants their perception of an ‘ideal room’ and only after that, an ‘ideal classroom’. This was intended to direct them to look at what elements of a physical space they might appreciate. That allowed the participant to describe the physical elements, such as room proportions, furniture, fireplace, or windows. It prevented the researcher from providing words that might influence the participant’s descriptions. Interview notes were taken, documenting the participant’s words verbatim. These notes were read and clarified by the participants to ensure accuracy.

All the interviews took place in person except for one telephone interview with a teacher. Originally, the interviewer intended to take notes as well as voice record, but after the first interview, it was determined that note taking was sufficient and voice recording was redundant, obtrusive, and not continued.

Table 1 lists the Research Questions (RQ) in column one that drove the study. The subsequent columns identify which Student, Teacher, or Administrator Questions were used to provide the source of the data that contributed to the answer of each research question (see Appendix G for research questions; see Appendix H for student, teacher, and administrator questions). This data collection process provided a rich and descriptive database from which to proceed to data analysis.

**Research Questions and Corresponding Answers from Interview Questions**

Table 1

*Research Question (RQ) v. Interview Answers from Student Questions (SQ), Teacher Questions, and Administrator Questions (AQ)*

Research Question	Student Questions	Teacher Questions	Administrator Questions
RQ.1	SQ. 1, 6, 7, 8, 9	TQ. 1, 6, 7, 8, 9	AQ. 1, 6, 7, 8, 9
RQ.2	SQ. 6, 9, 11	TQ. 6, 9, 10	AQ. 6, 10, 11, 12
RQ.3	SQ. 6, 7, 11		AQ. 6, 9, 10, 11, 12
RQ.4		TQ. 6, 9, 10	AQ. 6, 9, 10, 11, 12
RQ.5	SQ. 7, 8, 11		AQ. 7, 8, 10, 11, 12
RQ.6		TQ. 7, 8, 10	AQ. 7, 8, 10, 11, 12

*Notes:* For lists of questions, see Appendix G and Appendix H.

Numbers refer to question numbers.

**Establishing Credibility**

Procedures were put into place to ensure the study's reliability and validity. Before the interview questions were finalized, they were pilot tested by two teachers and three students to ensure their validity. They were tested to verify that they could be easily understood and answered. The questions were also tested to ensure that they were objective, neither leading nor biased, and that they answered the research questions. Some questions were eliminated; others were shortened, or simplified, and then re-tested.

The protocol for the data collection included the date and the place of interview. The transcripts were checked for errors. The researcher's interview notes were reviewed with the participant to ensure that the notes were understood in the intended context.

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To help ensure validity, triangulation was used by examining data from three sources that included teachers, students, and administrators. They were interviewed to include multiple perspectives.

Data that contradicted the emerging themes was also included in the data analysis to ensure validity. Finally, peer debriefing was completed by a student, teacher, and administrator who were not participants in the study. They reviewed the interview data to ensure that the answers indicated that the questions were understood. These comments helped to clarify and validate the findings (Cresswell, 2009).

### **Data Analysis**

Inductive data analysis was used to interpret the data. Data collection and analysis was simultaneous. During the interview process, repetitive key words and phrases began to surface immediately. As the interview process progressed, themes began to reveal themselves.

All interviews were re-read at the end of the day and key words, phrases, and emerging themes were noted. The data from each participant was attributed a letter to identify from which group (student, administrator, or teacher) it came from and if the participant was male or female and a number. When all the interviews were completed, the original hand written notes were typed.

A complete reading of all the interviews together was done to get a general sense of the data in its entirety. The interviews were also assessed for their overall depth. The researcher noted a sense of corroboration of data between and within the different groups.

The detailed analysis and coding process then began. The themes were given different colours to connect them with supporting key words and phrases. As these key words and phrases began to repeat, categories of ideas were expressed, or the new ideas led to a more inclusive theme. Final themes were determined.

This process was described well by Creswell (2009): “This inductive process illustrates working back and forth between the themes and database until the researchers have established a comprehensive set of themes” (p.175).

Charts were constructed in order to organize the categories and themes. It also enabled identification of the category of participant (whether student, teacher or administrator)

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that responded. It allowed clear visual identification of the depth of the support for that theme and a vehicle for summarizing the data. Eventually, all of the data was organized by categories and the final themes.

The themes were then represented by detailed discussion in narrative passages. Subthemes were also included and described. Tables were incorporated to further describe each group's perceptions.

An interpretation of themes was then discussed and lessons learned were indicated. The findings from this study were compared with information found in other literature. It included an assessment on how the results converged and diverged from previous studies.

### **Limitations**

There were inherent limits to the methodology used for this research. The researcher might have misinterpreted the participants' responses. The researcher brought bias to the study which had to be clarified, described in the study, and accounted for in the research. In this case, the researcher did have a bias in favour of windows in general, and in the classroom in particular. The researcher took great care not to voice an opinion and not direct the participant although there was no gain to be had in answering a question positively or negatively.

The sample group was taken from the school where the researcher is employed as a professor and coordinator, but care was taken that none of the students were known to the researcher. Most teachers were unknown to the researcher and all administrators were known, but there was nothing to be lost or gained by that connection.

Since the sample group was small and not representative of the entire school population, it was difficult to ensure that all stakeholders were represented. Although an attempt was made to interview three significant groups, students, teachers, and administrators, only twenty interviews were done. Subsequently, it can only represent a small sub-group in a single college and limits the study's generalizability.

The season or time of day of the interview could have biased the results. In this study, the interviews were given over a period of time, but all were in the winter when the appeal of a window may be different than in the summer.

### **Ethical Issues and Considerations**

Approvals from the Ethics Review Boards from the relevant institutions were obtained before research began. Approvals were also obtained from ‘gatekeepers’, those in authority to provide access to study the participants at the research site. The analyzed data will be kept for five years and then discarded.

### **Summary**

The purpose of this study was to explore the impact of a window in the classroom on learning as perceived by students and teachers at a large urban college. In this chapter the methodology for the research was presented. The research design using a qualitative study with a phenomenological approach was described and the choice of participants and the site explained. The procedure employed for data collection and recording the information acquired was portrayed, as were the processes used to establish credibility, ensuring reliability, validity, and pilot testing. The inductive data analysis process was explained as were the limitations, ethical issues, and considerations for this study. The following chapters will provide the data analysis and a summary of the study including conclusions and recommendations.

## **Chapter 4: Data Analysis**

### **Introduction**

The purpose of this study was to explore the impact of a window in a classroom on learning as perceived by students and teachers at one Ontario college. This study seeks to determine in what ways a window impacts learning.

### **Results of Study**

This qualitative study included individual interviews with 20 participants: eight teachers (T1 to T8), eight students (S1 to S8), and four administrators (A1 to A4). Of the teachers and students interviewed, half were male and half were female. Only one of the four administrators was female. No answers were found to be gender linked. All participants said they had attended classrooms both with and without windows.

All participants responded affirmatively, preferring a window in a classroom. A few qualified this stating that the windows should include controls such as blinds, to limit glare and light. The three groups of participants responded similarly with a few exceptions. Every participant noted that light from a window had a positive impact on learning. It was also mentioned that a noisy or very busy view from a window could be a distraction to learning. The teachers perceived more benefits from a window in a classroom than the other two groups.

The research questions below are answered by describing, in detail, the perceptions of participants. All groups interviewed answered questions one and two similarly, and therefore their answers were not differentiated by group. Answers to questions three and five are combined, as are four and six, since both teachers' and students' responses were similar. The exceptions were indicated. Most questions were open-ended. Various themes arose describing the impact of a window in a classroom on learning. Themes responding to research questions three through six are included in tables (see Table 2 to Table 8) that indicate the number of participants who responded affirmatively to a given perception.

The numbers in the table were based on the 20 participants interviewed. Therefore, if every participant responded positively to the perception in the table, then the numbers would show a maximum of 8 (for students), 8 (for teachers), and 4 (administrators). Each horizontal line represents a different perception with a possible total of 20 respondents.

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Explanations are included with each table. Direct quotes are also incorporated from these three groups in order to illustrate each group's perceptions in their own voice.

### **Question 1 (Q1): What are the Ways a Window Impacts a Room?**

Every person interviewed said that a window provided a positive impact to a room and indicated that windows were essential in their perception of an ideal room. They noted that a window impacted a room by providing light, view, ventilation, and escape. They are described in the following sections.

