# How classroom teachers do take the 'Physical activity pauses at school' (PAPS)? A project implemented in Wallonia

MARC CLOES* & STÉPHANIE CLOES**
*UNIVERSITY OF LIÈGE
**ÉCOLE FONDAMENTALE LIBRE DE CHÊNÉE

## Introduction

Nowadays, strong evidence show the link between an active lifestyle and the prevention of large array diseases (ANSES, 2016). Moreover, as pointed out in the Human Capital Model (Morris, 2013), physical activity benefits are not limited to the health domain. So, six categories of benefits are identified: physical, emotional, social, individual, intellectual, and financial.

Most of the studies focusing on physical activity and sedentary behaviour tracking show that the very early childhood lifestyle remains stable along the life course to adulthood (Jones et al., 2013; Telama et al., 2014). This underlines that children and adolescents should adopt an active lifestyle as soon as possible.

Unfortunately, many publications indicate that children and adolescents very rarely reach the 60 minutes of daily physical activity recommended by the World Health Organization (2010). The Report Cards prepared by the 38 countries involved in the Active Healthy Kids Global Alliance emphasize that efforts are needed all around the world.

In fact, the lack of physical activity of young people is currently identified as a major health risk for the adults of tomorrow. Thus, focusing on the US population, Olshansky et al. (2005) concluded that, despite rapid advances in medicine and sanitation, life expectancy is decreasing rather than rising for the first time since 200 years. In 2012, the movement 'Designed to move' proposed an interesting diagram explaining how 'physical inactivity perpetuates a very dangerous cycle that begins to take hold very early in life' (p.7).

### Need to promote physical activity in youths in schools

Even if they are not clearly mentioned in any of the goals and targets of the United Nations' 2030 Agenda/Sustainable Development Goals (United Nation, 2015), the promotion of physical activity and the fight against sedentariness are definitely two of the health challenges that society is facing today. Following the Ecological model (Sallis et al., 2006), school environment is a key element in the promotion of a healthy lifestyle in youths. In fact, schools represent a particularly rich place of development, especially because of the opportunities offered to all young people, including those from a less

privileged background, to become aware of many facets of life in society. Young people spend most of their time at school (Guinhouya et al., 2009); they meet adults whose expertise is recognized in many fields, can benefit from secure and adapted infrastructures and their parents can count on a close collaboration on the part of the educational staff (Bar-Or, 2005; Trost & Loprinzi, 2008). Comprehensive school-based strategies encompassing physical education, classroom activities, after-school sports, and active transport can increase physical activity in young people (Heath et al., 2012, p. 272). Based on several other models, Cloes (2014) identified six key dimensions of an active school: physical education, 'sport' at school, life environment (recesses, spaces), PA in the classroom, active transportation, and school policy. Bassett et al. (2013) showed that each dimension is likely to significantly increase children's daily moderate to high level of physical activity (MVPA).

As pointed out after the 6th International Conference of Ministers and Senior Officials Responsible for Physical Education and Sport (MINEPS VI), developing active schools becomes a priority:

> Active schools, in which physical activity is placed at the heart of the school, support the establishment of healthy lifestyles, behaviour and learning. In addition, quality physical education is a necessary component of primary and secondary education. It supports the building of physical skills and fitness, life skills, cognitive, social and emotional skills, and values and attitudes that frame socially responsible citizens (UNESCO, 2017, p.7).

Research underlined the effectiveness of projects aiming to promote physical activity in schools. There is a strong evidence for the interventions combining school plus family or community environment in adolescents and inconclusive evidence in children (Biddle et al., 2012). Such findings show that modifying lifestyle needs the collaboration of several actors and reinforces the legitimacy of comprehensive models like the CDC's Coordinated School Health (CSH) approach (Whole School, Whole Community, Whole Child – Lewallen et al., 2015).

**Physical activity in the classroom – Some approaches**

Among the strategies that could be implemented to reduce the physical inactivity at school, limiting the sitting time in the classroom represents a promising opportunity. In kindergarten and primary school, classroom teachers often spend more time with children than their parents. They can play a key role in motivating youth to adopt a physically active lifestyle. Thus, in collaboration with their specialist physical education colleagues, they are able to propose physical activities in their lessons.

All around the world, physically active academic lessons have been developed as a part of comprehensive strategies aiming to increase physical activity while also addressing core educational goals: AS! BC (Naylor et al., 2006), Take 10! (Kibbe et al., 2011),

Texas I-CAN! (Bartholomew & Jowers, 2011), L'école bouge (Uwer et al. 2015), Finnish Schools on the Move programme (Blom et al., 2017).

Other projects were more specifically focused on the classroom setting. Such moments during which pupils/students can be physically active, take different forms and names in literature but the basic principle remains the same: children should be encouraged to move around in class, taking into account the limited space.

Among the approaches that have been proposed, it is possible to stop a lesson for a short break. The duration of these breaks varies from 4 to 15 minutes depending on the method. Most have an average duration of 10 minutes, corresponding to the minimum duration of endurance periods recommended by the WHO (2010). These breaks include the *Energizers* developed by Mahar et al. (2006), the *CHAM Jam* studied by Reznik et al. (2015) or the *Instant Recess* of Whitt-Glover et al. (2011). Some breaks, however, have a shorter duration, from 5 to 7 minutes, like the *Movement Breaks* proposed by Fedewa et al. (2015) or the *Bizzy Break!* (Murtagh et al., 2013). The *FUNtervals* of Ma et al. (2015) have a duration of 4 minutes and are the shortest breaks.

