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SCHOOL SUBJECT COMPETITIONS AS AN EDUCATIONAL FORM

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Abstract
This article presents a study of school subject competitions, which are defined as special events where students in primary or upper secondary school have the opportunity to compete against peers in school subjects. The article analyse and discuss characteristics of this educational form across a variety of prominent competitions with a view to identifying types of competitions, and establish how their educational programmes are structured as regards educational themes and didactics. The methodological approach is divided into three phases: 1) a systematic mapping of prominent competitions, 2) a description and synthesis of the educational programmes of the competitions and 3) an analysis and discussion of the data. Systems theory, as presented by Niklas Luhmann, is applied to provide a theoretical framework with regard to the concepts of educational form, didactics, learning, contingency and structural coupling. The findings indicate that the competitions dominantly operate within the three following educational themes: 1) providing an alternative form of teaching subject matter and skills, 2) developing 21st century skills and 3) enhancing excellent students' learning. The characteristics of the three themes and their didactic approaches are elaborated along with a discussion of the potentials and limitations of school subject competitions as an educational form.

Keywords: School, subject competition, teaching, didactics, systems theory**.**

INTRODUCTION

In the early 1970s, German sociologist Niklas Luhmann started using the term *Die Weltgesellschaft – The World Society* (Luhmann, 1971), thereby acknowledging the polycentric and polycontextural society that has evolved over time. A society with a high level of complexity and higher structural contingencies, more unexpected and unpredictable changes and more interlinked dependencies and interdependencies. As he states:
[W]hen we want to observe the evolution of society there is no other choice than to focus on the social system of the world society. (Luhmann, 1997).

Luhmann's conception of the world society and its conditions is very similar to current conceptions of globalisation, and since his passing, the globalised world society has evolved further. With regard to education, the consequences of globalisation have been a much-debated topic. In this context, there is a common understanding among a large number of educational researchers and policy makers that the developed countries cannot compete with the developing countries on salary or productions costs. Therefore, the developed countries must survive the international competition caused by globalisation by excelling in relation to other parameters (Naidoo, 2018; Antunes, 2006; Campbell and Pedersen, 2014). This common understanding of globalisation, and its circumstances, has led to the catchphrase that *workers must work smarter, not harder*, thereby indicating the need for a higher level of knowledge, skills and competencies among the population (Sweetman, 2002; Potocan and Mulej, 2009). In continuation hereof, these circumstances have led to some major changes in educational systems throughout the last decades (Brown et al., 2008; Mundy et al., 2016; Ramirez et al., 2016; Sjøberg, 2015). Luhmann did not write much about the interrelation of changes in educational systems and the world society. However, he developed an extensive theoretical programme for analysing this theme, which will be applied in this article. But firstly, I will focus on the part of the theme that is of interest to me, which is the emergence of school subject competitions.

One common denominator for the aforementioned interrelation of the world society and educational systems is that new educational forms are moulded into shape in the educational practice of schools

(Sivesind and Wahlström, 2016; Ottesen et al., 2013; Amos et al., 2002). I will argue that one example of such new educational forms is the emergence of school subject competitions. Research within this field has indicated that some school subject competitions have the potential of enhancing students' motivation for the subject, thereby increasing their performance (Liu and Young, 2017; Cotton et al., 2013). Some competitions have proven to be an attractive way of binding up technology and education (Dagiene, 2006; Eguchi, 2016). Subject competitions are known for their ability to enhance skills and knowledge, ensuring that students achieve their learning goals (Huang et al., 2016; Florian, 2014; Christensen and Wistoft, 2016). In summary, I will argue that research within school subject competitions in general has been concentrated on measuring the outcomes for participating students – and research papers in this field typically focus on individual competitions. However, little attention has been given to analysing and discussing the general characteristics of this educational form across competitions. Therefore, I will address the following research question:

- Which forms of school subject competitions have emerged, and how are their educational programmes structured with regard to educational themes and didactics?

METHOD

With the aim of answering the research question, I will a) map prominent school subject competitions, b) describe and synthesise the educational programmes of the mapped competitions and c) analyse and discuss the empirical data of the mapping. In this methodological section, I will describe the process of the three phases and the approaches I have chosen.

I define a school subject competition as a special event where students in primary or upper secondary school have the opportunity to compete against peers in school subjects. With a view to mapping prominent examples thereof, I have performed internet searches with the search terms *school, education, subject, competition, contest* and *championship*. This resulted in a huge number of results, which I have assessed based on the following inclusion criteria to determine whether to include the search results in my analysis:

- The search results must meet the above definition of a school subject competition
- There must be an explicit programme with a self-description of:
  - The concept (What is the basic structure of the competition?)
  - Didactic reflections (What are the intended student outcomes? And what approach does the competition apply to ensure that students achieve these outcomes?)
  - Judging criteria (What is expected from the students?)
- The programme must be written in English or one of the Scandinavian languages

I have systematically excluded all search results that do not meet the above list of inclusion criteria. From the search results that do meet the criteria, I downloaded the educational programme of each competition and uploaded it to the software platform Nvivo, which is a software for coding and analysing qualitative data (Bazeley and Jackson, 2014). This process resulted in the inclusion of 50 school subject competitions as cases in this study. In Nvivo, I coded all the educational programmes by the name of the competition, country of origin, geographical range (local, regional, national or international), school subjects of interest, targeted age group, competition concept, didactic reflections and judging criteria. By extracting my coding and synthesising the content, I constructed the table in appendix 1, which serves to illustrate and make it transparent which competitions are included.

For the analysis of the empirical data, I will start by presenting a descriptive analysis of the four quantifiable coding points, which are: 1) the geographical origin of the competitions, 2) the geographical range of the competitions, 3) the school subjects that are integrated in the competitions and 4) the age levels that the mapped competitions are aimed at. After the descriptive analysis, I will present a semantic analysis. Luhmann defines semantics as certain structures that *hold ready forms of meaning that communication treats as worth preserving* (Luhmann, 2000). To study semantics means to study how a pool of generalised forms are created, and how they create a horizon of meaning that can be used in communication to manage expectations (Luhmann, 1993; Åkerstrøm,

2003). This means that I intend to examine the semantic structures that emerge when I observe the self-descriptions of the mapped subject competitions. Part of this process is to identify the educational themes and what characterises them with regard to didactic approaches.

