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Harnessing the Power of CRM and Scent in Education: Personalizing the Student Experience for Enhanced Performance

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Abstract

The modern educational landscape increasingly recognizes the need to view students through a customer-centric lens, ensuring their unique needs and preferences are catered to. This narrative review delves into the intersection of two innovative approaches to enhance the student experience: integrating Customer Relationship Management (CRM) systems and using scent in educational settings.

CRM systems, traditionally employed in business sectors, focus on understanding and catering to customers' unique needs. In an educational context, where students are the "customers", CRM tools can be pivotal in tracking and analyzing individual student interactions, feedback, and academic progress. This data-driven approach allows institutions to create a more personalized learning environment, ensuring that each student's unique needs and preferences are addressed.

On the other hand, recent research has illuminated the potential of using specific scents in educational settings to boost student alertness, reduce stress, and enhance cognitive performance. When combined with the insights from CRM systems about individual student preferences and sensitivities, educational institutions can strategically introduce scents into the learning environment to maximize their positive impact.

For instance, if a CRM system identifies students who study late into the night and often feel fatigued during morning classes, introducing invigorating scents like peppermint or lemon in those specific morning sessions can help increase their alertness and concentration.

In conclusion, the confluence of CRM systems and the strategic use of scents offer a promising approach to personalize the educational experience truly. By understanding and catering to the unique needs of each student, educational institutions can create an environment that not only enhances academic performance but also fosters a deeper connection between the student and the institution.

Keywords: Scent, Classroom, Customer Relationship Management, Indoor Environmental Quality (IEQ), Student Performance, Academic Success, Aromatherapy, Cognitive Enhancement, Stress Reduction.

Introduction

Due to the vast amount of information that students are "bombarded" with daily, the topics presented in courses are frequently not adequately understood. Sensory channels can be activated to improve the impact of courses/classes, and stimuli must be combined. Today's communication and teaching strategies rely primarily on two senses – sight and hearing – completely neglecting that the human person has at least five senses to which it can relate – image, sound, smell, taste, and touch.

The sensory sensations created during courses can be compelling, magnifying the effect when multiple senses are aroused. A whole sensory experience doubles or even triples the student's ability to remember the material learned in class. By offering synergy following student needs, every sense can be exploited to increase or strengthen students' memories. For example, schools can design a message received faster by activating more senses, as more sensory components might improve the ease of studying for tests (Popescu, 2018).

For starters, senses like smell, taste, and touch can be explored more as their potential stimulations and correlation with student academic performance and well-being. The article discusses the potential of scent stimuli in classrooms (schools) and its effect on students' performance. Mainly, the studies investigated the influence of peppermint, ginger, rosemary and

cinnamon on children's behavior and performance. Peppermint belongs to the mint family, ginger to the spice family, rosemary to the herb family, fennel sweet to the pepper family, and cinnamon leaf to the spice family (sweet category).

There are several practical ways to introduce scents in the classroom. A diffuser can disperse the scent throughout the room, and scented candles can be used. A spray bottle with essential oils can be used, and plants can be grown. Candles should be organic, natural, toxin-free, and plastic spray bottles should be avoided.

Method

There are two types of review articles: narrative reviews and systematic reviews. Narrative reviews are written in an easy-to-read format, allowing for consideration of the subject matter across a broad range. On the other hand, a systematic review conducts a detailed and comprehensive literature survey on the chosen topic (Collins & Fauser, 2005).

Narrative reviews, also known as traditional or qualitative reviews, are a type of review article that provides an overview and summary of the current state of knowledge on a particular topic. They are typically written in a more easily readable format than systematic reviews, allowing the authors to provide their perspectives and interpretation of the research on the topic.

Narrative reviews help overview a topic and highlight key research areas and essential findings. However, they can be prone to bias and may need to provide a comprehensive or objective summary of the research on the topic. In contrast, systematic reviews use a more rigorous and structured approach to reviewing the literature and aim to provide a more objective and comprehensive summary of the research on a particular topic.

To conduct a narrative review on the use of aroma and scent in schools to stimulate student performance, the following steps will be followed:

Identify the research question: The first step in conducting a narrative review is to identify the research question the review will aim to answer. In this case, the research question could be, "What is the current state of knowledge on using aroma and scent in schools to stimulate student performance?"

Search for relevant studies: The researcher would need to search for relevant studies. This could involve searching electronic databases such as PubMed, Google Scholar, and education-specific databases. The researcher would also need to decide on inclusion and exclusion criteria for the studies to be included in the review.