Equipment used for the pause varies a lot. Several types of breaks include three components: warm-up exercises, central strength or endurance exercises, and cool-down exercises. This is notably the case of *Activity Bursts in the Classroom* developed by Katz et al. (2010) or *Physical Activity Breaks* studied by Carlson et al. (2015).

Some breaks incorporate school content (*Instant Recess*, Whitt-Glover's et al., 2011 ; *Activity Burst*, Katz et al., 2010), others simply consist of games that are easy to set up.

Several physical activity breaks use videos like the *HopSports Brain Breaks* operated by Tumynaitė et al. (2014) as well as Cloes and Mornard (2014) or Sacli Uzunoz et al. (2017). This is also the case for *Classroom exercises for the body and brain* studied by Caldwell and Ratliffe (2014) or *Brain Breaks: Classroom Fitness for Children* used by Perera et al. (2015). The proposed videos then have a duration of 3 to 10 minutes and are shown on the board. Other supports can also be used as the movement card developed for the *Movement Breaks* (Fedewa et al., 2015) or an audio track used in the *Instant Recess* (Whitt-Glover et al., 2011).

Whatever the type of support used, the duration or the conditions of use, there is always a playful component intended to stimulate the motivation of the children. The goals of these breaks are usually to increase the physical activity of the children and allow them to refocus on school activity.

**Why to implement physical activity in the classroom?**

The benefits of the physical activity breaks begin to be documented. A non-exhaustive analysis is presented in Table 1. The studies that we reviewed show in particular that these breaks can significantly increase the daily physical activity rate. They also lead

**Table 1 – An overview of the physical activity breaks' benefits**

| |
|---|
| Daily PA rate: positive effect |
| ❑ Whitt-Glover et al. (2011), Wadsworth et al. (2012), Carlson et al. (2015) |
| Fitness level: mixed effect |
| ❑ Tumynaité et al. (2014) – No effect |
| ❑ Katz et al. (2010) – Positive effect |
| 'On-task'/'Off-task' behaviors: positive effect |
| ❑ Mahar et al. (2006), Whitt-Glover et al. (2011), Ma et al. (2014), Webster et al. (2015) |
| Selective attention: positive effect |
| ❑ Ma et al. (2015) |
| Academic success: mixed effect |
| ❑ Katz et al. (2010), Howie et al. (2015) – No effect |
| ❑ Maeda & Randall (2003) – Positive effect |
| Group interactions: positive effect |
| ❑ Paquette (2016) |

to a decrease in students' off-task behavior, and this is especially true for the least on-task students. Active breaks could also positively influence certain fitness parameters as well as social interactions in the classroom. Nevertheless, more research is still needed to bring the evidence. Moreover, there is no consensus on the effect of this practice on school performance and the selective attention of students. However, no negative consequences were put forward: the time spent in physical activity never cause a decrease of the academic learning. According to the already identified positive effects, this should encourage more teachers to introduce active breaks in their lessons.

**Implementation of the activity breaks by the classroom teachers**

The perception that classroom teachers have about physical activity breaks is important: "... if participants do not like the treatment, they can avoid it, or run away, or complain loudly. As a result, society will be less likely to use our technology as efficiently and effectively as it is." (Howie et al., 2014, p. 681)

McMullen et al. (2014) analysed logbooks and semi-structured interviews at the end of a one-year experiment during which 12 teachers implemented the *Energizers.* The main characteristics of the activities favoured by teachers were: not generate a feeling of chaos; not too noisy; not requiring preparation time; short duration (5 to 10 minutes); instructions quickly understandable; activities that children enjoy doing. Teachers also seemed to prefer activities that incorporated disciplinary content, which reduces their sense of wasted time.

Howie et al. (2014) have also pointed out teachers' preference for short-term activities: they compared opinions of eight classroom teachers about three durations of *Brain*

*Bites* (5, 10 or 20 minutes). The analysis of the focus groups showed that the teachers only feel able of implement daily breaks of 5 minutes, because of the time constraints related to the school program. On the other hand, students preferred breaks of 10 or 20 minutes and found breaks of 5 minutes too short.

In many studies, teachers are asked to set up the active breaks on a daily basis. However, effective implementation of active breaks often differs from what is prescribed. For example, Reznik et al. (2015) asked to their subjects to perform three 10 minutes *CHAM Jam* per day. An objective measure evidenced that, during the 8th week of the project, only one out of the 25 teachers respected the requirements, the average use of being 1.8 per school day. Barriers reported by teachers to more regular use of activity breaks were mainly lack of time.

The research of Delk et al. (2014) is particularly interesting because the researchers studied longitudinally the implementation of *Activity Breaks* (5 to 10 minutes) in 30 schools for three years. The research team sent questionnaires to each teacher in the 30 schools two and three years after the end of the *AB* training program. Two years after the supply of equipment in schools, 28.2% of the teachers who answered the questionnaire (n = 73) ensured at least one *AB* per week. After three years, they were 34.3% (n = 84). However, the results are different for schools that had a facilitator. This person had a varied role: to offer demonstrations of *AB*, organize promotional activities in the concerned schools, provide technical support, send regular e-mails to help the implementation of *AB*, etc. In this condition, the percentage of teachers reporting at least one *AB* per week two years after the start of the experiment was 43.5% and 53.7% after three years. However, the facilitator did not influence the average usage of the *AB*. In both conditions, it was 2 times/week.