#### **(Q1): Light**

Participants noted that natural light made them happy. They said it created a warm and inviting atmosphere. They also noted that it gave them an increased sense of time (a sense of day changing into night). When daylight streamed into the room they felt awake, while with darkness, they felt sleepy. They mentioned without the light from a window they could not tell day from night and said that often they felt disoriented. Many participants mentioned increased motivation, in a room with a window and said that it energized them.

#### **(Q1): View**

Many participants described a good view from a window as providing a positive addition to a room and that it made them feel good. They also said that a view from a window added beauty and it made the room feel larger. In particular, they described a good view as one including nature. They wanted to see "trees, grass, sky, animals, and water." Participants stated that they felt the need for a connection to nature, and said it helped to put them in a better mood and allowed them to function better.

#### **(Q1): Exit**

A window in a room provided a sense of freedom according to many participants. They said that they felt trapped and unsafe without a window. Some mentioned that they felt that a window provided an emergency exit from a room.

#### **(Q1): Ventilation**

Numerous participants perceived poor indoor air quality in rooms without a window. They found that a window provided fresh air and an ability to control room temperature.

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Participants believed that a room with an operable window was a healthier place to be. It provided to occupants a sense of improved health and well-being.

### **Question 2 (Q2): What is the Purpose of Having a Window in a Classroom?**

Almost every person interviewed (90%) indicated that windows were an essential element in their perception of an ideal classroom. They identified the specific purposes of windows as supplying light, view, and ventilation to the classroom.

#### **Q2: Light**

All participants noted natural light as an important purpose for a window in a classroom. They found it provided better light quality and greater energy efficiency than artificial lighting. Every participant indicated a preference for natural light over artificial light in the classroom. Many mentioned their dislike of the standard fluorescent lighting typically used and stated that they needed natural light. Some said that they felt that fluorescent lights made them ill, or a room without natural light made them ill.

#### **Q 2: View**

Some participants noted that the purpose a window in a classroom was to provide a view. They mentioned that they felt a view could help with creativity when completing an assignment or aid in the teaching of certain subjects, where the view could provide a direct example.

#### **Q 2: Ventilation**

Most participants said they felt that a window was required to help control room temperature and air flow in a classroom. Some mentioned a perceived energy savings by having a window for this function.

### **Questions 3 (Q3): In What Ways Would a Window be Beneficial in a Classroom as Perceived by Students?**

### **Questions 5 (Q5): In What Ways Would a Window be Beneficial in a Classroom as Perceived by Teachers?**

#### **Q 3 and Q5: Light**

Of all of the functions of a window noted to impact learning in a classroom, natural light was the one most often acknowledged by the participants in this study. An administrator stated, "Natural light is conducive to learning" (A3). Although natural light

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was mentioned in many other areas, it was most commonly perceived as contributing in areas of happiness, a sense of time, and motivation (see Table 2).

Table 2

*Perceptions Regarding Natural Light from Window in Classroom*

Perception with window	Participants Responding		
	Students	Teachers	Administrators
Increased happiness/sadness without	7	7	3
Increased sense of time	5	3	2
Increased motivation	4	3	2
Increased happiness, motivation, <b>and/or</b> sense of time	8	8	4

*Note:* Potential number of respondents: 8 students, 8 teachers, 4 administrators

**Q3 and Q5: Light-increased happiness.**

In this study, happiness also included comments that referred to calmness, a feeling of warmth and an inviting atmosphere, a place where participants said that they felt welcome and wanted to be. When natural light was unavailable, comments included sadness, bleakness, glumness, or depression. Participants said that the happier mood made them more receptive to learning.

Most students (88%) stated that either having a window in the classroom contributed to happiness or not having that window contributed to their sadness (see Table 2). They talked about the warm atmosphere in terms of a kinder, happier atmosphere. One student simply said that a window in the classroom “makes me happy” (S5) while another said

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that having a window in the classroom “calms me down” (S2). Another student illustrated how a windowless classroom contributed to sadness saying, “I do not feel so glum in a classroom with windows” (S1) and that a classroom without a window makes it feel like it is raining all the time. Another mentioned that some people can be affected by Seasonal Affective Disorder (SAD), in a windowless class (S8).

Teachers commented similarly (88%), relating a happier mood in the classroom to natural light from a window. One said that a window provides “fresh air and natural light and students feel better and happier” (T6). Another teacher said that “with no natural light it is depressing” (T7), and one teacher also noted the possibility of SAD (T7).

Administrators (75%) also remarked about the mood being happier and more inviting in a classroom with a window. One administrator mentioned that teachers, when given the choice, will choose a classroom with a window and said that the window created a more positive, warmer atmosphere (A2). Another said that “even a tiny ... window will relax the eyes” (A4). One administrator also mentioned SAD (A1).

All three groups complained about fluorescent lighting. A student said, “I find artificial lighting hurtful and tiring; the atmosphere cold and cramped” (S3).

### **Q3 and Q5: Light-increased sense of time.**

Many participants also commented on the increased sense of time through a window, or the lack of a sense of time without a window. This determined the second category relating to natural lighting. Participants’ comments made reference to their biological clock, circadian rhythm, and being in a “time warp.” They explained this to mean that without a window they “lost their sense of time”, whether it was night or day, early or late. Many said that because of this they felt tired or disoriented, and felt that it had a negative impact on learning. This increased sense of time with a window seemed to contribute to their feelings of well being. It was suggested that without a sense of time, there was a feeling of being tired and disconsolate, rather than awake and content.

Exactly 50% of participants made comments regarding natural light and an increased sense of time (see Table 2). One student said that without window,

[I am] not as present. I feel the need to eat dinner, sleep... [Having a window in the classroom makes me feel] in tune with the seasons and time of day. [A window in a

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classroom for] later classes is not as beneficial. You can see it's dark and you are getting ready for sleep. From 4:30 to 6PM...it's getting dark, and therefore it is not important to have a window at those hours. (S1)

Teachers also commented on the connection of a window to a sense of time as being important and one said that without a window,

I leave before light, end after dark, even if a lot of work is done, I feel like I lost a day. [The lack of window] affects our sense of time. Our internal clock is set so that it indicates when it is time to take a break. We gain a sense of time and the psychological benefits of natural light, weather, light and dark that helps set our biological clock which is important for students and teachers. It is my personal belief that with a window, a class is more productive to learning. (T8)

This teacher related the window to a general sense of well being and productivity due to an increased sense of time related to natural light. An administrator also commented similarly, saying that,

With a window there is a spirit of freedom and awakesness. Light... reinforces openness and awakesness. Most cultures relate light and day to awake and maybe to learning. [I feel] with natural light there is an interface between light and learning... that there is a correlation. (A1)

All three groups of participants mentioned the link of the natural light from a window to a sense of time. In general they noted that it contributed to being awake and added to a greater sense of well-being, both of which are important aspects to learning.

### **Q3 and Q5: Light-increased motivation.**

Motivation was the last category of significance in reference to natural light in the classroom. This category also included responses indicating increased energy with natural light or a lack of energy without natural light. Participants said they felt that increased motivation improved learning and many (45%) commented that natural light contributed to the motivation of students in the classroom (see Table 2).

Students commented that with natural light they were more alert. One student described a poorly designed classroom and noted, "It was the worst room because it had no windows...It was so dead [that] I wanted to pass out" (S4). A teacher said that

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“motivation is up in the class [with a window]... it is de-motivating and uninspiring [without one]” (T5). Lastly, an administrator commented that natural light “makes it more energetic and enhances learning” (A3).

### **Q3 and Q5: Light- increased happiness, sense of time, and motivation**

All three groups of participants mentioned this relationship between natural light, energy, and increased motivation as enhancing learning in a classroom with a window. One student credited all three themes to natural light in the classroom saying,

It feels that there is a connection that keeps me awake, alert, and happy. It makes me function a heck of a lot better. If there are shutters on windows, they need to be always left open. I have to have light in the room all the time and need to have sunlight on my face all the time. It perks me up. (S5)

The researcher did not ask whether natural light impacted learning in the classroom in relation to happiness, a sense of time, or in connection to motivation. These were some of the categories that were mentioned consistently, but spontaneously when the general questions were asked. As shown in the last line of Table 2, every participant noted that natural light benefitted learning by either an increased sense of happiness, sense of time, and/or motivation.

### **Q3 and Q5: View**

Participants from all groups in this study commented about the importance of a view from a window. It was often mentioned in terms of causing a good distraction, a resting point for the eyes to enable the student to then re-focus on the lesson at hand.

Respondents also stated that a view from a window could be used as a teaching tool.

### **Q3 and Q5: View-improved focus.**

The possibility of improved focus after a distraction from a view through a window was mentioned by 75% of participants (see Table 3).