The concept of *educational form* is central in this study. I rely on Luhmann's systems theoretical concept of *form*, which is inspired by George Spencer Brown and his book *Laws of form* (Brown, 1969). The essence is that distinctions constitute forms by indicating something in this world and thereby distinguishing the indicated something from the rest of the world. The concept of educational form is therefore understood as the distinction based on which education is shaped. When education is carried out in the form of subject competitions, it relies on various distinctions that indicate exactly why a certain approach is selected, and why it has its special characteristics. An essential part of systems theory, as an semantic analytical approach, is to observe such distinctions, and to analyse on what basis they are drawn.

Descriptive analysis

As can be seen in figure 1, there is a majority of American cases among the mapped school subject competitions, and Scandinavia is also well represented considering the small size of these countries. But this comes as no surprise as the searches were performed in English and the Scandinavian languages. European countries such as Germany or France have no reason to write educational programmes of subject competitions in English, unless they have an international range. The reason for the geographical skewness could also be that subject competitions are more widespread in the USA. However, this study does not claim to be exhaustive in the form of mapping all subject competitions in the world. It is the result of the search strategy that was outlined in the methodology section. Nevertheless, it should be noted that countries all over the world are represented, which indicates that this is not just an American or Scandinavian educational phenomenon, and that the topic is globally relevant.

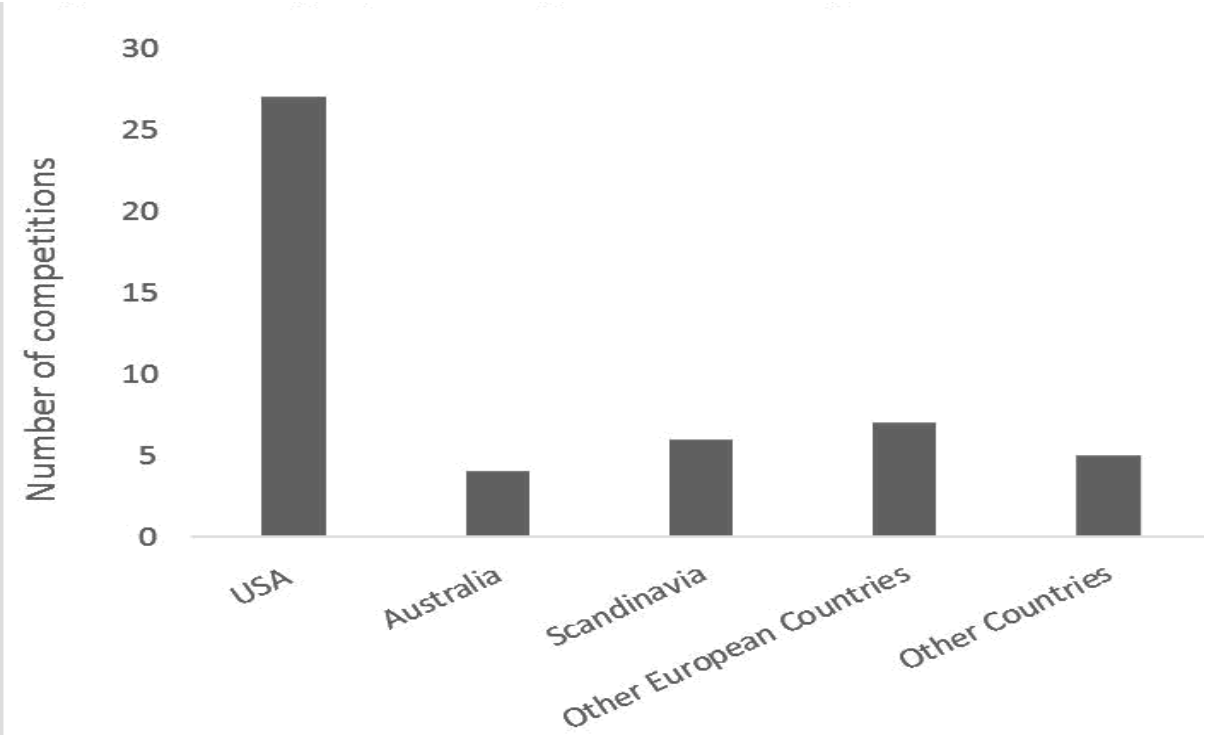

Figure 1: Geographical origin of the competitions

Figure 2 illustrates that 35 of the 50 mapped competitions operate on a national level, while 15 have an international reach. The reader should be aware that all of the competitions have a local or

regional aspect. For example, many of the competitions provide teaching sessions at local schools before the students are encouraged to participate in a regional championship. From here, they can qualify for the national or international part of the competition.