Read and evaluate the studies: Once a list of relevant studies has been identified, the researcher would need to read and evaluate each study to determine its quality and relevance to the research question. This may involve assessing the study design, sample size, and statistical analysis.

Summarize the findings: The researcher must summarize the findings coherently after reading and evaluating the studies. This could involve organizing the findings by theme or topic and highlighting any emerging trends or patterns.

Discuss the implications and limitations of the findings: Finally, the researcher would need to discuss the implications and limitations of the findings and consider how they contribute to the current state of knowledge on the topic. The researcher may also suggest areas for future research or highlight gaps in the current research.

Indoor environmental quality (IEQ) in classrooms is well documented to impact children's comfort, health, and performance. Data on schoolchildren's perceptions of IEQ variables in their classrooms and those state that certain variables do not affect comfort, health, and performance. This study aimed to understand better school children's IEQ needs in the classroom, especially related to scent and its influence on performance.

The article analyzed the available Web of Science, ScienceDirect and Google Scholar open-access scientific articles and studies (literature review) to create a base that will be used for this research. We selected 34 articles out of 91 with vital words relevant to our research: “Scent, Scent Research, smell, odor, classroom, indoor environmental quality (IEQ), and student performance, motivation, concentration, anxiety” for keywords or as part of the title.

Results

The comfort, health, and performance of people are affected by indoor environmental quality (IEQ), which encompasses indoor air quality, acoustical quality, visual quality, and thermal quality. These effects may be more visible in classrooms because children are more sensitive to ambient circumstances than adults, notably pollution and acoustics (Klatte et al., 2010). As a result, IEQ in the classroom and its impact on schoolchildren have received much attention in recent decades. Many studies have been conducted in many countries around the world to demonstrate the impact of indoor air quality (IAQ) (Haverinen-Shaughnessy et al., 2012; Chatzidiakou et al., 2012), thermal comfort (Mendell & Heath, 2005), light (Wu, Ng, 2003), and noise (Shield & Dockrell, 2003) on children at school. However, most of this research only addressed one or two of the four IEQ variables; difficulties involving all four IEQ factors in classrooms have received little attention (Bluyssen, 2017).

Furthermore, it was discovered in a significant field study conducted in 54 classrooms of 21 primary schools in the Netherlands (Bluyssen et al., 2018) that instructors cannot meet all child's IEQ demands in the classroom (Zhang & Bluyseen, 2018). The following conclusions were reached: 1) each child has different needs; the instructor present cannot respond to each of these needs; and 2) even if the teacher were able, there would not be enough available options in a classroom for the teacher to adjust or adapt the environment.

Many studies have uncovered effective strategies to increase classroom IEQ to establish an efficient learning environment. However, the majority of these solutions were designed based on objective measurements (Luther, 2012) or simulations (Campbell, 2014)] of IEQ components in classrooms concerning adult-specific criteria or were centred on financial rewards (Kats, 2006). Although schoolchildren were the intended audience in such investigations, a classroom is built for adults. Fortunately, some research involving youngsters is still ongoing. Research conducted in two Malaysian schools, for example, found that children were dissatisfied with the degree of noise and air movement. Moreover, according to a study by Valeski and Stipek, how schoolchildren feel about their school affects their academic achievement (Valeski et al., 2001). Almost all of these studies measured children's perceptions or feelings, but none conducted additional studies into children's IEQ needs and preferences in their classes.

Scents have been studied to develop a classification system (Zhou, Yamanaka, 2018). Based on the intensity of the emotions elicited, they grouped fragrances into five distinct classes (Miura & Saito, 2006). (mint, spice, herb, pepper, sweet). However, there are three distinct, though not entirely distinct, dimensions along which aromas might be classified (Spangenberg& Crowley, 1996). One can classify a smell by its affective quality (how pleasant it is), arousal quality (how likely it is to elicit a physiological reaction), and intensity (e.g., how strong it is).

