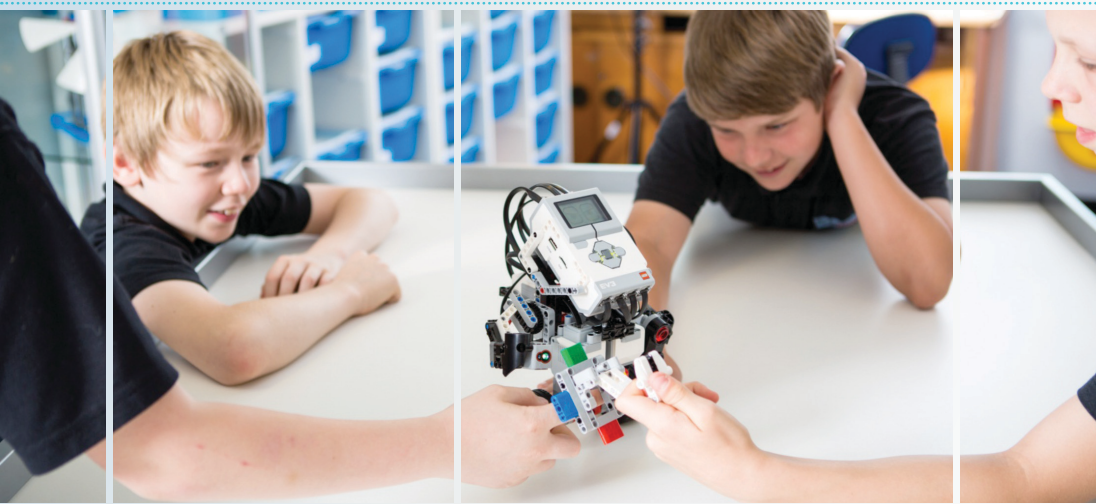




# Building Future Skills

## Creativity and Playful Learning in the classroom



# Welcome

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Possibly best known for its building bricks, the LEGO Group has been in the high street for almost a century. Meanwhile, less well known, LEGO® Education has been working with schools for more than 30 years to encourage what we call systematic creativity.

Our aim is to help teachers take a more progressive approach to teaching in order to unlock students' interest in learning, using digital tools, tailored curriculum resources, teacher-training programmes as well as our famous coloured bricks.

We believe that more playful, creative and hands-on methods engage students of all abilities and achieve results. While this lends itself to the STEM subjects – Science, Technology, Engineering and Maths – a more progressive approach can be successfully applied to all curriculum subjects, including literacy.

But how common is such a way of teaching STEM and other subjects in schools? Does the national curriculum enable teachers to improvise and bring out the innate playfulness and creativity in their students? Or does it encourage too much teaching to the test?

As teachers struggle to engage students, we believe that much more can and should be done to make these subjects relevant and engaging. This matters as a looming skills shortage in STEM subjects will harm the UK's competitiveness and productivity unless it is addressed.

For this pilot study we have been speaking to teachers across the UK to understand their views on these issues, including those that use LEGO Education resources and those that don't. What we discovered was a huge appetite for more hands-on, creative approaches.

I was delighted to find that teachers from schools with a LEGO® Education Innovation Studio said our approach is playing a key role in helping skills and creativity to flourish.

However, regardless of our involvement the fact remains that tomorrow's scientists and engineers are sitting in our classrooms today. Let's build something that will transform these classrooms into places for creative and successful learning that encourage and inspire students by bringing these subjects to life.

**Jacob Kragh**  
**President, LEGO Education**

# Executive summary

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**This report is the result of a pilot study into the attitudes, beliefs and practices of teachers in UK schools. It has provided LEGO® Education with a valuable snapshot of the how teachers feel about the challenges they face today; in particular it demonstrates a need for greater focus on skills development, and on creativity, hands-on and playful learning as an effective means to engage and develop those skills.**

The study suggests a number of key areas that we believe require more focus in the UK. These include developing a wider range of skills in students, providing more hands-on learning opportunities, facilitating a more creative approach to teaching and learning, and minimising the tendency in UK schools to teach to the test.