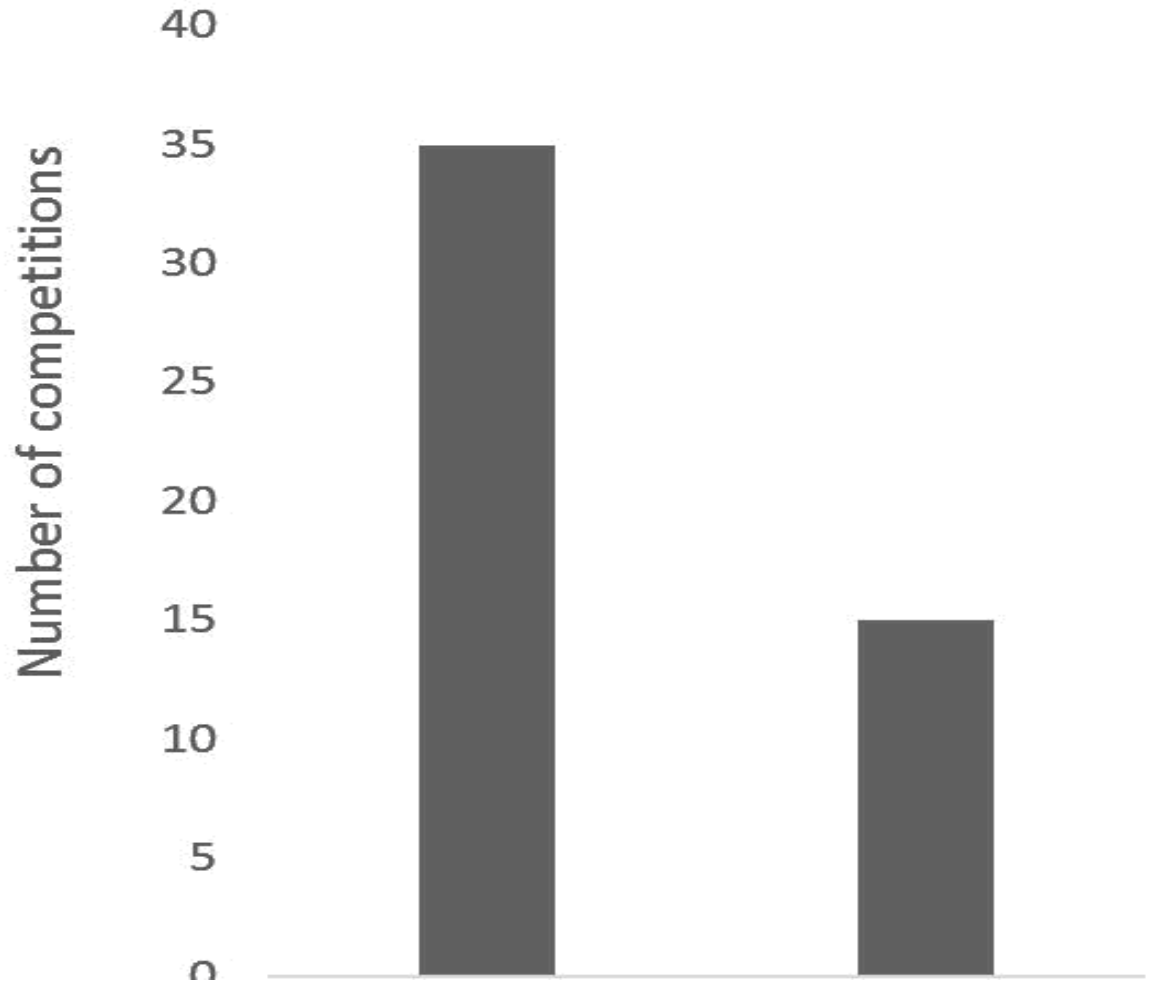

Figure 2: Geographical range

Figure 3 illustrates that the competitions are centred on many subjects. Note that the total number of competitions exceeds 50. This is because many of the competitions include more than one subject. For example, the majority of competitions are centred on STEM-related subjects (Science, Technology, Engineering and Math), often by combining different aspects of STEM subjects to develop innovative student products. Also note that art is well represented, often in the form of competitions where students must be artistically creative. Three of the competitions explicitly claim to include all school subjects. This is typically carried out as an interdisciplinary project where students must use the different subjects to improve their project and come up with different perspectives on the theme that they are working with.

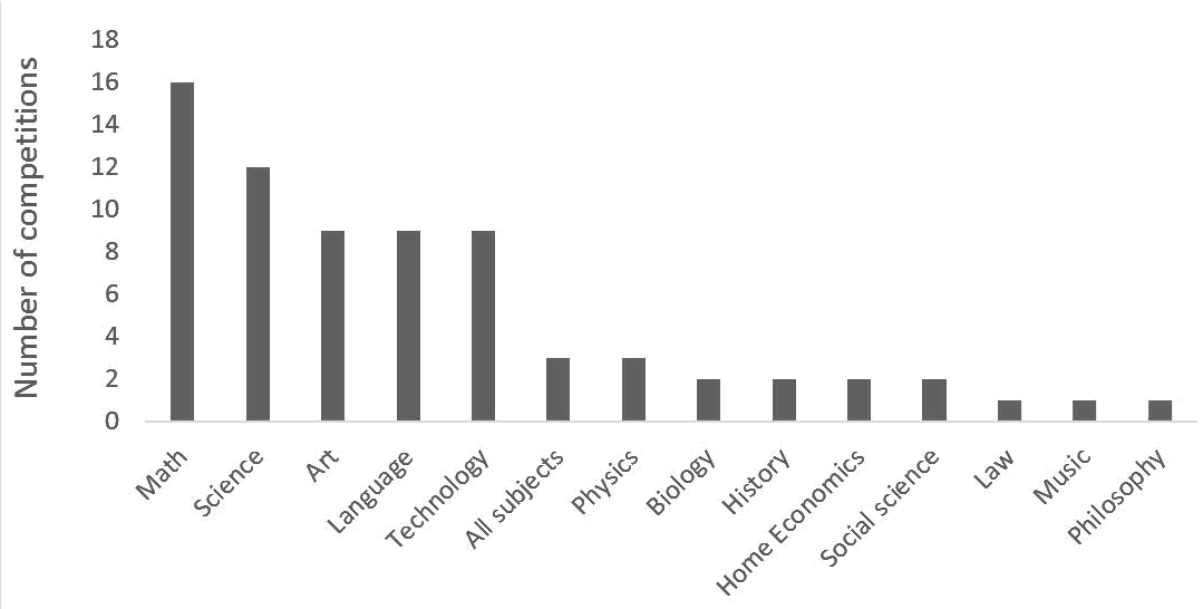

Figure 3: School subjects ıntegrated in the competitions

Figure 4 illustrates that the age of the participants in the mapped competitions ranges from 6 to 19. Again, the total number of competitions exceeds 50 because most of them allow participation by students from more than one age group. Many competitions also divide the students into different age categories, so that they only compete with peers of approximately the same age. I would like to point out that the most prominent age group is 14 years and the age levels nearby. This is partly a result of the search strategy and the inclusion criteria, which stated that the subject competitions should be aimed at students in primary or upper secondary school. However, I also interpret it as an indication of the age levels for which this educational form is considered suitable within primary and upper secondary school.