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Table 3

*Perceptions Regarding a View from a Window and Improved Focus*

Perception in a classroom with a window	Participants Responding		
	Students	Teachers	Administrators
Improved focus after view	5	7	3

*Note:* Potential number of respondents: 8 students, 8 Teachers, 4 Administrators

Many students noted that, although there would be a few moments of distraction, it refreshed and enabled them to re-focus on the lesson, and thus was considered to be a benefit to learning. Students said that although a window produces “a little distraction, I ignore it because it makes me feel a little more awake and able to concentrate” (S1). In total, 63% of the students commented that a view would be beneficial to them (see Table 3).

All but one teacher noted that a view provided a well-needed distraction. That one dissenting teacher still indicated a preference for a window in the classroom, but did not relate a view as the reason. Another teacher said that, “Students cannot sit still for as long a time in a classroom without a window. They act up without a window. It provides a momentary escape. They need a blip to come back and focus” (T2) and noted that the distraction from a window will not worsen the situation for a student who does not engage in the lesson in the first place.

Other teachers mentioned that disengaged students would turn to gadgets such as a cell phones, which would cause worse distractions than windows (T2). They noted that interior windows caused continual distractions as students watched friends walk by, while the momentary distraction caused by an exterior window helped students refocus on the lesson.

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Teachers reflected about how they felt the view from the window often directly helped learning. One said, “They need a little distraction to get the creative juices flowing” (T5), while another said that “The [occasional] distraction is needed...It resets [the student’s] mind to learn, especially when we have a three-hour lecture” (T8). Most teachers (88%) noted that the distraction provided by a window in the classroom was a positive one (see Table 3).

The group of administrators (75%) also commented that a window provided a needed and positive break (see Table 3). The first administrator said, “Distraction is not an issue. The type of student that might be distracted by a window, might be distracted by anything” (A2). Another administrator added, “I can’t imagine them staying put if they have no window” (A1), and the third administrator noted that the window was needed to give the mind a rest in order to concentrate for longer periods. It was explained this way:

A window lets the mind rest a few minutes. Peoples’ minds have limited concentration ability. Adults have a ten minute span. The window gives opportunity to refresh. The pedagogy is to participate in short activities and then change activity. (A3)

One administrator noted that a window was only beneficial if it was a view of nature; otherwise, a view would be a detriment (A4). This one dissenting administrator was more concerned with the negative distraction that a busy view could cause.

### **Q3 and Q5: View-increased connection to nature.**

Participants (65%) consistently mentioned that an important benefit a window brought to a classroom was a connection to nature (see Table 4). When participants noted that looking through a window provided a break that helped them better focus on the lesson, the type of view was often considered. A noisy city street or concrete parking lot was frequently noted as not offering the type of view needed for a beneficial distraction. A view of nature was repeatedly mentioned as necessary for a mental break. The view of nature gave a sense of well-being, that the environment was safe, inviting, and a place where they wanted to be.

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Table 4

*Perceptions Regarding View from a Window and Connection with Nature*

Perception in a classroom with a window	Participants Responding		
	Student	Teacher	Administrator
Desired view of nature	4	6	3

*Note:* Potential number of respondents: 8 students, 8 Teachers, 4 Administrators

Students (50%) expressed a need for a connection to nature through a window (see Table 4). One student mentioned that “I need to see a tree rather than look at a white wall...It is not natural to not see nature” (S2). Another said, “Not knowing what the weather is, feels like you don’t really care. You feel like you are losing out on what’s going on and you feel a loss of a sense of nature” (S5). Another student said, “We are not moles to live underground; we are meant to be outside. It is natural to be in an environment with a connection to the outdoors. It helps you snap back to reality” (S7). Students generally agreed that a classroom with a view of nature gave them a sense of well-being, that the environment was safe, inviting, and a place where they wanted to be.

Many teachers (75%) also indicated a desire for a connection with nature through a window (see Table 4). One teacher said, “It is good for moods, even if the weather is bad, [one] can still see the snow falling. Depending on the view, it can enhance the interior of a classroom” (T3).

One of the administrators mentioned that a classroom without a window is “anti-human” and noted the importance of being able to observe weather changes through a window (A1). Still another mentioned that the view to the outdoors provides “a greater sense of space by extending space outside” and that “nice scenery is calming and relaxes the eyes” (A3). The administrators noted that the type of view is important, as is a connection with the outside.

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All groups mentioned the desirability for the view from the window to have a connection to nature for a variety of reasons: noting that it was calming and inviting, helping with creativity, helping students function and making them feel that they are being treated more humanely.

**Q3 and Q5: View-enhanced learning.**

Participants (50%) mentioned that using the window as a teaching tool was useful (see Table 5).

Table 5

*Perceptions Regarding Value of Window as Tool for Teaching*

Perceptions	Participants Responding		
	Student	Teacher	Administrator
Window useful as direct teaching tool	3	6	1

*Note:* Potential number of respondents: 8 students, 8 Teachers, 4 Administrators

Student participants stated that a window allowed for greater opportunities to learn. One said that a “teacher could refer outside depending [on the material being taught]” (S6). Students also said that a window could assist them with their work and said that “when a window is in a classroom, it helps [them] to get ideas and helps with assignments” (S6).

Teachers, in particular, discussed the view from a window as a being an additional means to illustrate or demonstrate a concept. Another teacher mentioned this as an opportunity that connects with all students: “It gives opportunities to learn beyond the class without leaving it and helps engage students in learning” (T3).

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Only one administrator said that it could be a good tool for a student to understand a concept better saying, “looking outside is a greater opportunity for learning than in a room with a brick wall” (A1).

Both students and teachers mentioned that having a window in the classroom also stimulated creativity.

### **Q3 and Q5: Exit**

Originally, exiting from a window was not one of the functions the researcher described in the definition of a window. This became a function of a window because 60% of the participants perceived it as one, in the interviews (see Table 6). Although windows were never referred to as a means of escape in the conversations with the participants, they repeatedly mentioned the feeling of being trapped in classrooms without windows, and the feeling of safety and freedom they felt in classrooms with windows.

### **Q3 and Q5: Exit-increased sense of freedom.**

Jail was the most common metaphor used to describe a classroom without a window. Students (50%), teachers (75%), and administrators (50%) made such comparisons (see Table 6). According to the participants' remarks, simply having a window in the classroom seemed to elicit comments noting an increased sense of freedom, rather than imprisonment. Apparently, the window did not necessarily need to be operable. The absence of a window seemed to impart a sense of being trapped, and the appearance of a window seemed to impart a real or imagined way of escape. The participants' words and expressions that described these reactions included imprisoned, jail, closed in, captive, trapped, and no escape.

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Table 6

*Perceptions Regarding Feeling Trapped in a Classroom without a Window*

Perception in a classroom without a window	Participants Responding		
	Student	Teacher	Administrator
Perception of being trapped	4	6	2

*Note:* Potential number of respondents: 8 students, 8 Teachers, 4 Administrators

Students said that they felt trapped in a class without a window and said, “I feel like a prisoner in a classroom without a window. I feel confined. [With a window] I don’t feel trapped” (S2). Teachers had similar comments. One said, “I feel closed in with no windows” and then said that it was “oppressive”. With windows, the teacher said, “I feel freedom and safety. I do not feel trapped” (T2). Another teacher mentioned that windows make the classroom feel safe and continued to say,

In a class without windows I will open the door. Students will sit near the door with their coats on to make a fast get-away. If [students] are impacted with fear, then that impacts their ability to absorb information. (T4)

Another teacher commented an “interior window” saying the following:

An interior window is better than nothing. There is a [feeling of] openness even if it is to the interior. Having no window feels like being trapped. If there are no windows, interior or exterior, [then] the classroom will be like a jail. You are captive. (T7)

One administrator said that a window is “a way out in an emergency” (A3), while another said that “from the students’ perspective, it is oppressive in a non-windowed class” and added, “It is not an issue if the student only has 18 hours of classes per week” (A2). This administrator was explaining that although admittedly it was oppressive to have a windowless classroom, if students do not stay many hours per week in such a

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classroom, then it is not of much consequence. A different administrator said the following:

A window in the classroom gives a spirit of freedom. When there is no window it sends a subliminal message, that of being: enclosed, imprisoned, isolated to the world, and night. It reinforces unhelpful power structures. [It can affect] the reputation of the school, [It feels like a] jail with enforced learning...It is anti-human and less than ideal. With windows in the classroom it is open to learning. Learning is collaborative, the design of a room [should] permit collaboration. (A1)

This participant strongly asserted that a windowless classroom gave the sense of being trapped or imprisoned. Also mentioned was that without windows in classrooms, the whole school would then have the feel of a jail and enforced learning; however, a more collaborative style of learning was associated with windows. This administrator, furthermore, mentioned that “people on the street [are also] open to learning when labs have glass [and they can look in]” (A1). The thought now traversed from the feel of enforced learning brought on by windowless classrooms to more collaborative learning not only with the students inside the classrooms, but also those outside looking in.