## **THE STUDY ALSO MAKES THE FOLLOWING SPECIFIC RECOMMENDATIONS.**

- 1** Enable teachers to lead and facilitate more progressive approaches to STEM lessons to allow for more playful, creative and hands-on learning
- 2** Embed opportunities for hands-on learning throughout the curriculum to ensure that students of all abilities have the chance to learn by doing
- 3** Creativity should not be regarded as a 'nice to have' and restricted to arts subjects, but as fundamental to successful teaching and learning in STEM and other subjects
- 4** Ensure that non subject-specific skills for the future such as communication, problem solving and critical thinking are integrated throughout the curriculum
- 5** Creative approaches towards teaching and learning should be given more credit than they are given now when inspecting and evaluating school performance.

By sharing these findings we hope to inspire and engage others to rally behind educators to transform learning so that it becomes a more relevant, engaging and successful experience for every student as we prepare them for their future.

# Introduction



# LEGO® Education Innovation Studios

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**As part of our commitment to education, LEGO Education has been working with UK schools to develop and provide innovation studios. We currently have 39 operating in the UK, mainly in secondary schools, but also in primary schools and other settings. This concept is also flourishing in Denmark, home of the LEGO Group, where we recently opened a new International School in Billund, partially funded by the LEGO Foundation.**

The innovation studios are designed primarily to help teachers to deliver a creative, hands-on approach to teaching Science, ICT/Computing, Design & Technology and Applied Maths. We provide resources and training to help teachers maximize the impact of each studio.

But we also have a range of other resources that help with humanities, languages and cross-curricular projects and see the innovation studio approach to learning expanding beyond STEM subjects.

The resources and teacher training programmes we provide aren't just designed to support subject-specific teaching, but to help deliver relevant skills for contemporary society, including problem-solving, critical thinking and collaboration. We call it a 'hands-on, minds-on' environment that inspires teachers and students alike and helps to make learning fun.

## PILOT STUDY

This year LEGO Education decided to investigate how effective the studio concept was perceived to be and how well it answered to the current needs for educators. In particular we wanted to understand the impact of the studios against the backdrop of the current, social, economic and political drivers for education.

The following pages highlight some of the drivers that we want the innovation studios to be capable of supporting as well as detailing the findings of our study.

The study was carried out by research partners Ebiquity, and included 21 semi-structured telephone interviews of teachers, head teachers and heads of departments of existing innovation studios, and an online panel of 105 anonymous teachers, head teachers and heads of department in UK schools.

# Skills and creativity debate



# The Skills Debate

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**Skills are important – everyone says so. The debate about how the UK might get left behind and lose competitiveness because of skills shortages is never far away. The OECD Secretary General, Angel Gurría, has described skills as “the global currency of 21st century economies”, adding “they transform lives and drive economies.”**

**To continue this theme in the UK, 2013 has seen many programmes, initiatives and surveys drawing attention to the importance of skills.**

## **CABINET OFFICE REVIEW**

Deputy Prime Minister, Nick Clegg, announced a Cabinet Office review into employment, education and training provision available for 16-24 year olds.

Mr Clegg cited the need for “urgent action” to prepare young people better for working life at a time of high youth unemployment. He said that school leavers and employers each have to navigate a confusing “maze of different programmes” and government initiatives. [The review](#) is due to report to Mr Clegg and the Prime Minister in the autumn of 2013.

## **LABOUR PARTY GROWTH REVIEW**

For the Labour Party, Lord Adonis announced a growth review in order to seek “a radically better strategy for promoting skills...”. This follows No stone unturned, Lord Heseltine’s report, published in October 2012, which highlighted education and skills as the foundation for growth and prosperity. [The Adonis review](#) is due to be published in spring 2014.

## **TRAINEESHIPS AND THE TECHBACC**

New [Traineeships](#) were launched to help 16-24 year olds improve their skills and job prospects before beginning apprenticeships or entering the employment market, while a new Technical Baccalaureate ([TechBacc](#)) is to be offered post-16 from September 2014.

But it’s not just the Government and politicians that are concerned about these issues.

## **DIGITAL ILLITERACY**

The Prince’s Trust found that a lack of computer skills is damaging young people’s job chances (*Princes Trust Digital Literacy [Survey](#), March 2013*).