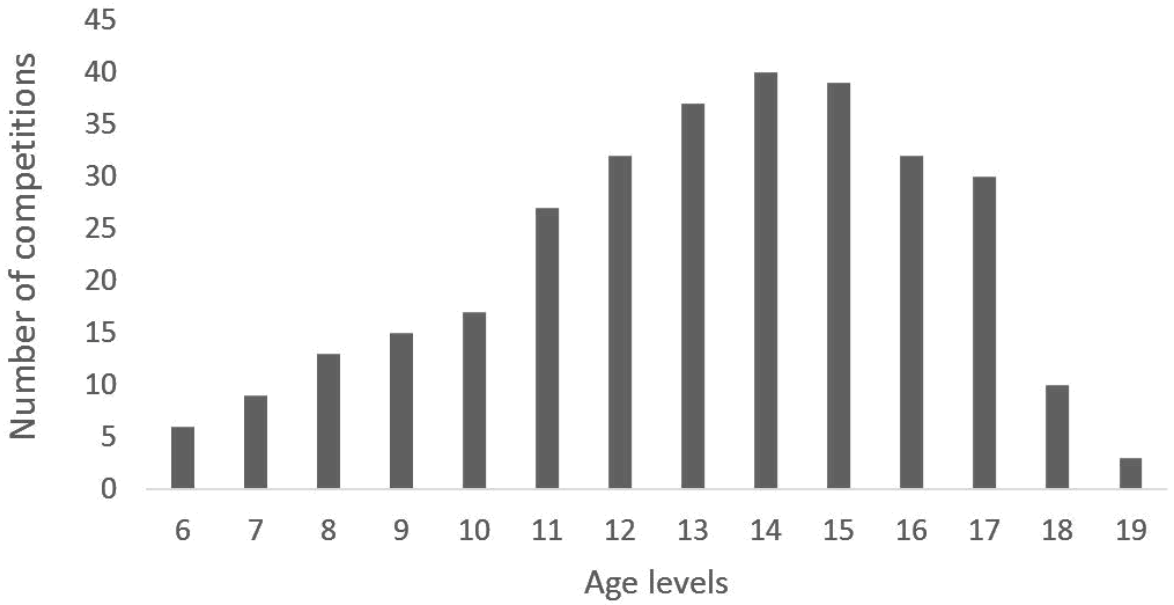

Figure 4: Age levels that competitions are aimed at

Semantic analysis

Part of my analytical strategy is to exploratively read all the programmes of the mapped subject competitions and, in this process, to code all text addressing the coding points that I outlined in the

methodology section. By extracting the coding points, it is clear that subject competitions operate with a broad variety of educational themes and didactic approaches. However, some themes and didactic approaches are more dominant across the self-descriptions in the educational programmes than others. Through this analytical process, I found that the three most dominant educational themes in the mapped school subject competitions are: 1) providing an alternative form of teaching subject matter and skills, 2) developing 21st century skills and 3) enhancing excellent students' learning. In the following sections, I will elaborate and discuss the characteristics of these themes along with the related didactic approaches.

FINDINGS

Most of the competitions that I have analysed are not merely school subject competitions in the form of competitive activities. They also provide specially developed teaching sessions that are meant to be carried out before and after the activities where the students actually meet to compete. The overall intention of these teaching sessions is to facilitate learning processes for the participating students. Before going further into how these teaching sessions are described, I will provide a definition of teaching and learning.

From a Luhmannian perspective, teaching is defined as communication that intends student learning. From the same theoretical perspective, learning is defined as an operation where students expand their consciousness (Luhmann, 1988). Hence, the system reference of teaching is social, and the system reference of learning is psychic. An important point in this context is that social and psychic systems are both regarded as closed systems, which means that a direct transfer of knowledge from one system to the other is not possible. Teaching can still result in learning, but it must be worthy of structural coupling. Students must experience the teaching as meaningful if they are to connect themselves hereto – if they are to participate on a level that exceeds just being physically present. Within educational research, it is therefore relevant to observe the communication that emerges from the self-descriptions of this form of teaching to answer the questions of what learning outcome is intended, and what didactical reflexions are made in this context to ensure that the teaching becomes worthy of structural coupling.

In the light of the above theoretical framework, subject competitions and their teaching sessions can be interpreted as a form of communication that intends to expand the consciousness of the participating students. In all the cases analysed in this study, the learning intentions are related to specific subject matter and skills. This is obvious when considering that one of the inclusion criteria for this study was that the competitions should provide students with the opportunity to compete against peers in school subjects. The learning intentions are therefore also coupled with the subject matter and skills related to each competition. However, I find it interesting that in the educational programmes, the teaching sessions of the school subject competitions are often described as an alternative form of teaching subject matter and skills. It is repeatedly emphasised that this form of teaching differs from more traditional and hegemonic ways of teaching in schools. Hence, the educational programmes distinguish between traditional teaching and the teaching of school subject competitions. The descriptions of "traditional teaching" in the programmes are often vague, and in my interpretation, the meaning of this term is considered self-evident. In the few explicit definitions that exist, traditional teaching primarily involves students sitting at their desks listening to the teacher or following instructions. None of them claim that all traditional teaching is like this, but they nonetheless maintain that such teaching practices are very dominant. Therefore, most of the mapped competitions emphasise that participating students will attain a higher level of subject knowledge and skills, which is explicitly put forward as an argument for why the students and teachers should participate in the competition – as a way of legitimising the competition as part of the educational system. This raises the question of which didactic approach the competitions adopt to distinguish this educational form from traditional teaching. I will address this question in the following section.

Developing 21st century skills

As I argued in the introduction, many single case studies indicate, that school subject competitions have the potential to realise subject-related learning intentions for participating students. But I will argue that an essential characteristic of the mapped competitions is that students typically do not just compete to achieve core knowledge and skills related the specific school subject. There is an add-on, which is the opportunity to work independently and creatively with a high degree of collaboration to create innovative products. In continuation hereof, another common description is that school subject competitions address real-world problem-solving tasks, which these two quotes illustrate: *It's as close to real-world engineering as a student can get.* And: *The competition involves students producing games and apps that offer solutions to real-world problems.* The proclaimed coupling with real-world problem solving is that it makes the teaching less abstract, and it provides a more meaningful learning process. It is claimed that students are more motivated to participate in the teaching and tend to be more engaged when they can relate what they are doing to something in the real world. In this context, many different terms are used across the self-descriptions of the competitions, but I will argue that they can be comprised and described as 21st century skills. This term has been defined in numerous ways. However, it commonly consists of skills and abilities that are considered necessary for students to succeed in their later working life and in modern society (Dede, 2010; Binkley et al., 2012). Furthermore, there is a consensus that 21st century skills are constituted by an increased worldwide demand for creativity, perseverance, critical thinking and problem solving combined with the ability to perform well as part of a team (Larson and Miller, 2011; Griffin and Care, 2014). I will argue that the mapped school subject competitions in general are intended as educational practices where students work under conditions that are claimed to be very similar to the modern labour market in the developed countries, as it has evolved in the globalised world. I will also argue that this makes sense from a Luhmannian perspective, because the function of the educational system is centred on socialising individuals, thereby ensuring that they become able to function within modern society (Luhmann and Lenzen, 2002; Qvortrup, 2005; Luhmann and Schorr, 2000: 271-274). So at first glance, the interrelations of 21st century skills and school subject competitions have a sympathetic and compassionate objective, which is to prepare children and young people to meet the future. However, there appear to be private companies behind many of the competitions that I have mapped. Thus, one should also question the extent to which private companies are to shape today's education. But since this question falls out of the scope of this article, I will not address it further. I find it more relevant to examine whether the competitions and the interrelated teaching sessions favour subject matter and subject skills or 21st century skills. In the following section, I will elaborate on this question by comparing and discussing two different didactic approaches to school subject competitions.