**Teachers' attitudes towards innovation**

Gather Thurler (2000) considers that the fate of an educational innovation depends on what teachers do with it, on their understanding of new ideas, on their adherence, but also on their ability and willingness to integrate them into their practice in a sustainable manner. The author defines six sources of change: (1) the changes envisaged by the individual teacher, arising from a personal reflection on the practice; (2) the induced changes because they are fashionable; (3) the changes contemplated because the work place insists on them or requires them; (4) the changes induced by the results of scientific research (for example: moving from front-line education to socioconstructivism); (5) the changes required by an institution (example: program update) and, finally; (6) changes resulting from a team decision, whether or not part of the school project.

According to Marsollier (2002), teachers are more likely to change their practices early in the school year. He showed also that discussions with colleagues and textbooks are the two ways that teachers used the most to discover innovative approaches when they feel a "dissatisfaction with their work". Huberman (1989) highlighted a succession of

crises and phases common to teachers at different points in their careers that affect their attitude towards innovation. This theoretical framework postulates that the teachers most likely to engage in innovations are those with between 7 and 25 years of seniority whereas teachers who have 25 to 40 years of experience would tend to adopt conservative attitudes leading to caution or resistance to change. Moreover, resistant teachers have most often started under conditions that were not very motivating: lack of initial training, choice of the profession out of spite, inspections too far apart, lack of encouragement or low turnover of teams (Marsollier, 2002). Finally, the institution's own culture could also provide a common code that allows teachers to be on the same wave when a reform occurs or when an informal leader or school head proposes a project (Gather Thurler, 2000).

Ducros and Finkelstein (1990) proposed a list of 10 tips to help change or adopt an innovation (Table 2). It seems that any project aiming to implement a change in the habits of classroom teachers should consider carefully such principles.

**Table 2 – Ten recommendations to achieve an innovation (Ducros & Finkelstein, 1990)**

| |
|---|
| 1) Work with volunteers |
| 2) Do not run out in the preparations |
| 3) Take into account the resistance of teachers and ensure that everyone finds ones account |
| 4) Offer a commitment of limited duration |
| 5) Propose a specific, cognitive objective |
| 6) Get the support of institutional leaders |
| 7) Agree to negotiate innovation, but not at any price |
| 8) Provide internal and external support over time |
| 9) Propose to the concerned actors a continuous training between "peers", focused on the practices |
| 10) Assist in the theorization of practices |

## Goal of the study

Cloes & Cloes (2014) proposed a specific approach allowing children to move in class using playful videos or traditional games: *PAPS* (Physical Activity Pauses at School). A special protocol was then developed so that any Wallonian teachers could set up *PAPS* easily. The pilot study demonstrated the satisfaction and interest toward the *PAPS* of the classroom teachers, students, and principals. Nevertheless, a limit of the initial project was its duration limited to four weeks.

In the present study, with the support of the City of Liège (French speaking part of Belgium), the goal was to implement the PAPS during an entire school year in several

classes volunteer to be part of the project "*The school moves for its health*". According to the review of literature, we identified three research questions:

1) What is the real implementation of the PAPS throughout the school year ?

2) What factors distinguish continuing teachers from those who stop ?

3) What are the barriers and levers to the daily implementation of the PAPS ?

## Method

The *PAPS* are a synthesis of the "*Brain Breaks*" proposed by HOPSports and the "*Physical Activity Break*" of Mahar et al. (2006), Maeda and Randall (2003) or Fedewa et al. (2015). *PAPS* are approximately 6 minutes long, require little space and allow pupils to do exercises. They respect a precise routine:

1) The setting up. An auditory signal decided with the children or brought by the teacher (horn, bell, new sound, etc.) indicates the beginning of the break. At this signal, the children stop their activity. They put their chairs under their bench and go to a place where they have enough space allowing them to raise their knees and stretch their arms.

2) The active phase. The pupils perform physical exercises either during a game proposed by the teacher (PAPS games), or by copying the movements of a character from a projected video (PAPS video).

3) The cool down. Before returning to their activity, the students collectively perform a breathing or relaxation task. They then quietly join their place and go back to work.

The use of such a routine aims to limit the loss of time and maximize the time on task. The *PAPS* are set up a pause between two periods of 50 minutes of consecutive classes, in order to limit periods of sedentary life and/or as soon as the students show that they need to expend energy.

There are two types of active phases:

1) The PAPS games which are activities implemented directly by the teacher by means of precise instructions and which do not require a video projector. These activities, inspired by the *Energizers* of Mahar et al. (2006) and *GEARs* (Maeda and Randall, 2003). They can use movement cards.

2) The PAPS videos that consist of showing a video of a character performing some physical exercises in a particular environment. In this case, the children act as if they were the character and reproduce his movements (short choreographies, fitness movements, etc.). These videos are those developed by HOPSports (2013) or those that can

be found for free on Internet. In the pilot study, we asked also to the pupils to create their own PAPS videos.