Although all groups seemed to concur regarding the sense of being trapped in a classroom without a window, the teachers (75%) appeared to voice this opinion most frequently (see Table 6).

### **Q3 and Q5: Ventilation**

Participants commented that with an operable window, the classroom felt like a healthier and safer place to be. In a windowless classroom, complaints of claustrophobia were common.

#### **Q3 and Q5: Ventilation-improved health and well-being.**

Claustrophobia was cited by all three groups and seven of 20 participants (see Table 7). Poor air quality, uncomfortable room temperatures, and lack of ventilation without a window were also noted. Participants mentioned that an operable window in the classroom could provide fresh air, temperature control, improved ventilation, and also alleviate feelings of claustrophobia.

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Table 7

*Perceptions Regarding the Impact of Ventilation from a Window*

Perception in a classroom	Participants Responding		
	Student	Teacher	Administrator
Sense of Claustrophobia without window	2	4	1
Sense of improved health with window	4	5	4
Sense of claustrophobia <b>and /or</b> being trapped without window	4	7	3

*Note:* Potential number of respondents: 8 students, 8 Teachers, 4 Administrators

Many participants (65%) mentioned that a window would improve the ventilation in the classroom (see Table 7).

One student mentioned the following:

It is possible to have more oxygen and more effective learning [with a window in the classroom]. If it is a small classroom then you could feel claustrophobic [without a window]. It is difficult to control the temperature. If it is too hot then it is difficult to work. (S7)

Another student said that in a classroom with a window “there is fresh air which helps you to think [while without a window it is] muggy....We need the window to get air” (S4). Half the student participants related ventilation from a window with an improved learning environment.

A teacher mentioned that in a classroom without a window, the air flow is inadequate and said, “I believe that their education is impeded by claustrophobia. It feels stifling. I like to face the [exterior] window. It helps me since it is not so claustrophobic (T4).

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Another teacher mentioned that without a window “there might be claustrophobia so you will want to leave the door open” and noted the possible disruptions inherent in leaving a door open (T3). Teachers and students both noted that fresh air directly from a window would benefit learning and help prevent claustrophobia.

An administrator said that window issues in the classroom were not mentioned in the student surveys but did state that heat problems were, and noted that teachers wanted the ability to control temperature (A2). Another administrator commented that with an “interior window there is no fresh air” (A4). A third administrator said,

The classroom needs operable windows for fresh air and to feel wind and a breeze. It makes it more energetic and enhances learning. A mechanical system gives poor air quality and stale air. It makes the students tired and it is harder to concentrate. They need access to fresh air. [Without windows] claustrophobia is possible. (A3)

Members from all three groups (students, teachers and administrators) noted a need for ventilation from a window for a variety of reasons: fresh air to benefit learning, a solution for a feeling of claustrophobia, and control of uncomfortable temperature situations. Participants appeared to perceive the window as a source of ventilation required to give a sense of improved health, safety, and well-being.

### **Q 3 and Q5: Positive Impacts Related to Learning Style**

Participants were asked if students with a particular learning style would be impacted positively or negatively by a window in the classroom. Participants described positive impacts of a window in a classroom on all learning styles with the possible exception being for auditory learners or students with an auditory dysfunction (see Table 8).

Students were required first to identify their own learning style before they answered. All students noted that a window either would benefit all learning styles, or at the very least would have no impact on learning, with 75% of students indicating that windows would benefit their learning style. Visual learners, in particular, perceived the window as a benefit. One self-identified visual learner said that seeing colours and shapes was important, and the window also helped with ideas (S4).

One of the two students that determined that a window would have no impact on learning was self-identified as a combination auditory and visual learner. All the other

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students identified themselves as visual, kinesthetic, reading-writing style or a combination of those styles.

Most teachers agreed with students saying, “A window is complementary to most learning styles” (T5), and another, “With a window all would benefit. I cannot see any difference with learning style” (T6). Two teachers singled out the reading and writing style, one saying this type of learner would leave the room more without a window (T1), while a different teacher (self-identified as a reading and writing learner) said that, “Reading and writing learners work better with some stimulus” (T4), identifying the window as providing that. One noted that tactile learners would benefit by being better able to imagine the task they would need to do if it was something related to the view they could see from the window (T4). The teachers also identified visual learners as those who would most appreciate the window, one saying that “visual learners need the extra visual. It would enhance learning, and it is like sensory deprivation without it (T4).

Administrators also agreed that windows would benefit most learning styles, one commenting in particular that, “Windows favour more the visual, tactile, and the reading and writing styles” (A1). An Administrator said, “Visual learners tire more easily under fluorescent lights” (A3).

Except for two teachers and two administrators (see Negative Impacts Relating to Learning Style), all felt that a window either would benefit all learning styles, or at the very least, would have no impact on learning (see Table 8).

### **Questions 4 (Q4): In What Ways Would a Window be Detrimental in a Classroom as Perceived by Students?**

### **Questions 6 (Q6): In What Ways Would a Window be Detrimental in a Classroom as Perceived by Teachers?**

#### **Q4 and Q6: View-Increased Distraction**

Students determined that there could be specific “noisy, busy views” that could be problematic and cause a negative distraction and impede learning. One student noted a ground level location might be too distracting, especially if there was “noise from the outside or road work” (S8). A different student acknowledged the possibility of distraction from a window by saying that, “maybe there is a distraction with a guy

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passing by, or if the class is overlooking a street and there is an accident, or if it is a beautiful day you might want to spend it outdoors and not in class” (S5).

Though all students noted the possibility of distraction with a window in the classroom, many then qualified their answers with one or more of the following responses: a distraction would only happen with poorly located windows, the respondent claimed he or she would not be distracted by a window, or stated that he or she still required the connection to the outside that the view could provide. In the case of a busy view, a student mentioned that there is the possibility that “students would not be able to focus; they would be looking outside constantly, eager to see what is going on” (S4). Only one of the eight teachers (T7) noted the possibility of a view from a window as being detrimental.

One of the four administrators noted that a view from the window would be a benefit for the teacher only, but a distraction for the students unless the view was just of the sky, ocean, or a similarly calm view (A4). This administrator stated that while natural light from a window was very important for both teachers and students, a view could distract students and said,

A window for the students could be a distraction if there was a view of maybe traffic and noise. A window is good if positioned properly, but if low is a constant distraction. If it is poorly oriented it is worse than none. Any courses that need concentration need black-out curtains. (A4)

Of the four administrators, two felt that the term ‘distraction’ for a window could not be considered at all in a negative way, only positively (A1; A3). One noted more advantages with re-focusing with a good view, but acknowledged the possible disadvantage of distraction with a busy view (A2), while the fourth was most concerned with the possibility of great distraction with a view from a window of anything but the most serene view (A4).

### **Q4 and Q6: View-Negative Impacts Related to Learning Style**

Students did not mention any specific concerns relating to learning style and a window in a classroom. Two teachers were concerned with auditory learners and one said, “An auditory learner could close their eyes and then maybe it would not matter” (T6). The

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other said, “Auditory learners could be distracted, but I never had an auditory learner complain, but I think one could” (T5). They both noted that the visual distraction from the window could affect those students from concentrating on the lesson (see Table 8). Rather than listening to the lesson, these teachers were concerned that instead, they would be looking out the window.

There were two administrators who thought that there was a possibility that a student with an auditory dysfunction might be ill affected, and one explained that by saying that “glass is not as acoustically sound,” and was worried that noise would cause a aural distraction rather than a visual one (A1). The other said that a student with “an auditory processing dysfunction, if engrossed in something visually stimulating, would not pay any attention and would be particularly distracted” (A4). This participant was not speaking of an auditory learner, but a student with auditory problems. However, this time, the concern was about the visual distraction from the window, not the aural one.