The study presented in this article is an international comparison, which should always be carried out with care, because national educational systems differ very much in terms of cultural background as well as the values that shape the educational forms and didactic approaches. One example of a major difference is observable when comparing the Japanese bento competition and the National Danish Championship in the subject Food Education. Both are competitions within the subject Home Economics and the part of the subject that relates to food and cooking. They both have specially developed teaching sessions, which are meant to be carried out before and after the activities where the students actually meet to compete. Both competitions aim at increasing the students' knowledge and skills related to food and cooking. So I will argue that the similarities are very easy to observe. However, there are also differences which become very clear when analysing and comparing the judging criteria. The Danish competition values the level of student participation, collaboration and innovativeness, while the Japanese competition values cooking efficiency, safety, hygiene and nutritional balance. In my interpretation, this exemplifies how the Danish competition more explicitly focuses on 21st century skills, while the Japanese competition focuses on the attainment of subject knowledge and skills of Home Economics. Both competitions address elements of 21st century skills and the attainment of subject knowledge and skills in Home Economics. However, I find it interesting to analyse what is given priority, because from a Luhmannian perspective, prioritising one over the other is a contingent choice (Baraldi and Corsi, 2017). Here, contingency refers to the fact that other

choices could be made, but the final choice is not random. On the contrary, the final choice indicates what is considered valuable – what is considered most important for the students to learn. In the Danish competition, the argument is that the students attain subject-matter knowledge and skills by applying 21st century skills as an didactic approach. But what is being judged is not their level of subject-matter knowledge and skills. It is rather their ability to work independently and creatively with a high degree of collaboration to create innovative products – their attainment of 21st century skills. This is not necessarily problematic if it is actually the intention of the teaching. However, as I elaborated earlier, many of the competitions legitimise their role in the educational system by proclaiming that they enhance the subject knowledge and skills of the participating students. Hence, there are divergent learning intentions. My argument is that educators should be aware of this divergence, and the risk that the focus on 21st century skills can overshadow the attainment of subject knowledge and skills, which is the essence of the judging criteria.

Enhancing excellent students' learning

As I stated in the descriptive analysis, most of the competitions are either nationally or internationally oriented. However, they typically also have a preceding local and/or regional level wherefrom the best performing students advance in the competitions. Thus, the competitive element is fundamental in this educational form. It is repeatedly emphasised as a special opportunity for excellent students to be challenged, and as a way of facilitating learning processes where the students can perform their best. Furthermore, the intention behind the competitive element is repeatedly and explicitly described as a didactic approach aimed at recognising and cultivating the talent of the brightest young minds. A well-known issue with regard to enhancing the learning outcomes of excellent students is that teaching becomes too simple and does not challenge the students enough (Freeman, 2013; Rubenstein et al., 2012). When this occurs, it could be argued, from a Luhmannian perspective, that students experience an inappropriate level of variety and redundancy in the teaching (Luhmann and Lenzen, 2002). They simply experience too much redundancy (repetitions) and are not subjected to requirements that can challenge them enough in their learning process. In the light of the previously described focus on 21st century skills, I find it plausible that the typical didactic approach of school subject competitions can handle this educational challenge. Especially because the limits are very wide, as the students are expected to constantly develop and perfect their products. There is no definitive or presubscribed result, and the students are constantly inspired by other students who also perform at a high level. Not only at their local school, but also the most excellent students in a national and international context. However, I find it striking that very few of the self-descriptions address the influence on other groups of students than the excellent students. This can be regarded as a blind spot. There are only two examples of the opposite in the entire data material. One of these two programmes proclaims that it gives students who fear the subject of math a chance to feel successful in a math project. The other programme stresses that the competitive element can motivate even the most unenthusiastic students. However, I will argue that there is a contradiction. It is common sense that students who fear or are unenthusiastic about a specific subject do not also fall into the category of excellent students. Nonetheless, when this group of students participate in a school subject competition, they compete with the excellent students in a competition where only the best advance. In this part of the didactic approaches, it is difficult to see what elements should motivate the students that fall outside the category of being excellent.

DISCUSSION AND LIMITATIONS

In this article, I have argued that school subject competitions mainly operate with three educational themes. However, there are examples of school subject competitions which do not operate with all of the three themes that I have identified. One example hereof is an essay competition which seeks to promote the spirit of Americanism and patriotism among American youth. Accordingly, I do not claim that all competitions fall within all the three identified themes. Indeed, some school subject competitions operate with other themes and didactic approaches than the ones that I have chosen to highlight. In appendix 1, the reader can gain an impression of all the ideographic themes and didactic approaches of school subject competitions included in this study. However, what all mapped

competitions have in common is that their educational programmes are coupled with at least one of the three themes. If we return to the essay competition, it is difficult to find explicit couplings with 21st century skills in the self-description of the competition. On the contrary, it is evident that the competition favours the most excellent students, and that it aims to be an arena where they can strive for perfection.

The empirical data of this study consist of self-descriptions of 50 school subject competitions. The study could have contained more data, or perhaps the same results could have been obtained with fewer cases. The reason why the final empirical sample ended up comprising educational programmes from 50 different competitions is empirical saturation. Within qualitative research, this generally means that the data collection has reached a point where newly collected data do not lead to new answers of the research question. This indicates that the data collection does not have to continue, and the researcher can be reasonably confident that further data collection will yield similar results (Saunders et al., 2018; Faulkner and Trotter, 2017; Fusch and Ness, 2015). Concretely, in this study I collected data until I estimated that there was a sufficient minimal foundation to answer the research questions. This point was reached when the data were comprised of approximately 30 educational programmes. I continued to collect data until new cases no longer contributed new perspectives – until the data sample was saturated. With this approach, I chose to stop at 50 cases, mostly because of empirical saturation, but also due to limited time resources. In continuation hereof, it should be stressed that this analysis does not claim to be exhaustive in the form of mapping all school subject competitions in the world. This would undoubtedly be interesting, but I also consider it a utopian ideal. Nevertheless, this article analyses a sample of prominent cases, which, from my assessment, gives a valid and reliable perspective on which forms of school subject competitions that have emerged, and also on how their educational programmes generally are structured with regard to educational themes and didactics. Additional research is still needed on this topic, from single case studies of student outcomes to large-scale research designs or systematic reviews, including inquiring into the effectiveness of school subject competitions in relation to underachieving students.