**Context**

The project "*The school moves for its health*" consisted of the implementation of actions aiming to promote the development of healthy attitudes among 6 to 8 year-old pupils. It was based on a collaboration between the deputy burgomaster of health of the City of Liège, which provided a financial support to buy video devices for the schools, the University Hospital of Liège, involved in the "healthy food" part and the SIGAPS-ULiège research unit, in charge of the promotion physical activity among young people. After the agreement of their school principal, teachers were invited to attend to a seminar aiming to provide information about the project (Table 3).

**Subjects**

23 primary school teachers from 6 different schools received an initial PAPS training. Of these, 9 have a 1st grade class, 8 a 2d grade and 6 a mixed class (1st and 2d grades). The sample comprises of 2 men for 21 women. The teachers have between 4 and 40 years of professional experience. Five schools come from the network of the City of Liège and one from the catholic network.

**Data collecting**

Quantitative and qualitative data were collected throughout the project (Table 3). At the end of the training, the teachers had to complete an online questionnaire aiming to identify their initial impressions about the PAPS and their self-confidence on the project's success. During the whole year, teachers were requested to fulfil a logbook, recording each day the PAPS that were proposed to the pupils (start time, duration, type) or to explain why they did not propose it. PAPS were coded between November 9, 2015 and May 2, 2016, which corresponds exactly to a duration of 100 working school days.

After four months, a follow up meeting was organized with the teachers. We proposed a focus group to identify good practices, share experiences in an interactive way, and identify difficulties encountered during PAPS. At the end of the school year, a final online questionnaire was proposed. One year and half after the beginning of the project, we sent an email with few questions focusing on the long term follow up.

**Statistical analysis**

Data collection was done using a variety of tools to respect triangulation recommended in qualitative studies (Griffin & Templin, 1989). The analysis of the quantitative data laid on SPSS software. A content analysis has been conducted for all open questions,

good practices, and problems encountered by the teachers. The reliability of the analyses was verified by comparing the themes identified by a second analyst and a percentage of agreement of 88% was obtained.

**Table 3 – Description of the data collecting**

| | |
|---|---|
| January 2015 | Contacts with the partners of 'The school moves for its health' and preparation of the action plan |
| May, June, July 2015 | Recruitment of the schools (n=7) |
| October 2015 | Meeting with the classroom teachers and principals (n=31)<br>Focus on :<br>- Description of the project's principles<br>- Presentation of the PAPS<br>- Distribution and explanation of the PAPS supports<br>- Distribution of the logbook and explanation of data collecting process |
| October 2015 | Sending of the initial questionnaire (n=15) |
| November 2015 | Beginning of the PAPS implementation until May 2016 |
| March 2016 | Focus groups with the classroom teachers<br>Goals :<br>- Make an inventory of the problems encountered and collectively seek solutions<br>- Share good practices (n=54) |
| May 2016 | Sending the final questionnaire (n=23) |
| June 2016 | Organization of a social activity and collecting of the logbooks (n=20) |
| February 2017 | Sending of a short follow up questionnaire (n=14) |

## Results

### What is the real implementation of the PAPS throughout the school year ?

We coded 1575 PAPS in the SPSS software. Each teacher proposed between 13 and 156 PAPS during the 100 school days period (M = 78, sd = 46). Only 30% of the activity breaks used video. The three periods when PAPS were proposed the most are 11:00-11:20, 9:20-9:30, and 14:00-14:30. During the week, Monday is the day when the PAPS are the most frequent (27%). Finally, the PAPS performed by teachers had an average duration of 6 minutes (sd = 2'31).

Based on the 23 responses collected, 7 teachers totally stopped using PAPS while 16 used them on a regular basis: 2 once or twice a week, 6 three to four times a week, 6 every day and 2 more once a day (Figure 1). The same distribution appeared with the teachers' answers about their intent to pursue the PAPS during the following school year. The teachers who stopped did not wish to resume the project the following year; those who implemented PAPS 1-2 times/week were uncertain and those who still used PAPS in May wanted to continue using them the following year.

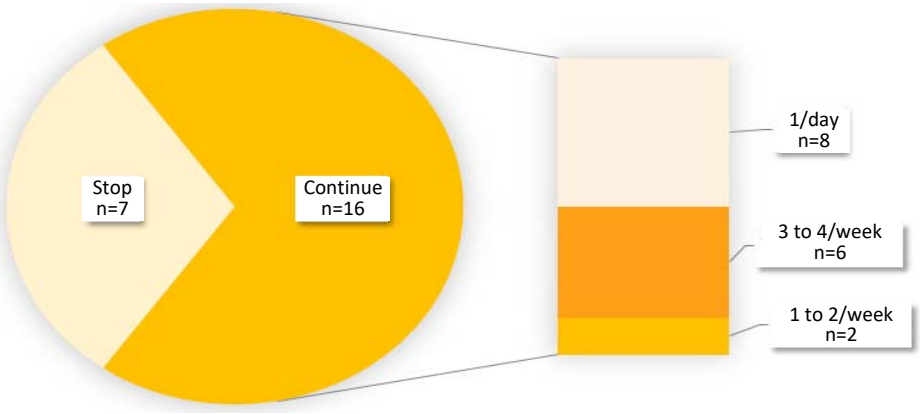


**Figure 1 - How often do you put PAPS in place?**

Four profiles emerged according to the teachers' reaction to the proposed innovation (Figure 2). They differ slightly from those proposed by Marsollier (2002). Among the 'innovative' teachers identified by this author, it is important to distinguish the "Involved" teachers who apply the proposed innovation as it was presented and the "Innovators" characterized by their ability to propose good practices illustrating new PAPS or proposals of improvements.