# More STEM skills needed

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The Social Market Foundation (supported by Engineering UK) found evidence of a big mismatch between the future skill requirements in STEM industries and the likely supply of qualified people, concluding: "The UK will need to substantially increase the number of individuals taking STEM subjects at school." ([In the balance](#) – the STEM Human Capital Crunch March 2013).

Bearing this in mind, the summer's exam results appear to hold out some hope. They showed that the number of students taking the separate science subjects of Physics, Chemistry and Biology continued an upward trend, with growing numbers choosing the sciences, Maths and Further Maths at A-level.

While this is encouraging, the results also revealed a worrying trend of multiple and early entries for GCSE Maths as schools try to 'bank' the all important 'C' grade or above for their pupils. The introduction of the new English Baccalaureate performance measure, which highlights the proportion of students obtaining a grade C or higher in Maths, English, Science, a humanity and a foreign language, may also be driving the increasing numbers of students taking separate science subjects.

This points to an exam factory mentality in some schools as 'teaching to the test' takes priority in order to increase the proportion of their students achieving five or more GCSEs including Maths and English at grade C or above. Andrew Hall, head of the AQA exam board, described multiple, early and repeat entries for Maths as "doing real damage to education in this country" because of the stress it placed on students and teachers. He blamed the "perverse incentives" created by government targets.

## THE FUTURE OF STEM EDUCATION

In July 2013 the National Science Learning Centre published a [paper](#) on the future of STEM education, setting out seven recommendations to "accelerate the improvements in STEM education that have begun in recent years". These covered the need to:

- Recruit and retain specialist teachers
- Develop clearly defined career pathways for STEM teachers
- Support STEM teachers' professional development
- Have a specially trained science teacher in every primary school
- Incentivise schools to provide an enriched science curriculum
- Encourage STEM teachers into leadership roles in schools
- Ensure high quality careers information and advice is available.

The paper also highlighted an [Accenture study](#), which showed that while 22% of all new degrees awarded in the UK are in STEM subjects, the equivalent figure in China is 41%.



# What place for creativity?

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## **So where does this leave us? What's the place for creativity when skills are what the UK economy needs?**

Education secretary, Michael Gove, has extolled the importance of encouraging creativity in schools. But what is it? Creativity per se isn't something that's assessed by the new Ofsted inspection regime. Ofsted's 45 page School inspection handbook 2013 mentions creativity just once, in a section on judging a school's overall effectiveness. When looking for evidence of pupils' spiritual, moral, social and cultural development, inspectors are asked to look for instances where children use "their imagination and creativity".

Is expecting Ofsted to do more to take creativity into account too big an ask? From the perspective of a school's Ofsted judgement and league table performance, creative approaches simply don't figure. Where's the incentive to innovate and try more creative approaches when exam results are what really matter?

Perhaps one difficulty for Ofsted and others is that creativity is hard to pin down or define – although plenty of definitions exist. For instance, author, speaker and adviser, Sir Ken Robinson, has defined creativity as a dynamic process of having original ideas that have value. He is concerned that the new national curriculum "...will be too linear and prescriptive." For Sir Ken "too much prescription is a dead hand on the creative pulse of teachers and students alike... The real driver of creativity is an appetite for discovery and a passion for the work itself. When students are motivated to learn, they naturally acquire the skills they need to get the work done."

Jobs that are perceived to be 'creative' are certainly an appealing prospect to young people. According to one survey, more than a fifth of 15-16 year olds dream of a career in culture, media or sport, but jobs available in this field will account for just 2.4% of new and replacement jobs over the decade. 1).

How can we nail the myth that creativity is only possible in media, design or sport when the creative possibilities of science, technology and engineering are almost endless? How can we bridge the gap between young people's aspirations and the skills needed for tomorrow's economy?