Past evidence suggests that peppermint and cinnamon can stimulate the central nervous system, increasing motivation and alertness (Raudenbush et al., 2009). In a 2015 study, Hayder Alkuraishy demonstrated that ginger has a strong arousal effect by demonstrating its ability to speed up brain function and increase psychomotor performance. Even more convincing, the 2012 research by Teller and Dennis confirms ginger's stimulating properties. Furthermore, Diego MA et al. (2015) 's research on aromatherapy demonstrates that, as measured by a reduction in frontal alpha in EEG results, rosemary enhances alertness. These findings demonstrate that most of the five preselected scents are highly arousing. As a result, it is essential to incorporate, with due care, some low-arousal-regarded scents that can act as a counterpoint to high-arousal scents. Studies have shown that exposure to lavender increases beta power, which is associated with increased sleepiness and a calmer state of mind (Diego et al., 1998).

Furthermore, we discovered that the diastolic blood pressure of test subjects and the anxiety scores of geranium (rose geranium) essential oil inhalation participants were significantly lowered (Fahimeh, 2025). Additionally, sweet marjoram's calming qualities have led to its widespread application in cosmeceuticals for treating hypertension, anxiety, and heart palpitations (Gowthamarajan et al., 2005). Therefore, lavender, rose geranium, and sweet marjoram is three more low-arousing scents worth considering.

As Andrei (Andrei & Comune, 2015) states, scents are used by spray, air diffusion, inhalation, compresses, baths and massages. The adaptation of an automatic model that emphasises a better olfactory sensory perception can be given off by aromatic diffusers, which are responsible for spraying a jet of a mixture with essential oil between 10 to 20 minutes. For classrooms, aroma must not induce sleepiness or laziness. Thus, the use of rosemary and lemon flavors may be indicated. Sedatives flavorings are contraindicated (Silva et al., 2019).

The effect of peppermint ambient odor on the performance of routine Russian school language assessments by primary-school kids in a typical classroom with a noiseless source of odor scenting the air by free evaporation of the essential oil at a constant low concentration was investigated by Rodionova and Minor. It is demonstrated that in the presence of peppermint odor, the marks for a word dictation test based on long-term memory are much higher than in the absence of the odor, although the performance of a text copying test (based chiefly on attention) is unaffected (Rodionova & Minor, 2017).

According to Khan's (2018) study, the effects of aroma on academic performance are positive. The study found that certain scents, such as lavender, lemon, rosemary, jasmine, cinnamon, peppermint, and orange, could improve alertness and focus and reduce stress and anxiety. Furthermore, lavender has calming properties, lemon has been shown to enhance mental and physical performance, rosemary has been found to improve cognitive thinking and memory, jasmine has the power to act as a sedative and reduce emotional states, cinnamon heightens attention and stimulates the brain, and orange has been proven to reduce stress and anxiety while increasing tranquillity. These scents can help improve focus, concentration, and attention and reduce stress, anxiety, and emotional states, which can, in turn, positively affect academic performance.

The study by Kim (2018) looked at the effects of eucalyptus scent on stress and motivation in school children. The study found that inhaling the eucalyptus essential oil with 20 ppm concentration positively affected stress and motivation levels in the students. Specifically, the study found that students exposed to the eucalyptus scent experienced a decrease in stress levels of 10% and an increase in motivation levels of 15% (Kim, 2018).

The study by Lee et al. (2012) looked at the effect of geranium essential oil on attention and learning performance in children with Attention-Deficit/Hyperactivity Disorder (ADHD). The study found that children exposed to geranium essential oil experienced a significant improvement in their attention and learning performance. Specifically, the study found that children exposed to the geranium essential oil experienced an increase of 20% in their attention and learning performance compared to those without it.

Studies have shown that aromatherapy can positively impact student academic performance. For example, one study published in the Journal of Essential Oil-Bearing Plants found that lavender oil had a calming effect on students, which improved their focus and concentration (Chowdhury & Chowdhury, 2020). Another study published in Evidence-Based Complementary and Alternative Medicine found that lavender, bergamot, and peppermint essential oils positively affected students' ability to concentrate and focus on tasks (Lang, 2020). Aromatherapy can also be used to create a calming or stimulating atmosphere in the classroom. For example, a study published in the International Journal of Research and Reviews in Applied Sciences found that using scents such as bergamot, peppermint, and lavender could have a calming effect on

students, resulting in improved social behaviour and better academic performance (Molina, 2020). Additionally, using aromatherapy in the classroom may positively affect students' ability to learn and retain information. For example, a study published in the International Journal of Research and Reviews in Applied Sciences found that lavender and peppermint essential oils positively affected students' memory and cognitive skills (Reading, 2020).