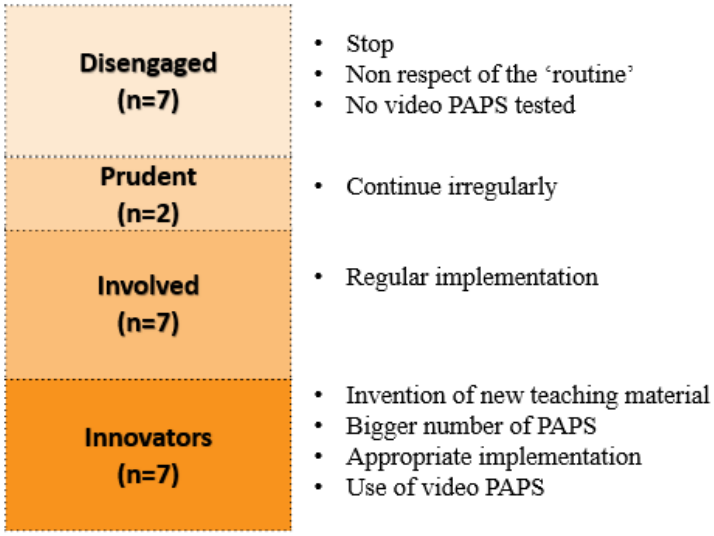


**Figure 2 – Four profiles of teachers**

**What factors distinguish continuing teachers from those who stop?**

Three categories of factors were analysed: (1) personal factors (initial interest of teachers; personal understanding of PAPS; perception of one's ability; number of years of experience; relationship to physical activity; relationship to new technologies); (2) school factors (school effect; principal's support; colleagues' interest in PAPS); (3)

class factors (number of pupils; pupils' age; perception of difficulty of class). Table 4 shows the characteristics differing according to the four categories of teachers identified above.

**Table 4 – Links between teachers' profiles and several factors**

| Factors differing according to the profiles | Factors not differing according to the profiles |
|---|---|
| • Initial interest of teachers towards PAPS<br>• Initial understanding of PAPS<br>• Number of years of experience<br>• Use of video PAPS<br>• School<br>• Colleagues' interest in PAPS<br>• Self-confidence about PAPS implementation<br>• Participation of the teacher in PAPS | • Principal's support<br>• Number of pupils<br>• Class characteristics<br>• Perception of difficulty of class<br>• Perception of ones' computer skills |

**What are the levers and barriers to the daily implementation of the PAPS ?**

In this section, our finding lays on quantitative and qualitative data as the levers and barriers perceived by the teachers were collected by different tools and at multiple moments. As shown in Table 5, the main positive aspect dealt with the pleasure demonstrated by the pupils. The most assiduous teachers underlined a positive impact on attention, and benefit for the atmosphere of the class. Only two teachers highlighted the interest of PAPS for pupils' health. The barriers to innovation identified in this study were the lack of time, the lack of computer knowledge and the identification of discipline problems in the classroom.

**Table 5 – Summary of the factors that support/limit PAPS implementation**

| | Levers | Barriers/limits |
|---|---|---|
| **Recurring items** | • Pleasure/pupils' interest<br>• Positive effect on classroom management<br>• Answer to a need of the pupils<br>• Support to pupils' attention<br>• Positive effect for group atmosphere<br>• Personal interest of the teacher | • Lack of time<br>• Concurrence with other activity<br>• Discipline problems<br>• Lack of computer equipment |
| **Punctual items** | • Quick/easy to implement activity<br>• Wellness/health<br>• Simple equipment<br>• Overall view of the pupils<br>• Creativity | • Space<br>• Some pupils do not participate<br>• Noise |

## Discussion

The PAPS implementation rate is satisfactory if we refer to Perera et al. (2015). In addition, contrary to Cloes and Mornard's (2014) findings, no lassitude effect was reported by participants when they did not give up at the beginning of the experiment.

This study showed that even there are volunteer at the beginning of the project, all classroom teachers do not react in the same way when time is to the concrete implementation. Our findings allowed us to precise the categories proposed by Marsollier (2002).

Moreover, based on the combination of quantitative and qualitative approaches, 12 factors influencing teacher involvement in the PAPS project can be identified (Table 6).

**Table 6 - 12 factors determining teachers' involvement in PAPS**

| | Factors | Barriers | Facilitating |
|---|---|---|---|
| 1 | Initial motivation | Pressure of the principal | Interest, request of information |
| 2 | Appropriate implementation | Lack of cool down | Respect of the routine |
| 3 | Observed effect on behavior | Increase of off-task behaviors | Positive effect on pupils attention |
| 4 | Computer equipment | Lack of projection equipment | Availability of the equipment |
| 5 | Computer skill | Reluctance towards ICT | Mastery of the ICT equipment |
| 6 | School/class projects | Concurrent projects | Links with the school project |
| 7 | Colleagues' attitude | Indifferent colleagues | Supporting colleagues |
| 8 | Frequency of implementation | Obligation of daily implementation | Implementation on need |
| 9 | Pupils' interest | Lack of interest of some pupils | Pupils' request |
| 10 | Classroom space | Restricted space | Spacious classroom |
| 11 | Administrative aspects | Diary fulfilment | No document to fulfil |
| 12 | Individual support | Teachers left to their own | Support of the teachers |

Finally, we tried to answer to the question: 'How to get teachers to move their students to class?' So, a model has been proposed to increase the achievement's rate of projects aiming to implement PAPS. It consists of five steps (Figure 3):

(1) At the request of a teacher or principal, the first step would be to briefly present the PAPS project to the educational staff. This presentation would be based on many concrete videos of PAPS activities in classrooms.