CONCLUSION

Most of the analysed competitions in this study are not merely school subject competitions in the form of competitive activities. They also provide specially developed teaching sessions that are meant to be carried out before and after the activities where the students actually meet to compete. The self-descriptions of the competitions contain semantic distinctions between traditional teaching and the teaching sessions that form part of school subject competitions. Generally, it is argued that the didactic approach of school subject competitions provides a more motivating form of teaching than traditional teaching. A very dominant didactic approach hereto is that students do not just compete in relation to their achievement of the core knowledge and skills within the specific school subject. There is an add-on, which consist of the ability to work independently and creatively with a high degree of collaboration to create innovative student products that address real-world problems. In this article, the add-on is 21st century skills. A term that has been defined in a variety of ways, but commonly consist of skills and abilities that are considered necessary for students to succeed in their later working life and in modern society. The mapped school subject competitions intend to be educational practices where students work under conditions that are claimed to be very similar to the modern labour market in the developed countries, as it has evolved in the world society. The competitions and the interrelated teaching sessions differ with regard to whether they favour subject-matter knowledge and subject skills or 21st century skills. In some competitions, the didactic argument is that students attain subject-matter knowledge and skills by applying 21st century skills as a didactic approach. But this contradicts with the fact that it is not the students' level of subject knowledge and skills that is being assessed. It is rather their attainment of 21st century skills. This is not necessarily problematic if it is the intention of the teaching. However, if attainment of subject knowledge and skills is the intention, then educators should be aware of the risk that other parameters can overshadow this intention.

Most of the competitions are either nationally or internationally oriented. However, they typically also have a preceding local and/or regional level wherefrom the best performing students advance in the competitions. The competitive element is repeatedly emphasised as a special opportunity for excellent students to be challenged and as a learning process where they can perform their best. The aim is explicitly to recognise and cultivate the talent of the brightest young minds. It is concluded that the typical didactic approach of school subject competitions can be considered an educational form that can provide a balance between variety and redundancy for excellent students. Not only at their local school, but also at a national and international level. However, very few of the self-descriptions address their influence on other groups of students than the excellent students.

From the analysis presented in this article, it is concluded that the mapped school subject competitions dominantly operate within three educational themes: 1) providing an alternative form of teaching subject matter and subject skills, 2) developing 21st century skills and 3) enhancing excellent students' learning.

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Appendix 1: Mapping of prominent school subject competitions

Competition	Country of origin	Range	School subjects	Age group	Concept	Didactic reflections	Judging criteria
AAPT High School Physics Photo Contest	USA	International	Physics	14,15,16,17	This contest provides teachers and students an opportunity to learn about the physics behind natural and contrived situations	Students are creating visual and written illustrations of various physical concepts. Students submit a essay of 250 words or less describing the physics in the photo. The essay should have a title and must be written by the student	A committee of physics teachers will select the top photos (scoring approximately 40% essay and 60% photograph)
AAPT Physics Bowl	USA	National	Physics	14,15,16,17	Approximately 10,000 students take a 40-question, 45-minute timed, multiple-choice test under their school's supervision.	Motivating students by letting them to compete against one another	Correct test answers
Apparatus Competition	USA	National	Physics	14,15,16,17	Students must develop their own physical apparatus	The Apparatus Competition was established to recognize, reward, and publicize worthwhile contributions to physics teaching through demonstration and experiment. Developed to pique the interest of students, used in lecture and demonstration, or simply used to help teach physics in new or fascinating ways	Apparatus is either new in design or a modification of an existing design. Apparatus is not commercially available. The specifics of the apparatus have not been published.
Americanism Essay Contest	USA	National	Language	12,13,14,15,16, 17	An essay contest.	Seeks to promote the spirit of Americanism and patriotism among American youth through writing	The essay shall be on the yearly theme designated and writing skills
Anne Frank Essay Contest	Netherlands	National	Language	10,11,12,13	An essay contest.	The contest seeks to deepen the knowledge of its namesake and to raise awareness about the refugee crisis today through a writing project	Evidence of thoughtful research, writing skills, creativity and interpretation.
Australian and New Zealand Brain Bee Challenge	Australia	International	Biology, science	15	A competition for high school students to learn about the brain and its function. Starts with an online quiz from which the regional winners advance to the finals.	Aims at motivating young people to learn about the brain. Students are given a test of knowledge about important facts concerning intelligence, memory, emotions, sensations, movement, stress, aging, sleep, Alzheimer's disease and stroke.	Correct test answers
CANSAT	UK	National	Science electronics, programming, mathematics	14	Contest where students get the opportunity to have practical experience working on a small-scale space project.	Provides an opportunity for students to have their first practical experience of a real space project. They are responsible for all aspects: selecting the mission objectives, designing the CanSat, integrating the components, testing, preparing for launch and then analysing	To fit all major subsystems found in a satellite, into the volume and shape of a soft drink can. To provide a parachute to ensure the can survives the landing. To carry out scientific experiments and transmit in-flight data to an Earth-based computer.