*1) The Guardian, 17 May 2013. Nothing in common: The career aspirations of young Britons mapped against projected labour market demand 2010-2020; March 2013, UK Commission for Education and Skills, b-live Foundation and Education and Employers Taskforce.*

# More progressive approaches

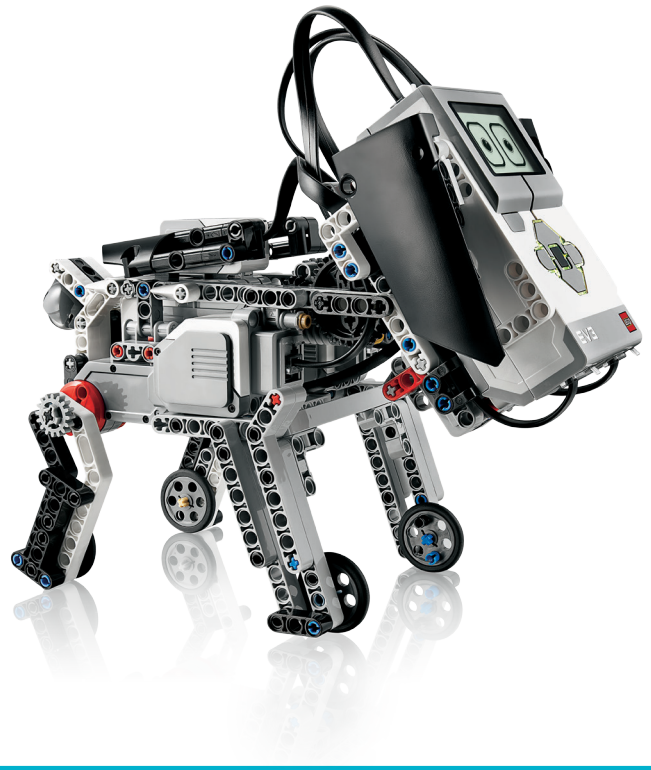
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**At LEGO® Education we believe this will require more progressive, creative approaches in the classroom – delivering inspirational lessons and approaching STEM and other subjects in enjoyable and engaging ways.**

So should creativity become the pre-requisite to teaching our children in order to harness their potential? Will a more playful approach help to prepare today's pupils for tomorrow's world, giving teachers the tools to embed creativity at the heart of a successful approach to learning?

Our view is that a more playful, creative and hands-on approach to learning is more likely to inspire students to choose STEM subjects and to develop skills that are more relevant for the future. But we wanted to find out what teachers thought, so we spoke to a cross section of teachers from schools without LEGO Education Innovation Studios as well as those with a studio to discover their views.

# The Pilot Study



# Research Methods

## RESEARCH METHODOLOGY

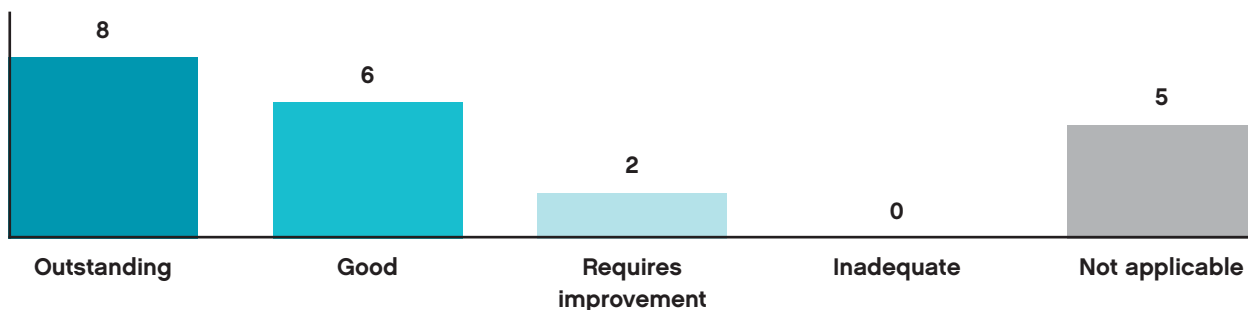
The research worked like this.

### 1. SCHOOLS WITH LEGO® EDUCATION INNOVATION STUDIOS

- 21 semi-structured telephone interviews among teachers / head teachers / heads of departments of existing innovation studios
- The sample consisted of 12 Secondary schools, three Primary schools and six others, as follows
  - Learning Centre with the Local Authority
  - University
  - Support centre for primary / secondary schools
  - LEGO technician, based at secondary school
  - Community Interest Company
  - ICT development Service
- 17 of those taking part were from England and four were from Wales
- Most of the Innovation Studios had been in place for between one and two-and-a-half years, with most of the participants using their Studio at least twice a week
- The interviews took place during 3-22 July 2013.