(2) At the end of this, the volunteer teachers could enroll in the second step, a training lasting at least one day. During the course, the teachers would receive the equipment necessary for the implementation of PAPS as well as explanations about how concretely use them. Computer equipment would also be presented to teachers. Finally, small groups of volunteers should create PAPS activities and propose them to their peers.

(3) Essential for the achievement of such a project, the third step would consist to stimulate exchanges between the participants. We recommend to plan group meetings to share good practices and collectively find solutions to the potential problems.

(4) In the fourth stage, it would be appropriate to organize the project monitoring by an external person that would be available in case of problems and would regularly meet the teachers to relaunch the project. Internal monitoring could also be implemented in collaboration with the support of a physical education teacher. This would reinforce the teamwork.

(5) Finally, in order to try to extend the project as much as possible, teachers would be invited to share their experience with their more reluctant colleagues ... or with colleagues from other schools.

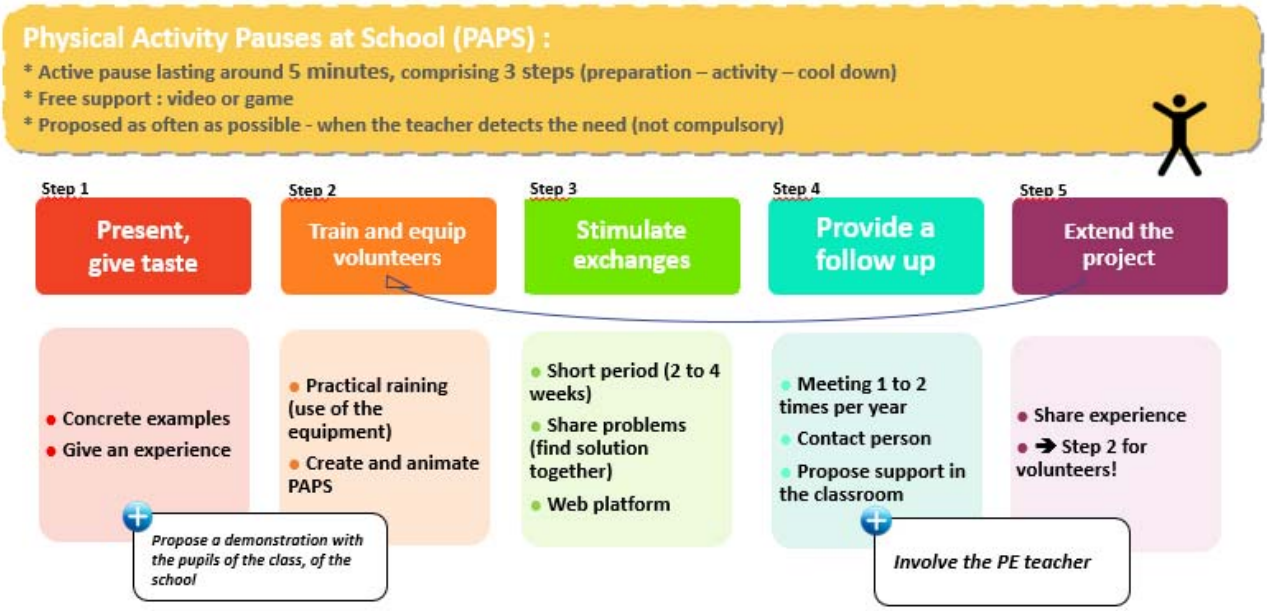


**Figure 3 – A model to implement PAPS in schools**

Surfing on the positive *a priori* expressed by most of the classroom teachers and principals who were involved in the project or were informed about it, it would be necessary to apply the model within a dissemination of the PAPS concept in Wallonia as it is the case for similar approaches in many regions or countries around the world. Encouraged by the smiles of the pupils, the support of practitioners and parents will be a key element.

## References

ANSES - Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (2016). *Actualisation des repères du PNNS - Révisions des repères relatifs à l'activité physique et à la sédentarité* (ANSES). France : Maisons-Alfort.

Bar-Or, O. (2005). Juvenile Obesity. Is School-Based Enhanced Physical Activity Relevant? *Archives of Pediatric and Adolescent Medicine*, 159, 996-997.

Bartholomew, J.B. & Jowers, E.M. (2011). Physically active academic lessons in elementary children. *Preventive Medicine*, 52, 51-54. doi:10.1016/j.ypmed.2011.01.017.

Bassett, D.R., Fitzhugh, E.C., Heath, G.W., Erwin, P.C., Frederick, G.M., Wolff, D.L., Welch, W.A., & Stout, A.B. (2013). Estimated Energy Expenditures for School-Based Policies and Active Living. *American Journal of Preventive Medicine*, 44(2), 108-113. doi : 10.1016/j.amepre.2012.10.017

Biddle, S.J.H., Brehm, W., Verheijden, M., & Hopman-Rock, M. (2012). Population physical activity behaviour change: A review for the European College of Sport Science. *European Journal of Sport Science*, 12, 4, 367-383.