Table 8

*Perceptions Regarding Learning Styles and the Impact of a Classroom with a Window*

Perception in a Classroom with a Window	Participants Responding		
	Students	Teachers	Administrators
Impediment to auditory learners or learners with an auditory dysfunction	0	2	2

*Note:* Potential number of respondents: 8 students, 8 Teachers, 4 Administrators

**Summary**

Participants responded similarly regardless of which group they were in. They noted that in order for them to learn, they needed to be comfortable in their physical environment. Comfort to them meant satisfying a variety of needs. In many cases they

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said that a window would provide some of those needs. Participants spoke at times of requiring very basic physiological needs in order to learn, such as adequate “fresh air” and mentioned room temperature as a problem, mostly when it was “too hot.” They felt that a window could alleviate both the temperature and air problem. Sleep was another problem that was mentioned. They said that light from a window kept them awake, whereas with no window, they felt sleepy.

Security needs were also mentioned. Participants noted that it was difficult to concentrate on studies if they felt unsafe, and mentioned that they felt “trapped” and “unsafe” in windowless classrooms. They stated that it was healthier to be in a room with a window.

Participants mentioned that classrooms with windows were more inviting, made them happier and that enabled them to learn. In windowless classrooms they felt “glum” and “depressed” and this inhibited learning.

Both an administrator and a student noted that a windowless classroom was “inhumane” and therefore it was disrespectful to be placed in a classroom without a window. Participants noted that these needs could be fulfilled by a window and needed to be satisfied in order for them to better concentrate on learning.

Although the focus of the answers to the interview questions most often related to how the window in the classroom affected students’ learning, teachers often mentioned that the windows impacted their own teaching in a similar way. They said that they themselves often felt depressed, trapped, unmotivated, and claustrophobic for example, when teaching in a windowless classroom. Teachers noted that they did not teach as well in a classroom without a window because of this.

The three groups interviewed, (students, teachers, and administrators) voiced a variety of views regarding the impact of a window in a classroom on learning. The data analysis described these viewpoints. The following chapter will summarize the results and discover meaning with the study’s findings with reference to the literature reviewed. Conclusions will be drawn and recommendations made.

## **Chapter 5: Summary, Conclusions and Recommendations**

### **Summary**

The purpose of this study was to explore the impact of a window in the classroom on learning as perceived by students and teachers at a large urban college. The perceptions of administrators were also explored. A window can impact a classroom by adding natural light, ventilation, and a view. A considerable number of studies on windows in the classroom have concluded that they can have some positive effects on learning; others have shown that their omission can possibly be detrimental, while a few have indicated negative or little effect on learning. Very few studies have included the perceptions of both college teachers and students. Classrooms are chosen for courses based on a variety of criteria, such as size, equipment, and furniture. If a window in a classroom is perceived to impact learning, then that could be another consideration for classroom choice. This would also be valuable information for an architect designing schools.

A qualitative study using a phenomenological approach was carried out. This study examined the learning experience of students and teachers in a classroom through interviews. A questionnaire was provided, and probing questions were asked. Inductive data analysis was completed.

A limitation was the difficulty to ensure that all stakeholders were represented. Although three significant groups were interviewed including students, teachers, and administrators, only twenty interviews were completed from a single college, which limits the study's generalizability. In general, all three groups found that the inclusion of a window was advantageous to learning.

### **Safety**

According to Maslow's (1943) "Hierarchy of Needs," lower level needs must be met before the higher-order needs can be fulfilled. Learning in a college involves the highest level, self-actualization which includes problem solving and acquiring knowledge (level 5). Physiological needs such as air and sleep (level one), safety needs such as security and health (level two), belongingness (level three), and esteem (level four) must be met before learning takes place. The findings of this study show that elements of a window in the classroom may help to satisfy some of these lower level needs. Respondents noted

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that some physiological needs such as fresh air and temperature were met with an operable window. Participants noted that natural light kept them awake, while without a window, they felt sleepy. They said that a windowless classroom felt unsafe and unhealthy, mentioning claustrophobia, lack of oxygen, excessive heat resulting in difficulties in concentrating on studies. Participants most often commented on the window satisfying physiological and security needs. These findings all relate to Maslow's (1943) level two, health and safety needs, which must be met before learning takes place.

Hattie (2009), in his meta-analysis, concluded that the classroom environment had a very large impact on learning. Significant in this definition for classroom environment was "...providing a safe, caring environment..." (p. 33). According to Banning and Canard (1986), if the physical environment is not welcoming, then the message that the student is valued might not be believable. The article by Veltri, Banning and Davies (2006) corresponded, noting that studies have shown that classroom behaviors including both attendance and questioning, and also attitudes like satisfaction can be influenced by the classroom environment (p. 524). Participants in this study concurred stating often that the classroom without a window felt like a jail; they said they felt trapped, unsafe and unwelcome.

### **Light**

The benefits of natural light on learning, was found to be the benefit most supported by the literature (Chambers, 2004; Hastings, Fadiman, and James, 1980; Hathaway et al., 1992; Heschong Mahone Group, 2002; Kennedy, 2007; Veltri et al., 2006) and also by the participants of this study. Morris (as cited in Veltri et al., 2006, p. 523) noted that natural lighting was seen as a benefit because it had been found to actually affect feelings, behavior, learning, and concentration in a positive way. Participants in this study said that daylight enabled them to learn by putting them in a happier mood and improved their motivation.

Tanner and Lackney (as cited in Tanner, 2008 p. 385) argued that people need daylight to regulate circadian rhythms, and windowless classrooms can cause a form of jet lag. Lackney (2007) noted that natural lighting has been found to minimize mental fatigue. Veltri et al. (2006) said that the lack of lighting in one classroom seemed to

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induce sleepiness and their students reacted by actually falling asleep (p. 521). Sleepiness was also a common complaint of participants in this study. They said that daylight improved their sense of time. This awareness of the time of day gave them a sense of well-being and daylight kept them awake, while they were sleepy and disoriented without it.

The results of the study by the Heschong Mahone Group (2002) reported significant improvement in learning with reading gains of 26% and math gains of 20% with daylighting, in elementary school children. In this study which relates to colleges, the administrator with a specialty in English and Communications agreed, saying that learning gains could be substantially aided by natural light. On the other hand, the administrator with a Math specialty did not believe such gains to be realistic and was concerned with possible distractions from a noisy or busy view. The findings from this study were inconclusive regarding gains in reading and math.

Participants in this study also considered illumination important to learning and often stated their preference for natural light. They noted a common dislike of fluorescent lights and said that it made them unwell. Lackney (as cited in Tanner, 2008 p. 385) said that fluorescent lighting may affect some students and teachers negatively by causing mild seizures.

### **View**

A study by Tanner (2008) reported that when a student needed to take a break from learning, it was easier to get back on track after taking a quick look outside at a pleasant view than after doodling on paper. It was easier to re-focus. Tanner qualified these views, indicating that not all views were beneficial. He differentiated them, noting that while a view of a wall or parking lot was not desirable, “unrestricted views of nature add to the well being of students and teachers” (p. 387). Findings in this study concurred, that students and teachers perceived a view of nature was important by providing a mental break. Participants also noted that a busy or noisy view could be distracting.

### **Ventilation and Sense of Improved health**

Hathaway et al., (1992) stated health benefits from daylighting included improved growth and development in elementary schoolchildren and also noted improved

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achievement. He noted its importance to their well-being. A study by Kuller and Lindsten (as cited by Tanner, 2008, p. 386) found that doctors also reported a biological need for windows. This health issue was argued by multiple other proponents for daylighting in classrooms (Chambers, 2004; Hastings, Fadiman, & James, 1980; Hathaway et al., 1992; Heschong Mahone Group, 2002; Kennedy, 2007).

The perception of participants in this study was that a classroom with a window was healthier. They valued the health benefits of an operable window that allowed the control of ventilation and temperature. Some participants said that the classroom was stifling or claustrophobic without an operable window and therefore difficult to learn in. Earthman (1996) also found that the control of the thermal environment in combination with proper illumination, were some of the factors found to positively influence learning. These same factors were also described as important in work performance by office workers in studies noted by the CAGBC (2004) where there was greater productivity and less absenteeism when a window was available and manually operable.

### **Conclusions**

#### **How a Window Impacts a Room**

A window impacts a room in a positive way and is considered essential to an ideal room. A window increases energy level, alertness, motivation, and improves mood. It creates a more inviting atmosphere, a sense of safety, and a healthier space that tends to not feel claustrophobic.

#### **The Purpose of a Window in a Classroom**

A window provides light, view, and ventilation to the classroom. It provides better light quality than artificial lighting alternatives. Natural light is preferred and considered necessary in particular by those who feel ill with fluorescent lights. A window aids creativity and the teaching of certain subjects. The window is felt to have an important function in controlling room temperature and air flow, which is considered necessary for a healthy learning environment. Windows offer cost and energy savings by controlling ventilation and providing free light. An exit is not the purpose of a window in a school, yet it is seen as a possible means of escape that make students feel safer.