The majority of schools used their innovation studio to teach design and technology, ICT/ computer science, science, maths and engineering. Individual schools also used them for a range of other subjects, including PHSE, art and design, enterprise and business studies.

### THOSE PARTICIPANTS WITH AN INNOVATION STUDIO HAD THE FOLLOWING OFSTED RESULTS.



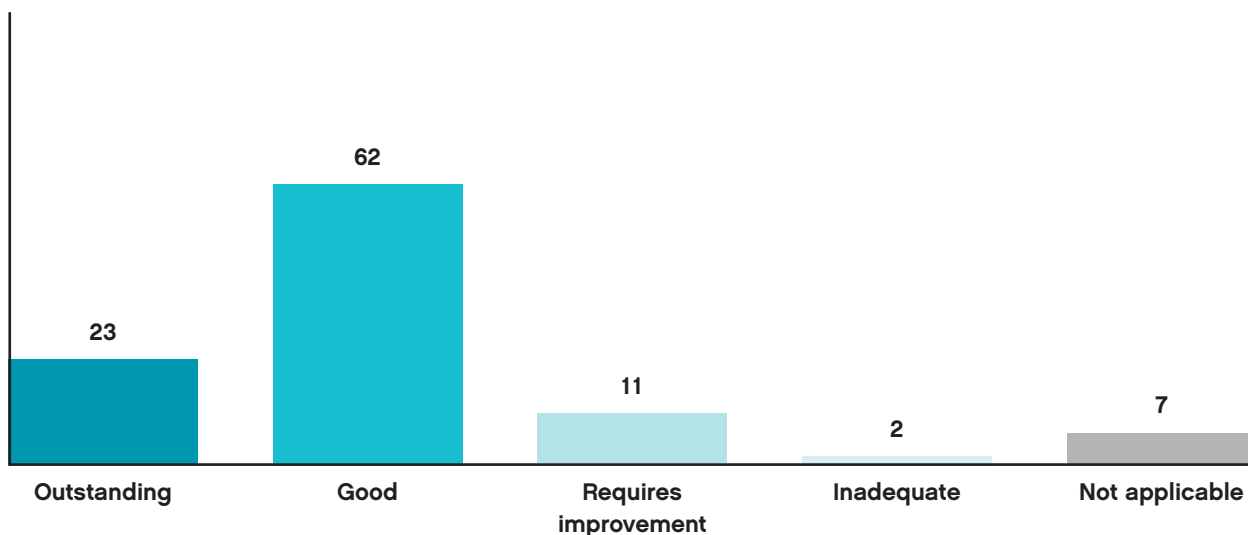
# Research Methods

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## 2. SCHOOLS WITHOUT INNOVATION STUDIOS

- An online panel of 105 people was conducted anonymously using an invitation-only group of teachers, head teachers and heads of department in STEM subjects in UK schools
- 91 participants were from England, 11 from Scotland and three from Wales
- 63% were from secondary schools; 14% from lower primary and 23% from upper primary
- Teachers in STEM subjects were pre-registered, screened and verified to ensure the quality of participants
- The panel was conducted during 8-12 July 2013.

### THESE PARTICIPANTS HAD THE FOLLOWING OFSTED RESULTS.



# Findings – Skills development

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## SKILLS DEVELOPMENT

**We have seen that much has been made of the skills that will be needed to meet the future demands of an economy and society that is changing rapidly.**

We asked survey participants for their views about the relative importance of seven skills and whether they believe these skills are taught in their schools. The skills listed were inspired by the OECD and the research centre and think tank, the Institute for the Future, as those that will be crucial to our future prosperity. We have included 'creativity' in this list; although it is arguable that this is not a skill per se, we were keen to test teachers' views. The list was:

- I Communication – the ability to convey and exchange thoughts, ideas and feelings through speaking, writing or other media
- II Problem solving – the ability to define and work through a problem to arrive at a solution
- III Critical thinking – the process of analysing, synthesising and evaluating information to reach a conclusion
- IV Collaboration – the ability to work with others to produce or create something
- V Creativity – the dynamic process of generating original ideas that have value
- VI Self-directive learning – the ability to take the initiative and take responsibility for one's own learning
- VII Innovation – the ability to introduce a change that outperforms previous practice.