Blom, A., Tammelin, T., Laine, K., & Tolonen, H. (2017). Bright spots, physical activity investments that work: the Finnish Schools on the Move programme. *British Journal of Sports Medicine*. doi: 10.1136/bjsports-2017-097711

Caldwell, T., & Ratliffe, T. (2014). Investigation of Intensity Levels During Video Classroom Exercise Sessions. *Physical Educator*, *71*(3), 473.

Carlson, J. A., Engelberg, J. K., Cain, K. L., Conway, T. L., Mignano, A. M., Bonilla, E. A., … Sallis, J. F. (2015). Implementing classroom physical activity breaks: Associations with student physical activity and classroom behavior. *Preventive medicine*, *81*, 67–72.

Cloes, M. (2014, May). *Promotion of physical activity in schools*. Keynote presented at the Congresso Ciëncias do Desporto, Exercicio e Saùde, Vila Reale, Portugal. Available on : http://hdl.handle.net/2268/166531

Cloes, M., & Mornard, M. (2014). Analyse du point de vue des enseignants sur la mise en place de «Brain Break» dans l'enseignement primaire. Étude de cas. *Science & Sports*, *29*, S25.

Delk, J., Springer, A. E., Kelder, S. H., & Grayless, M. (2014). Promoting teacher adoption of physical activity breaks in the classroom: findings of the Central Texas CATCH Middle School Project. *Journal of School Health*, *84*(11), 722–730.Gather Thurler, M. (2000). *Innover au cœur de l'établissement scolaire*. Paris, France: ESF.

Ducros, P., & Finkelstein, D. (1990). Dix conditions pour faciliter les innovations. *Cahiers pédagogiques*, *286*, 25–27.

Fedewa, A., Erwin, H., Young, D. J., & Alumbaugh, A. (2015). Effects of a physical activity intervention for preschool children identified with speech, motor, and physical disabilities. *American Exchange Quarterly*, *19*(2), 557-71.

Gather Thurler, M. (2000). *Innover au cœur de l'établissement scolaire*. Paris: ESF.

Griffin, P., & Templin, T. (1989). An overview of qualitative research. In *Analyzing physical education and sport instruction.* (Human Kinetics Books, p. 399-409). Champaign.

Guinhouya, B. C., Lemdani, M., Vilhelm, C., Hubert, H., Apété, G. K., & Durocher, A. (2009). How school time physical activity is the « big one » for daily activity among schoolchildren: a semi-experimental approach. *Journal of Physical Activity & Health*, *6*(4), 510-519.

Heath, G.W., Parra, D.C., Sarmiento, O.L., Andersen, L.B., Owen, N., Goenka, S., Montes, F., & Brownson, R.C. (2012). Evidence-based intervention in physical activity: lessons from around the world. Physical Activity 3. *Lancet*, 380, 272–281.

Howie, E. K., Schatz, J., & Pate, R. R. (2015). Acute Effects of Classroom Exercise Breaks on Executive Function and Math Performance: A Dose–Response Study. *Research quarterly for exercise and sport*, *3*(86), 217-224.

Huberman, M. (1989). Les phases de la carrière enseignante [Un essai de description et de prévision]. *Revue française de pédagogie*, *86*(1), 5-16. doi:10.3406/rfp.1989.1423

Jones, R.A., Hinkley, T., Okely, A.D., & Salmon, J. (2013). Tracking physical activity and sedentary behavior in childhood: a systematic review. *American Journal of Preventive Medicine*, 44(6), 651-658. doi : https://doi.org/10.1016/j.amepre.2013.03.001

Katz, D. L., Njike, V., Treu, J. A., Walker, J., & Reynolds, J. (2010). Putting Physical Activity Where It Fits in the School Day: Preliminary Results of the ABC (Activity Bursts in the Classroom) for Fitness Program. *Preventive Chronic Disease*, *7*(4), 82.

Kibbe, D.L., Hackett, J., Hurley, M., McFarland, A., Godburn Schubert, K., Schultz, A., & Harris, S. (2011). Ten Years of TAKE 10!®: Integrating physical activity with academic concepts in elementary school classrooms. *Preventive Medicine*, 52, S43–S50.

Lewallen, T.C., Hunt, H., Potts-Datema, W., Zaza, S., & Giles, W. (2015). The Whole School, Whole Community, Whole Child Model: A New Approach for Improving Educational Attainment and Healthy Development for Students. *Journal of School Health,* 85(11), 729-739. doi : 10.1111/josh.12310

Ma, J. K., Le Mare, L., & Gurd, B. J. (2015). Four minutes of in-class high-intensity interval activity improves selective attention in 9-to 11-year olds. *Applied physiology, nutrition, and metabolism*, *40*(3), 238–244.

Maeda, J. K., & Randall, L. M. (2003). Can academic success come from five minutes of physical activity? *Brock Education Journal*, *13*(1). Consulté à l'adresse http://brock.scholarsportal.info/journals/brocked/home/article/view/40/0

Mahar, M. T., Murphy, S. K., Rowe, D. A., Golden, J., Shields, A. T., & Raedeke, T. D. (2006). Effects of a classroom-based program on physical activity and on-task behavior. *Medicine and science in sports and exercise*, *38*(12), 2086.