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

### **The Benefits of a Window in a Classroom**

There are four main benefits to having a window in a classroom, light, view, exit, and ventilation. Since it is possible to have a window that provides one of these elements but not another, the benefits of each of these elements are examined separately.

#### **Benefits from light.**

Light from a window in a classroom is inviting, creating a happier mood, more receptive to learning, and might counteract sadness, depression, and Seasonal Affective Disorder (SAD). Artificial lighting is often seen as harmful, tiring, and producing a cold atmosphere, while natural light can help to reduce these problems.

Natural light contributes to an increased sense of time (an awareness of the time of day), eliminating the disorientation which results without it. Students are more awake, alert, content, and ready to learn in a classroom with natural light.

Natural light contributes to increased concentration, energy, and motivation to learn, impacting mood positively.

#### **Benefits from a view.**

A view from a window allows a mental break from learning by providing a resting point for the eyes, enabling the student to obtain a quick rest and then to re-focus on the lesson at hand. A view of nature is ideal for a mental break. Nice scenery is calming, relaxes the eyes, helps with creativity, and functioning. A view creates a sense of well-being, that the classroom environment is safe and inviting, and a desirable place to be. It makes students feel more human and valued. A view could occasionally be used as a teaching tool, as an additional means to illustrate a concept, enabling opportunities to learn beyond the classroom without leaving it.

#### **Benefits from an exit.**

Windows increase the feeling of safety in a classroom by providing a possible exit. Feeling safe is necessary for learning. The window does not need to be operable. An interior window feels safer than no window at all.

#### **Benefits from ventilation.**

A classroom with an operable window feels healthier and safer. Fresh air from a window is seen to help concentration, alertness, and control temperature. Uncomfortable

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

temperature conditions are considered an obstacle to learning. There is mistrust regarding the mechanical systems that ventilate the classrooms. An operable window appears to satisfy these apprehensions by providing back-up mechanical ventilation, while also fulfilling the desired connection to nature. Operable windows satisfy complaints of claustrophobia that are common in classrooms with inoperable windows.

### **The Drawbacks of a Window in a Classroom**

The main drawbacks from a window in a classroom are related to view. Distraction from the lesson at hand is the main detriment to having a window in a classroom. If the view is bad, which means noisy or busy, it could be distracting and could impede learning. Glare from a window is also distracting. Light controls such as blinds are necessary. A student who is an auditory learner, or a student with an auditory dysfunction, might find a window a distraction. Noise through a window, or any view from a window, might be a distraction and detrimental to these students.

### **General Comments**

Windows in the classroom impact learning in positive ways. A window benefits all learning styles, except for possibly auditory learners (see “The Drawbacks of a Window in a Classroom”), or at the very least, has no impact on learning styles. The main drawback found to a window in a classroom is distraction if the window provides a busy or a noisy view.

Although the focus of the study is on how, or if, a window is impactful on a student’s learning, a window was also found to help teachers. It permitted them a mental break, improving their mood, and thus allowing them to be better teachers.

There are a few unexpected findings. Respondents answered similarly regardless whether student, teacher, or administrator. Every participant valued natural light in the classroom. It was a surprise to discover that a classroom was felt to be unsafe without a window. Finally, it was not a surprise to find that if participants found a place unwelcoming, unsafe or unhealthy, that they also found it not conducive to learning.

### **Recommendations**

This study frequently aligned itself with the results of prior research. There were also some inconsistencies and areas where further research is required. The findings of this

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

study indicated that a window in the classroom provided benefits to learning, and that at worst no drawbacks result from a window in a classroom, unless the view is busy or noisy, is not provided with light or glare control, or perhaps when it is for students who are auditory learners or those with an auditory dysfunction. It is for these reasons the following recommendations are suggested:

1. There should be a window to provide daylighting in each classroom. Glare and light control need to be an essential part of any window installation.
2. The window should also provide a calm view of nature, if possible. Where only a bad view is available, it must be avoided; clerestory (high level windows) or skylights can satisfy the situation.
3. It is recommended to supply an exterior window if possible, which can be manually operated for additional ventilation from within the classroom.
4. If no exterior window can be provided, an interior window would be recommended for a sense of safety, avoiding a busy or noisy view.

### **Future Research**

A significant study by The Heschong Mahone Group (2002) indicated significant improvement in both reading and math with daylighting in elementary schools. The specialists interviewed in this study perceived a possibility of significant improvement in English and Communications courses (A3), but not Math (A4). A quantitative study would be valuable to observe if significant gains could be made in various college level courses.

Hathaway et al. (1992) studied absenteeism and noted increased attendance in classrooms with windows in elementary schools. It could be valuable to discover through further research if there is a similar co-relation in a college.

A study by Tanner (2008) qualified views in classrooms and indicated that not all views through windows were beneficial. More research on the types of view to offer a positive mental break in a classroom would be of use. Furthermore, a study to discover if an interior classroom view of a painting of nature or perhaps the provision of plants in the classroom, offer similar benefits that an exterior view of nature does in providing a mental break.

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

Interior windows are common place in many schools. Participants in this study found interior windows helpful for a sense of safety, but noted that the view was often busy and distracting. An assessment of the true value of interior windows in a classroom on learning would be valuable.

Are schools presently using full spectrum lighting where there is no day-lighting? Previous studies by Hathaway et al. (1992) indicated the value of full spectrum lighting as a substitute for daylighting in elementary schools. Studies have also shown some health issues with fluorescent lighting. It would be interesting to discover if some schools have used full spectrum lighting and to study its benefits and drawbacks as an alternative to light from a window where a window is impossible.

Research on the value of a window in a night class on learning could prove useful. Participants in this study have said that the natural light from window helps to keep them awake. Veltri et al. (2006) said that the lack of daylighting in a classroom seemed to induce sleepiness. Does a window showing the exterior darkness that one might see taking an evening course bring on sleepiness? It would be helpful to discover the impact of a window in a classroom on learning at night and if it varies from its daytime impact.

Participants in this study found a window of value and at minimum not a drawback, for all learning styles except possibly one. There was some concern that a window (with a view in particular) could pose a distraction, inhibiting learning for both auditory learners and students with an auditory dysfunction. Further research in this area is needed.

According to participants in this study, and supporting literature, the physical environment did appear to influence learning in particular by the addition of natural light. An administrator in this study involved in the design of five college buildings said, "In design of classrooms, these are considerations that would have dominated: cost, environmental principles, space, and efficiency. Windows are on the margin of discussions, not getting much consideration" (A1).

There are no requirements for a window in a classroom in Canada. The direct functions of a window can be provided by alternatives. Light can be supplied by light fixtures, ventilation by mechanical systems, exits by doors, and a view is never required. Students, teachers, and administrators of the college in this study noted that a window in

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

a classroom answers some physiological and security needs. These needs satisfied by a window, may impact learning positively and may not be so easily replaced by alternative light fixtures and mechanical systems. As more members of society spend increasingly longer time in educational institutions, a larger portion of their time is spent in the classroom. The classroom environment becomes a more significant part of their life and its impact on learning more important. Additional research is needed to further determine the significance of a window in a classroom on learning.

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## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

**Appendix A - Faculty/Administrator- Email Invitation**

Dear

Re: Research Study - The Impact of a Window in the Classroom on Learning as Perceived by Students and Teachers

You are invited to participate in a research study which seeks to gather information about the perceptions of students and faculty at George Brown College regarding the impact of a window in the classroom. The intention is to discover, in this research, the value of a window in a classroom and whether window is necessary, desirable or perhaps an impediment to learning.

A letter explaining this research study and the terms of consent to take part in this study is attached to this email. If you have any difficulty opening the attachment or if you have any questions please do not hesitate to contact me, at [slopa1mr@cmich.edu](mailto:slopa1mr@cmich.edu) or 416-415-5000 ext. 6634

If you are willing to volunteer to participate in this research study please send an email to [slopa1mr@cmich.edu](mailto:slopa1mr@cmich.edu) and I will contact you to set up a time and place to conduct the interview.

Your participation would be very much appreciated.

Sincerely,  
*Marlene Slopack*

Marlene Slopack  
Graduate Student, Masters of Arts in Education  
School of Graduate Studies - Central Michigan University

**Appendix B - Letter of Information and Informed Consent- Faculty, Administrators***Letter of Information and Informed Consent-Faculty, Administrators*

Study Title:

**The Impact of a Window in the Classroom on Learning as Perceived by  
Students and Teachers**

\_\_\_\_\_, 2010

Dear Participant,

My name is Marlene Slopach and I am a graduate student in the Masters of Arts in Education program at Central Michigan University. As a part of my course work I am completing a research project for a Capstone thesis in the course Issues of Education, EDU 776.