						the data.	
Caribou Mathematics Competition	Canada	International	Math	8,9,10,11,12,13,14,15,16,17	There are six online math competitions held throughout the year offered for students	Aims to show students that mathematical puzzles can be fun and that competing in math contests with interactive questions can be exciting. To improve student's problem solving techniques by providing a wide variety of challenging math activities .	Correct test answers
Cisco Little Big Futures	UK	National	Science, Technology, Engineering and Math	11,12,13,14	A collection of one-hour lessons and five-hour challenges across the STEM subjects and for STEM Clubs looking at the use of the Internet of Things	Aims at introducing upcoming technologies that will be part of everyday life and give students the opportunity to be creative with their learning and explore careers.	Problem solving
Clean Tech Competition	USA	International	Science, Technology, Engineering and Math	15,16,17,18	CleanTech asks students to use STEM concepts in order to research and design a product that will deal with an environmentally related issue.	The competition is designed to foster a deeper understanding of STEM related concepts, recognize outstanding talent, and prepare the next generation of globally competitive innovators.	The ability to identify a specific issue, analyze then explain in detail, and design a solution that can mitigate the negative impacts of climate change
Congressional Art Competition	USA	National	Art	11,12,13,14,15,16,17	A visual art competition where students submit entries to their representative's office, and panels of district artists select the winning entries	Aims at recognizing and encourage artistic talent among students	Each entry must be original in concept, design, and execution
Education Perfect English Championships	Australia	International	Language	7,8,9,10,11,12,13,14,15,16,17	Teachers register and sent in class lists, where after each student will receive an individual login which they use to access Education Perfect, where they must answer questions correctly.	Aims to raise the profile of English learning at local schools, and to help cement students' understanding of concepts and subject areas.	Correct test answers
FIRST Lego League	Denmark	International	Science, Technology, Engineering and Math	6,7,8,9,10,11,12,13,14,15,16	Students design, build and program a robot using LEGO, then compete on a table-top playing field.	Students must research a real-world problem, and are challenged to develop a solution. They also must design, build and program a Lego robot. It is intended that students learn critical thinking, team-building, and presentation skills	Innovation, Impact, inclusion, teamwork and fun.
FIRST Robotics	Denmark	International	Science and technology	15,16,17	Students build robots to play a field-game against other students.	Students are challenged to raise funds, design a team "brand", hone teamwork skills, and build and program industrial-size robots to play a difficult field game. The aim is to inspire young people to be science and technology leaders and innovators, by engaging them in exciting mentor-based programs that build science, engineering, and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.	Innovation, Impact, inclusion, teamwork and fun.
Google Science Fair	USA	International	Science	13,14,15,16,17,18	A science and technology competition. Students share their best best idea using science, technology, engineering, and math.	Focused on problem-solving, communication, and teamwork.	Participants are rewarded for being creative, inspiring, and designing projects that will make an impact on local or global communities.
Japanese Bento Competition	Japan	National	Home Economics	13,14,15	Students compete in making the best version of a traditional Japanese Lunch box (Bento)	Aims at improving students' knowledge and skills, and ultimately improving their daily lives	Efficiency in cooking, safety, hygiene, nutritional balance, presentation.
JASNA Essay Contest	USA	International	Language	12,13,14,15	An annual student Essay Contest	Intends to foster the study and appreciation of Jane Austen's work.	Original insights and clear, correct writing
Kids' Art Contest: Sketch a School Subject	USA	National	Art	6,7,8,9,10,11,12,13,14,15,16,17	An annual art contest	Aims at offering students a fun way to explore their creative side and an opportunity to be recognized for their talents.	Creativity, interpretation, technical skill, originality

Kids Philosophy Slam	USA	International	Philosophy	7,8,9,10,11,12, 13,14,15,16,17	An annual teaching program designed to make philosophy fun and accessible to kids. Student compete by uploading electronic submissions.	Younger students may paint, draw a picture or use any combination of words and pictures to express their feelings or ideas about the topic. Older students write an essay, answering a philosophical question. Aims at giving students a voice and to inspire them to think by unlocking their intellectual and creative potential through philosophy	Creativity, originality and overall strength of the message the student is conveying. Organization, and thought development, as well as spelling and grammar.
LifeSmarts	USA	National	Family and consumer science, Home economics, technology	14,15,16,17	A consumer education program followed up by a quiz based competition	Aims at encouraging high school students to learn more about the issues faced by consumers today.	Correct quiz, test answers
MATHCOUNTS	USA	National	Math	11,12,13,14	A math competition	Seeks to enable middle school students to gain confidence in their math ability. Utilises problem solving skills and positive attitudes about math, so students embrace challenges and expand their academic and career opportunities in the future.	Speed, accuracy, problem-solving, mathematical reasoning and collaboration
Math Video Challenge	USA	National	Math	11,12,13,14	A online math video competition	Intends to blend math, creativity, art and technology and challenge students to produce a video solving a math problem in a real-world setting.	Creativity, communication, mathematical accuracy, and real world application
Mathematics Challenge for Young Australians	Australia	National	Math	8,9,10,11,12,13 ,14,15	A math competition	There are three independent stages in the contest: the Challenge Stage, the Enrichment Stage and the Australian Intermediate Mathematics Olympiad. The contest is designed to help teachers motivate, stimulate, encourage and develop mathematically interested students and to bring forth the talent and potential within	Mathematical skills
MIT INSPIRE	USA	National	Art and social sciences	12,13,14,15,16, 17,18,19	A competition that involve online submission of research projects.	One hundred Finalists will be selected from the submissions to participate in the competition's final round - a two-day event on MIT's campus in Cambridge The purpose is to give students a unique opportunity to show off their research, get feedback from experts, and have an unforgettable experience before college	original inquiry on a unique topic
MTNA Student Competitions	USA	National	Music	6,7,8,9,10,11,1 2,13,14,15,16,1 7,18	A music competition	Seeks to provide educational experiences for students and teachers and to recognize exceptionally talented young artists and their teachers in their pursuit of musical excellence.	Music skills
National Danish Championship in the subject of Food Education	Denmark	National	Home Economics, Food education	12,13,14,15	A national contest where students compete in development of dishes	Students should develop their ability to work cooperatively, with a high degree of participation , and the should develop their ability to create innovative solutions cantered around food.	Student participation, collaboration, innovativeness and product quality and taste.
National Danish subject championship	Denmark	National	Language, Math, History and Biology	13,14,15	A national contest where students will solve tasks all of which are rooted in The national curriculum, but different from what they are solving in their daily education. Students should, for example, come up with creative solutions to challenges from private companies.	The purpose of the project is to demonstrate varied and inspiring teaching methods and let students participate in academic and social communities by showing their talents in the subjects.	Skills, knowledge and creative solutions to business challenges
National Economics Challenge	USA	National	Economics, Math	16,7,8,9,10,11, 12,13,14,15,16, 17,18	an online competition	Student teams compete on their knowledge, skills, and ability to work collaboratively to progress through multiple rounds which measure comprehension and application of concepts related to a rapidly changing global economy.	based on knowledge of microeconomics, macroeconomics, International economics, and current global events. Ability to collaborate as a team