Marsollier, C. (2002). L'innovation pédagogique: ses figures, son sens et ses enjeux. *Expressions, 22, 9–32*.

McMullen, J., Kulinna, P., & Cothran, D. (2014). Physical activity opportunities during the school day: classroom teachers' perceptions of using activity breaks in the classroom. *Journal of Physics Teacher Education*, *33*, 511–527.

Morris, C. (2013). Designed to Move. *National Civic Review*, *102*(4), 55–56. doi:10.1002/ncr.21157

Murtagh, E., Mulvihill, M., & Markey, O. (2013). Bizzy Break! The effect of a classroom-based activity break on in-school physical activity levels of primary school children. *Pediatric exercise science*, *25*(2), 300.

Naylor, P.-J., Macdonald, H. M.,&- & McKay, K. E. (2006). Action Schools! BC: a socioecological approach to modifying chronic disease risk factors in elementary school children. *Preventing Chronic Disease, 3*(2), A60. www.cdc.gov/pcd/issues/2006/apr/05_0090.htm

Olshansky, S. J., Passaro, D. J., Hershow, R. C., Layden, J., Carnes, B. A., Brody, J., … Ludwig, D. S. (2005). A potential decline in life expectancy in the United States in the 21st century. *New England Journal of Medicine*, *352*(11), 1138–1145.

Paquette, A. (2016). *La pause active dans la classe du primaire : effets sur les interactions dans le groupe.* Paper presented to the 3ème Colloque International en Éducation, Montréal.

Perera, T., Frei, S., Frei, B., & Bobe, G. (2015). Promoting Physical Activity in Elementary Schools: Needs Assessment and a Pilot Study of Brain Breaks. *Journal of Education and Practice*, *6*(15). Consulté à l'adresse http://files.eric.ed.gov/fulltext/EJ1079961.pdf

Reznik, M., Wylie-Rosett, J., Kim, M., & Ozuah, P. O. (2015). A Classroom-Based Physical Activity Intervention for Urban Kindergarten and First-Grade Students: A Feasibility Study. *Childhood Obesity*, *11*(3), 314-324.

Sacli Uzunoz, F., Chin, M.-K., Cing Mok, M.M., Edginton, C.R., & Podnar, H. (2017). The effect of technology supported Brain Breaks on physical activity in school children. In, D. Dumon, A.R. Hofmann, R. Diketmüller, K. Koenen, R. Bailey, & C. Zinkler (Eds.), *Passionately inclusive : Towards participation and friendship in sport* (pp. 87-104). Münster, Germany : Waxmann Verlag.

Sallis, J.F., Cervero, R.B., Ascher W., et al. (2006). An ecological approach to creating active living communities. *Annual Review of Public Health*, 27, 297-322.

Telama, A.R., Yang, T.X., Leskinen, T.E., Kankaanpää, T.A., Hirvensalo, T.M., Tammelin, T.T., Viikari, T.J.S., & Raitakari, T.O. (2014). Tracking of Physical Activity from Early Childhood through Youth into Adulthood. *Medicine & Science in Sports & Exercise, 46*(5), 955-962.

Trost, S.G., & Loprinzi, P.D. (2008). Exercise-Promoting healthy lifestyles in children and adolescents. *Journal of Clinical Lipidology*, 2, 162-168. doi: 10.1016/j.jacl.2008.03.001

Tumynaitė, L., Miežienė, B., Mok, C., Mo, M., Chin, M., Putriūtė, V., … Emeljanovas, A. (2014). Effects of intervention« hopsport brain breaks » program on physical fitness and sedentary behaviour in primary school. *Education. Physical Training. Sport*, *94*(3), 57-66.

UNESCO (2017). *MINEPS VI Kazan Action Plan*. SHS/2017/PI/H/14 REV. Available on: https://en.unesco.org/mineps6/kazan-action-plan

United Nations (2015). *Transforming our world: the 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015*. A/RES/70/1 Available on: http://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

Uwer, S., Bamert, U., & Stettler, K. (2015). «L'école bouge». *mobilesport.ch*, 09/2015. Available on https://www.mobilesport.ch/wp-content/uploads/2015/09/l_ecole_bouge.pdf

Wadsworth, D. D., Robinson, L. E., Beckham, K., & Webster, K. (2012). Break for physical activity: Incorporating classroom-based physical activity breaks into preschools. *Early Childhood Education Journal*, *39*(6), 391–395.

Webster, E. K., Wadsworth, D. D., & Robinson, L. E. (2015). Preschoolers' time on-task and physical activity during a classroom activity break. *Pediatric exercise science*, *27*(1), 160–167.

Whitt-Glover, M. C., Ham, S. A., & Yancey, A. K. (2011). Instant Recess®: A practical tool for increasing physical activity during the school day. *Progress in community health partnerships: research, education, and action*, *5*(3), 289–297.

World Health Organization (WHO). (2010). *Global recommendations on physical activity for health*. Geneva, Switzerland : WHO. Available on : http://www.who.int/dietphysicalactivity/publications/9789241599979/en/

www.designedtomove.org. (2012). *Designed to move: A physical activity agenda*. Beaverton: Nike Inc