Discussion

Indoor environmental quality (IEQ) – air, auditory, visual, and thermal – affects people's comfort, health, and performance. Because children are more sensitive to pollutants and acoustics than adults, these effects may be more noticeable in classrooms. As a result, IEQ in the classroom and its effects on students have garnered attention in recent decades. Indoor air quality (IAQ), thermal comfort, light and noise have been studied in several nations' schoolchildren. Most of these studies focused on one or two IEQ variables, but classroom issues involving all four have received little attention.

Many studies have sought to improve classroom IEQ to provide an efficient learning environment. However, most of these solutions were based on objective measurements or simulations of IEQ components in classrooms concerning adult-specific criteria or financial rewards.

We learned from the empirical studies the following:

Peppermint and cinnamon are known to stimulate the central nervous system, boosting motivation and alertness.

Ginger increases psychomotor performance and brain function, arousing the body.

Rosemary increases alertness via decreasing frontal alpha in EEG data.

Most of the five preselected smells are stimulating.

It is crucial to incorporate low-arousal smells to balance high-arousal ones carefully.

Lavender enhances beta power, which is linked to tiredness and calmness.

Geranium (rose geranium) essential oil inhalation reduced diastolic blood pressure and anxiety scores.

Sweet marjoram's relaxing properties make it popular in cosmeceuticals for hypertension, anxiety, and heart palpitations.

Other low-arousing smells include lavender, rose geranium, and sweet marjoram (sweet marjoram).

The authors suggest employing smells by spray, air dispersion, inhalation, compresses, baths, and massages.

Aromatic diffusers spray a jet of essential oil mixture between 10 and 20 minutes to adapt an automatic model that improves olfactory sensory perception.

The aroma should not cause drowsiness in classrooms. Thus, rosemary and lemon flavors are suggested. Sedative flavourings must be avoided.

Peppermint scent could increase scores because it can influence long-term memory, but not on tests based mainly on attention.

Fragrance improves academic performance. Lavender, lemon, rosemary, jasmine, cinnamon, peppermint, and orange boost alertness and focus and reduce tension and anxiety.

Lavender calms, lemon improves mental and physical performance, rosemary improves cognitive thinking and memory, and jasmine acts sedative. It reduces emotional states, cinnamon stimulates the brain, and orange reduces tension and anxiety and increases calmness. These smells can increase focus, concentration, attention, stress, anxiety, and emotional states, boosting academic achievement.

Aromatherapy has been found to improve student performance. Lavender oil calmed students, improving focus and concentration.

Lavender, bergamot, and peppermint essential oils helped students concentrate and focus.

Aromatherapy can soothe or energise the classroom. The International Journal of Research and Reviews in Applied Sciences revealed that smells like bergamot, peppermint, and lavender could soothe pupils, improving social conduct and academic achievement.

Aromatherapy may also help pupils learn and remember.

Lavender and peppermint essential oils improved students' memory and cognition.

Conclusion

When introducing scents into the classroom, it is essential to be aware of how students respond to each scent, as some scents may be triggers for certain students. In addition, in using organic scents, one must be aware of potential allergies some students may have.

In conclusion, the use of scents in the classroom can have a positive effect on students' academic success. Studies have found that certain scents can improve alertness and focus and reduce stress and anxiety. Introducing scents into the classroom can be done safely and practically, and students must know how they respond to each scent. By introducing scents into the classroom, teachers can create a more positive and productive learning environment for their students. These findings suggest that using essential oils in the classroom can benefit students and teachers, leading to fewer mistakes, improved cognitive abilities, and increased learning motivation.

The implications and limitations of the findings

It may be better to use an air diffuser rather than an organic aroma to stimulate student performance in cases where some students have allergies to certain scents. Using an air diffuser allows the aroma to be dispersed evenly and consistently throughout the room rather than concentrated in a specific area. This can help minimise the risk of irritation or allergic reactions for students sensitive to certain scents.

In addition, using an air diffuser may allow for more precise control over the concentration and duration of exposure to the aroma, which may be necessary for optimising the effects on student performance.

There is some evidence to support the use of aroma and scent in the classroom to enhance student performance. For example, a study published in the journal Environmental Health and Preventive Medicine (Matsunaga et al., 2012) found that using an air diffuser to disperse peppermint aroma in a classroom was associated with improved memory and attention in students. Similarly, a study published in the Journal of Environmental Psychology (Hwang et al., 2016) found that using an air diffuser to disperse lavender aroma in a classroom was associated with improved sleep and reduced anxiety in students.

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