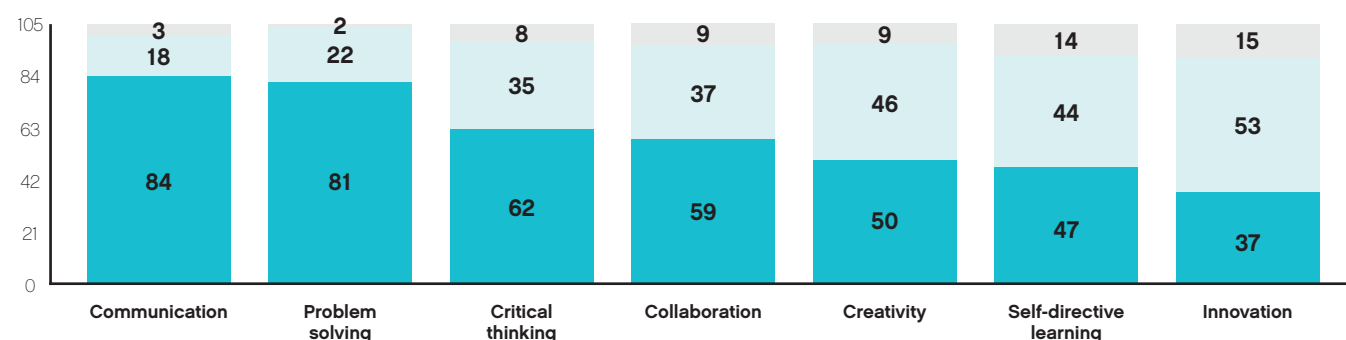
The teachers taking part in the survey were asked to state how important or unimportant they believed it was that schools should seek to develop these skills in their students to help to prepare them for work and their future lives.

The following two charts show how many respondents ranked each skill as either very or quite important. The first chart shows the responses of teachers from schools without LEGO® Education Innovation Studios (hereafter called non-LEGO Education schools), while the second shows the views of respondents with an Innovation Studio (hereafter referred to as LEGO Education schools).

# Findings – Importance of different skills

How important is it that schools help to develop each of these skills?

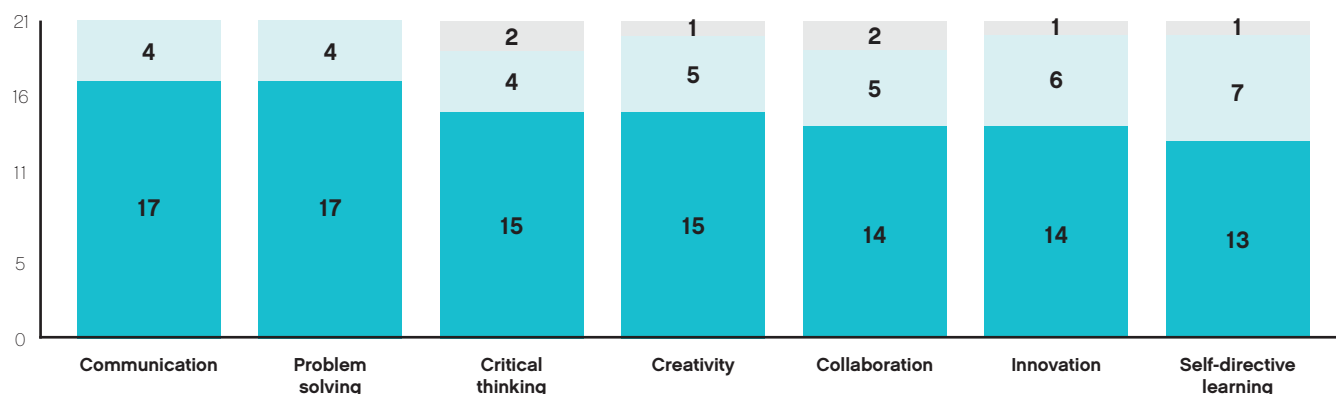
## NON-LEGO® EDUCATION SCHOOLS



Base: 105 school teachers, with responses ranked as a percentage in decreasing order of importance



## LEGO EDUCATION SCHOOLS



Base: 21 LEGO® Education Innovation Studios, with responses ranked as a count in decreasing order of importance.