The purpose of my research is to explore the impact of a window in the classroom as perceived by students and teachers in a college. The intention is to explore whether or not a window in a classroom has any impact on learning. Is a window necessary, desirable or perhaps an impediment to learning? This research will attempt to answer the following questions. In what ways does a window in the classroom of a college impact learning? What are the ways a window impacts a room? In what ways would a window in a classroom improve or detract from learning? I will be conducting this research by inviting you to participate in an interview for this study. It is hoped that the information gained from the study may provide insight that may be used in the design of better classroom spaces for learning.

No names will be recorded during the interview or used in the Capstone project. The completion of the interview should take no longer than 45 minutes. There are no known risks to participating in this study and there is no compensation for being a participant.

All information collected for this study will be kept strictly confidential and your identity will be protected at all times. Only the researcher and Capstone Advisor will have access to this information. The presentation of this data in the Capstone paper will not allow for the identification of any individual.

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

If you agree to participate in this interview, please sign at the indicated place below giving your informed consent to participate in the study. Based on the participant's request, the participant will have a chance to read the capstone report upon CMU's approval. Thank you for your time and please do not hesitate to contact me if you have any questions or concerns.

Participation in this research is voluntary. You may refuse to participate or you may withdraw from this study, at any time and for any reason. During the Interview you may decline to answer any of the questions at any time and for any reason.

Sincerely,

Marlene Slopach  
Central Michigan University  
(416) 415-5000 ext 6634  
[slopalmr@cmich.edu](mailto:slopalmr@cmich.edu)

### Faculty Advisor Contact Information

Dr. Valerie Lopes, Faculty  
Central Michigan University  
[lopes1vm@cmich.edu](mailto:lopes1vm@cmich.edu)  
416-529-2684

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the Institutional Review Board by calling 989-774-6777, or addressing a letter to the Institutional Review Board, 251 Foust Hall Central Michigan University, Mt. Pleasant, MI 48859.

*My signature below indicates that all my questions have been answered. I agree to participate in the project as described above.*

\_\_\_\_\_  
Signature of Subject

\_\_\_\_\_  
Date Signed

### **CONSENT TO AUDIOTAPE**

\_\_\_\_\_ I agree to have the interview session audio-taped.

\_\_\_\_\_ I do not agree to have the interview session audio-taped

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

I understand that I will only be identified by a previously assigned code in any transcripts or any further reporting of the data collected at this Interview Session. Only the researcher will have access to the codes and the corresponding names of the participants

**For the Research Investigator**—I have discussed with this subject the procedure(s) described above and the risks involved; I believe he/she understands the contents of the consent document and is competent to give legally effective and informed consent.

\_\_\_\_\_  
Signature of Responsible Investigator

\_\_\_\_\_  
Date Signed

*A copy of this form has been given to me.* \_\_\_\_\_ Subject's Initials

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

**Appendix C - Email to Faculty re: Distribution of Student Participation**

Title of Study: The Impact of a Window in the Classroom on Learning as Perceived  
by Students and Teachers

Researcher: Marlene Slopack

Dear

With the approval of the George Brown College Ethics Review Board I am conducting a research study which seeks to gather information about the perceptions of students and faculty at George Brown College regarding the impact of a window in the classroom. The intention is to discover, in this research, the value of a window in a classroom and whether window is necessary, desirable or perhaps an impediment to learning.

As part of that study students are being invited to participate in interviews. I am asking for your help to distribute to the students, by \_\_\_\_\_, the invitation to participate in this study. A copy of the invitation is attached. I will ensure that the invitations are in your mailbox by \_\_\_\_\_. Please distribute the invitation to the students without explanation or lengthy comment. If you prefer, I could come to your class to give the invitation to the students at a time that would be most convenient for you. Please let me know what would work best for you. If the students have any questions about the interview or the research please ask them to contact me. I sincerely appreciate your assistance with this and thank you very much for your support. If you have any questions or would like more information please do not hesitate to let me know.

Sincerely,  
*Marlene Slopack*

[slopa1mr@cmich.edu](mailto:slopa1mr@cmich.edu) or 416-415-5000 ext. 6634

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

**Appendix D - Student Flyer Invitation**

Dear Student,

Re: Research Study - The Impact of a Window in the Classroom on Learning as Perceived by Students and Teachers

You are invited to participate in a research study which seeks to gather information about the perceptions of students and faculty at George Brown College regarding the impact of a window in the classroom. The intention is to discover, in this research, the value of a window in a classroom and whether window is necessary, desirable or perhaps an impediment to learning.

A letter explaining this research study and the terms of consent to take part in this study is attached. If you have any questions please do not hesitate to contact me, at [slopalmr@cmich.edu](mailto:slopalmr@cmich.edu) or 416-415-5000 ext. 6634

If you are willing to volunteer to participate in this research study please send an email to [slopalmr@cmich.edu](mailto:slopalmr@cmich.edu) and I will contact you to set up a time and place to conduct the interview.

Your participation would be very much appreciated.

Sincerely,

***Marlene Slopack***

Marlene Slopack  
Graduate Student, Masters of Arts in Education  
School of Graduate Studies - Central Michigan University

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

**Appendix E - Students - Email Interview Appointment**

Hello,

Thank you very much for volunteering to participate in an interview.

The interviews will be held in \_\_\_\_\_ which is located at Casa Loma campus. As a token of appreciation for your participation in these sessions a lunch certificate will be distributed at the end of the session.

The times and dates of the sessions are:

	Day	Month	Time
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

There will be more sessions added, if they are needed. The session will take approximately 45 minutes and participation is voluntary. You may leave the session at any time and you may choose whether or not you wish to answer the questions. You will not be evaluated in any way.

**Please let me know, by return email, which session you will attend so that I can order the right amount of lunch certificates.**

If you are unable to attend any of the sessions listed above please let me know a time and date that you would prefer.

Thank you for your time and your willingness to participate in the study. I look forward to meeting you at the interview.

Sincerely,  
Marlene Slopach

[slopa1mr@cmich.edu](mailto:slopa1mr@cmich.edu) or 416-415-5000 ext. 6634

**Appendix F - Letter of Information and Informed Consent - Students***Letter of Information and Informed Consent- Students*

Study Title:

**The Impact of a Window in the Classroom on Learning as Perceived by  
Students and Teachers**

\_\_\_\_\_, 2010

Dear Participant,

My name is Marlene Slopach and I am a graduate student in the Masters of Arts in Education program at Central Michigan University. As a part of my course work I am completing a research project for a Capstone thesis in the course Issues of Education, EDU 776.

The purpose of my research is to explore the impact of a window in the classroom as perceived by students and teachers in a college. The intention is to explore whether or not a window in a classroom has any impact on learning. Is a window necessary, desirable or perhaps an impediment to learning? This research will attempt to answer the following questions. In what ways does a window in the classroom of a college impact learning? What are the ways a window impacts a room? In what ways would a window in a classroom improve or detract from learning? I will be conducting this research by inviting you to participate in an interview for this study. It is hoped that the information gained from the study may provide insight that may be used in the design of better classroom spaces for learning.

No names will be recorded during the interview or used in the Capstone project. The completion of the interview should take no longer than 45 minutes. There are no known risks to participating in this study and there is no compensation for being a participant.

All information collected for this study will be kept strictly confidential and your identity will be protected at all times. The presentation of this data in the Capstone paper will not allow for the identification of any individual.

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

If you agree to participate in this interview, please sign at the indicated place below giving your informed consent to participate in the study. Based on the participant's request, the participant will have a chance to read the capstone report upon CMU's approval. Thank you for your time and please do not hesitate to contact me if you have any questions or concerns.

Your participation in this study is completely voluntary. If you choose to participate in the study you may withdraw at any time without explanation or consequences of any kind, and you are free to not answer any question(s) you do not wish to answer. The information that you provide will not be seen by any of your professors. Only my Capstone Supervisor and I will have access to the information. Participating or not participating in this study will not affect your grades or standing at the college now or in the future.

Sincerely,

Marlene Slopak  
Central Michigan University  
(416) 415-5000 ext 6634  
[slopalmr@cmich.edu](mailto:slopalmr@cmich.edu)

Faculty Advisor Contact Information

Dr. Valerie Lopes, Faculty  
Central Michigan University  
[lopes1vm@cmich.edu](mailto:lopes1vm@cmich.edu)  
416-529-2684

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the Institutional Review Board by calling 989-774-6777, or addressing a letter to the Institutional Review Board, 251 Foust Hall Central Michigan University, Mt. Pleasant, MI 48859.