National Geographic GeoBee	USA	National	Geography	9,10,11,12,13	An academic competition within knowledge of geography	Teachers receive a teaching material from which course are carried out	Correct quiz, test answers
National High School Essay Contest	USA	National	Language	14,15,16,17	An annual essay contest	The contest intends to give high school students International topics to think and write about	Submissions are judged on the quality of analysis, quality of research, writing skills, form and style.
National High School Mock Trial Championship	USA	National	Law	16,7,8,9,10,11, 12,13,14,15,16, 17,18	Promoting an understanding and appreciation of the American judicial system through academic competitions for students	Aims at high school students achieving a greater understanding through competition and education.	scoring judged upon which team makes the best presentation
National History Day	USA	International	History	11,12,13,14,15, 16,17	A year-long education program that culminates in a national contest once a year	Students hone their expressive abilities as they present their work in one of the competition's formats: paper, exhibit, performance, documentary, or website	Historical Quality, Relation to Theme, Clarity of Presentation
National STEM Video Game Challenge	USA	National	Science, Technology , Engineering and Math	11,12,13,14,15, 16,17	Students compete in creating an original video game	Aims to encourage critical thinking, problem solving, collaboration and communication Science, Technology, Engineering and Math	The students ability to develop: Engaging gameplay, come up with an innovative, creative vision, and producing well-balanced game play
Norwegian championship in English	Norway	National	Language	16,17,18,19	Students compete within one of three disciplines; formal writing, creative writing and audio visual (short film).	Intends to stimulate increased interest in English language and culture, and allow students to tap into their knowledge and creativity English subject.	Creativity, Creative Writing. Ability to convey an idea or message through an audiovisual experience
Readers Cup	Australia	National	Language	10,11,12,13,14, 15	It is a competition where teams of four students together read a set of books, and then compete with other school or public library teams to answer quiz questions from the books.	The aim is to challenge students to read widely, work collaboratively in a team and continue developing a love of reading.	Correct quiz, test answers
RoboCup Junior	France	International	Science, Technology , Engineering and Math	12,13,14,15,16, 17,18,19	A International educational robotics competition	Aims to promote STEM content and skill learning among participating students, and to expand their skills and knowledge. Introduction to the field of robotics, a new way to develop technical abilities through hands-on experience with electronics, hardware and software, and a highly motivating opportunity to learn about teamwork while sharing technology with friends.	Cooperation, creativity problem-solving and task-achievement.
School Superhero Comic Contest	USA	International	Language, Art, Citizenship, Social Studies, Geography	8,9,10,11,12,13 ,14,15,16,17,18	A lesson plan provides a sensitive overview of the issue of violence in schools, gives space to reflect on solutions for safe learning environments and walks the class through a creative superhero story-telling activity. Students are invited to submit their superhero to a contest searching for a superhero that keeps schools safe and peaceful. The winner will work with a professional artist and storyteller to bring their ideas to life in a published comic book!	Understand how the issue of violence against children is manifested in and around the school and what impact this has. Build empathy for those affected.• Bring knowledge and empathy together in storytelling to engage others in this important issue.	Problem solving, creativity, writing
Stockholm Junior Water Prize	Sweden	International	Science	15,16,17	A competition for high school students who have conducted a water-science research project.	All projects must use a research-oriented approach, which means they must use scientifically accepted methodologies for experimentation, monitoring, and reporting, including statistical analysis.	Relevance, creativity, methodology, subject knowledge, practical skills, and report and presentation
StudentCam	USA	National	Art, language	11,12,13,14,15, 16,17	An annual national video documentary competition	Aims at encouraging students to think critically about issues that affect our communities and our nation.	Videos should evaluate how this right, characteristic or event is upheld in our society, or challenged by current events. Rights or characteristics may include aspects of democracy, opportunity, liberty, justice, equality, diversity, unity, individualism, other rights, guiding principles, or shared values.

Texaco Children's Art Competition	Ireland	National	Art	6,7,8,9,10,11,12,13,14,15,16,17	A arts competition where original drawings, paintings or prints using any media and on any subject matter are eligible for submission to the competition.	Has the goal of fostering a young love of art in children.	Originality and skills
The Black Swan Prize for Portraiture	Australia	National	Art	7,8,9,10,11,12	Students compete in making the best portrait	Aims at providing young artists with an opportunity to showcase their creative talents and to challenge them from an artistic perspective through the field of portraiture. Identifies emerging artists and encourages them to have faith in themselves and their developing skills.	Originality and skills
The International History Bee and Bowl Asian championships	Thailand	International	All subjects	8,9,10,11,12,13,14,15,16,17,18	An all-subject quiz bowl tournament for school teams with questions from all academic disciplines	Aims to help students develop confidence, deepen subject understanding, and lead to friendships formed at tournaments.	Correct quiz, test answers
The US Academic Bee	USA	National	All subjects	13	An all-subject academic quiz competition for students	Aim to reward students for being well-rounded scholars whose intellectual curiosity drives them towards excellence inside and outside the classroom.	Correct quiz, test answers
The West Coast Baptist Fine Arts Competition	USA	National	All subjects	9,10,11,12,13,14,15,16	Provides students the option to participate in an annual interscholastic Fine Arts Competition	The goal is to glorify Christ by providing an opportunity for students to compete in various areas. This competition also provides students a time to fellowship with other students in a Christ-honoring environment.	Students' minds and abilities for a life of service to Christ
UCT Mathematics Competition	South Africa	National	Math	13,14,15,16,17	Is an annual mathematics competition	Aims to popularise mathematics and to identify promising students and offer them opportunities for further development of their mathematical talents	Correct quiz,test answers
Ultimate STEM Challenge	UK	National	Science, Technology, Engineering and Math	11,12,13,14	A completion where students must use their STEM skills to tackle one challenge: reimagine a solution to a real-life problem	The competition is designed to stimulate creativity, build confidence and teamworking skills, and inspire young people to consider careers in STEM	Judges looks for projects that uses STEM, provides a prototype that help, work and stand out
UpStArt student art competition	UK	National	Art	13	An arts competition where painting, illustration, ceramics, mixed media, photography and sculpture pieces of any theme are accepted for judging	Aims at supporting emerging artistic talent and give students a chance to promote their work	Innovation, originality
Vans Custom Culture	USA	National	Art	14,15,16,17	Schools are challenged to design 2 pairs of shoes around 2 themes. In addition to designing shoes, schools will also be submitting an Impact Document reflecting how their school would be impacted by winning the grand price of $75,000 for their art program	to empower high school students to embrace their originality through art and design, as well as encourage students to pursue a career in the arts.	Overall Creativity, method, use of material, media, originality, imagination, ability to showcase new, meaningful concepts
Verizon App Challenge	USA	National	Science, Technology, Engineering and Math	11,12,13,14,15,16,17	This competition, invites students to create a mobile app that will solve a problem in their community.	Focuses on ideating concepts for mobile apps, and encourages students to learn about app development.	Innovative value
Victorian Schools' Games and App Challenge	Australia	National	Science, Technology, Engineering and Math	11,12,13,14,15	Participating schools work on creating games, apps, and the Challenge culminates in a showcase exhibition, where the best solutions are appointed	The Challenge highlights the role of the Digital Technologies, Critical and Creative Thinking curriculum areas and their contribution to building the Education State.	Critical and Creative Thinking, quality of product

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