*My signature below indicates that all my questions have been answered. I agree to participate in the project as described above.*

\_\_\_\_\_  
Signature of Subject

\_\_\_\_\_  
Date Signed

**CONSENT TO AUDIOTAPE**

\_\_\_\_\_ I agree to have the interview session audio-taped.

\_\_\_\_\_ I do not agree to have the interview session audio-taped

IMPACT OF WINDOW IN CLASSROOM ON LEARNING

I understand that I will only be identified by a previously assigned code in any transcripts or any further reporting of the data collected at this Interview Session. Only the researcher will have access to the codes and the corresponding names of the participants

**For the Research Investigator**—I have discussed with this subject the procedure(s) described above and the risks involved; I believe he/she understands the contents of the consent document and is competent to give legally effective and informed consent.

\_\_\_\_\_  
Signature of Responsible Investigator

\_\_\_\_\_  
Date Signed

*A copy of this form has been given to me.* \_\_\_\_\_ Subject's Initials

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

### **Appendix G - Research Questions**

#### **Main question**

In what ways does a window in the classroom of a college impact learning, as perceived by students and teachers?

#### **Supporting questions**

7. What are the ways a window impacts a room?
8. What is the purpose of having a window in a classroom?
9. In what ways would a window be beneficial in a classroom as perceived by students?
10. In what ways would a window be beneficial in a classroom as perceived by teachers?
11. In what ways would a window be detrimental in a classroom as perceived by students?
12. In what ways would a window be detrimental in a classroom as perceived by teachers?

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

### **Appendix H – Interview Questions**

#### **Students - Interview Questions**

This information will be included at the beginning of the interview:

The participants will be reminded that their participation is voluntary and they can withdraw from the study at any time and that they can refuse to answer any questions. If at any time they do not wish to continue with the interview the interview will end.

Title of Study: The Impact of a Window in the Classroom on Learning as Perceived by Students and Teachers

Researcher: Marlene Slopach

Collection of Background Information:

Students asked to identify:

1. Name of the program in which they are registered,
2. Course in which they are registered,
3. Their ages

Q. 1 – Could you describe to me the physical design of an ideal room.

Q. 2 – Could you describe to me the physical design of an ideal classroom.

Q. 3 – Have you ever had a classroom with a window?

Q. 4 – Have you ever had a classroom without a window?

Q. 5 – Do you have a preference?

Q. 6 – What would be the benefits to learning in a classroom with a window?

Q. 7 – What would be the drawbacks to learning in a classroom with a window?

Q. 8 – What would be the benefits to learning in a classroom without a window?

Q. 9 – What would be the drawbacks to learning in a classroom without a window?

Q. 10 – Some students are visual learners, some auditory, others tactile, and still others have a reading/writing-preference. What is your preferred style of learning?

Q. 11 – Considering your learning style, how do you feel that a window in a classroom will affect your learning?

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

### Teachers - Interview Questions

Title of Study: The Impact of a Window in the Classroom on Learning as Perceived by Students and Teachers

Researcher: Marlene Slopach

Collection of Background Information:

Teacher asked to identify:

1. Their area of expertise,
2. Name of the program in which they teach,
3. Names of the courses in which they teach,
4. How long they have been teaching

Q. 1 – Could you describe to me the physical design of an ideal room.

Q. 2 – Could you describe to me the physical design of an ideal classroom.

Q. 3 – Have you ever had a classroom with a window?

Q. 4 – Have you ever had a classroom without a window?

Q. 5 – Do you have a preference?

Q. 6 – What would be the benefits to learning in a classroom with a window?

Q. 7 – What would be the drawbacks to learning in a classroom with a window?

Q. 8 – What would be the benefits to learning in a classroom without a window?

Q. 9 – What would be the drawbacks to learning in a classroom without a window?

Q. 10 – Some students are visual learners, some auditory, others tactile, and still others have a reading/writing-preference. Considering learning style, how do you feel that a window in a classroom will affect learning?

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

### **Administrators - Interview Questions**

Title of Study: The Impact of a Window in the Classroom on Learning as Perceived  
by Students and Teachers

Researcher: Marlene Slopach

Collection of Background Information:

Administrator asked to identify:

1. Their position in the college
2. Area of the college they are responsible for,
3. Their area of expertise,
4. How long they have been in the college system
5. If they have ever taught and then for how many years

The following questions are being asked to you in regards to your collective experience as relayed to you regarding teachers and students.

Q. 1 – Could you describe to me the physical design of an ideal room.

Q. 2 – Could you describe to me the physical design of an ideal classroom.

Q. 3 – Do you have facility planning or teaching or learning experience with a classroom with a window?

Q. 4 – Do you have facility planning or teaching or learning experience with a classroom without a window?

Q. 5 – Do you have a preference?

Q. 6 – What would be the benefits to learning in a classroom with a window?

Q. 7 – What would be the drawbacks to learning in a classroom with a window?

Q. 8 – What would be the benefits to learning in a classroom without a window?

Q. 9 – What would be the drawbacks to learning in a classroom without a window?

Q. 10 – Some students are visual learners, some auditory, others tactile, and still others have a reading/writing-preference. Considering learning style, how do you feel that teachers or students perceive that a window in a classroom might impact learning?

Q. 11 – Have you been aware of any situations or reports where teachers or students have shown preferences regarding the inclusion or exclusion of a window in a classroom.

Q. 12 – Have you been aware of any situations or reports where teachers or students have felt that that a window in a classroom or the lack of it affected learning?

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

**Appendix J - Transcriber's Confidentiality Agreement**

**Title of Study: The Impact of a Window in the Classroom on Learning as  
Perceived by Students and Teachers**

Researchers: Marlene Slopach (MA in Education Student)

Dr. Valerie Lopes (Capstone Monitor)

**TRANSCRIBER'S CONFIDENTIALITY AGREEMENT**

As a transcribing typist of this research study, I understand that I will be hearing tapes of confidential interviews. The information on these tapes has been revealed by research participants who participated in this project on good faith that their interviews would remain strictly confidential. I understand that I have a responsibility to honor this confidentiality agreement.

I hereby agree not to share any information on these tapes with anyone except the researchers, Marlene Slopach and Dr. Valerie Lopes, of this project. Any violation of this agreement would constitute a serious breach of ethical standards, and I pledge not to do so.

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Signature of Transcribing Typist

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Date

**Appendix K - Letter of Information***Letter of Information*

Title of Study: The Impact of a Window in the Classroom on Learning as Perceived by Students and Teachers

Researchers: Marlene Slopack (Graduate Student)  
Dr. Valerie Lopes (Thesis Advisor)

My name is Marlene Slopack and I am a graduate student in the Masters of Arts in Education program at Central Michigan University. As a part of my course work I am completing a research project for a Capstone thesis in the course Issues of Education, EDU 776.

The purpose of my research is to explore the impact of a window in the classroom as perceived by students and teachers in a college. The intention is to explore whether or not a window in a classroom has any impact on learning. Is a window necessary, desirable or perhaps an impediment to learning? This research will attempt to answer the following questions. In what ways does a window in the classroom of a college impact learning? What are the ways a window impacts a room? In what ways would a window in a classroom improve or detract from learning? I will be conducting this research by inviting you to participate in an interview for this study. It is hoped that the information gained from the study may provide insight that may be used in the design of better classroom spaces for learning. Based on the participant's request, the participant will have a chance to read the capstone report upon CMU's approval.

No names will be recorded during the interview or used in the Capstone project. The completion of the interview should take no longer than 45 minutes. There are no known risks to participating in this study and there is no compensation for being a participant.

All information collected for this study will be kept strictly confidential and your identity will be protected at all times. The presentation of this data in the Capstone paper will not allow for the identification of any individual. Based on the participant's request, the participant will have a chance to read the capstone report upon CMU's approval.

Your participation in this study is completely voluntary. If you choose to participate in the study you may withdraw at any time without explanation or consequences of any kind, and you are free to not answer any question(s) you do not wish

## IMPACT OF WINDOW IN CLASSROOM ON LEARNING

to answer. The information that you provide will not be seen by any of your professors. Only my Capstone Supervisor and I will have access to the information. Participating or not participating in this study will not affect your grades or standing at the college now or in the future.

Thank you for your time and please do not hesitate to contact me if you have any questions or concerns.

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