# Findings – Importance of different skills

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**The findings show that communication, problem solving and critical thinking skills were rated the most important by both sets of participants. LEGO® Education schools placed a greater emphasis on the importance of creativity and innovation.**

Participants were subsequently asked whether they believed these skills were particularly relevant or important for specific subjects at school. Both sets of respondents were most likely to say that these skills were important for 'all subjects', but Maths, Science, ICT and DT (design and technology) were the subjects highlighted most often as those for which these skills would be the most useful.

## **NON-LEGO EDUCATION SCHOOL TEACHERS' VIEWS**

### **Collaboration:**

"If we are going to emphasize skills for work, students need to understand collaboration and put it in place- at the moment they lack this."

### **Communication:**

"We have to learn both aspects of communicating – clear instructions and listening skills are essential in the world of work so that things get done on time and correctly."

### **Creativity:**

"We need to be creative and innovative to develop new teaching techniques as 90% of children in the future will be in jobs which do not exist yet."

### **Problem solving:**

"Problem-solving skills are essential and pupils can physically build something, then through the building process, evaluate it, then by trial-and-error, improve it."

# Findings – Skills teaching

## LEGO® EDUCATION SCHOOL TEACHERS' VIEWS

### Problem solving:

"Life is full of situations where you have to make decisions based on a variety of information available to you." LEGO school

### Self-directive learning:

"It helps to prepare them for university/further education." LEGO school

### Critical thinking:

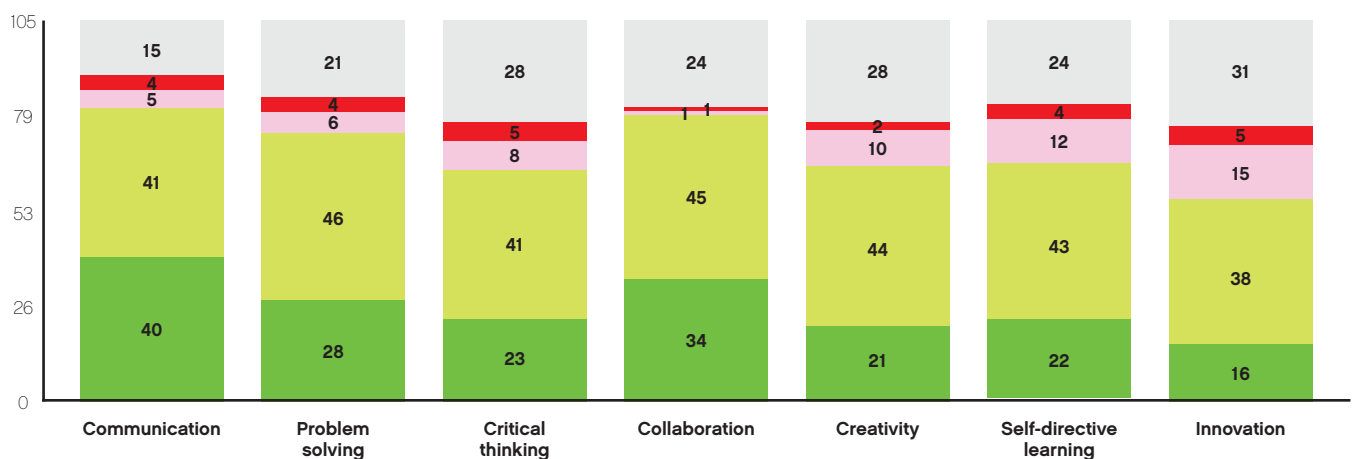
"It helps to show that they are capable of working independently and think things out for themselves."

### Innovation:

"New ways of thinking require all the best skills of analysis and creativity." LEGO school

Respondents were then asked to what extent they agreed or disagreed that the development of each of these skills in students was a **core component of learning** in their schools. The responses are shown in the next two tables.

## NON-LEGO EDUCATION SCHOOLS

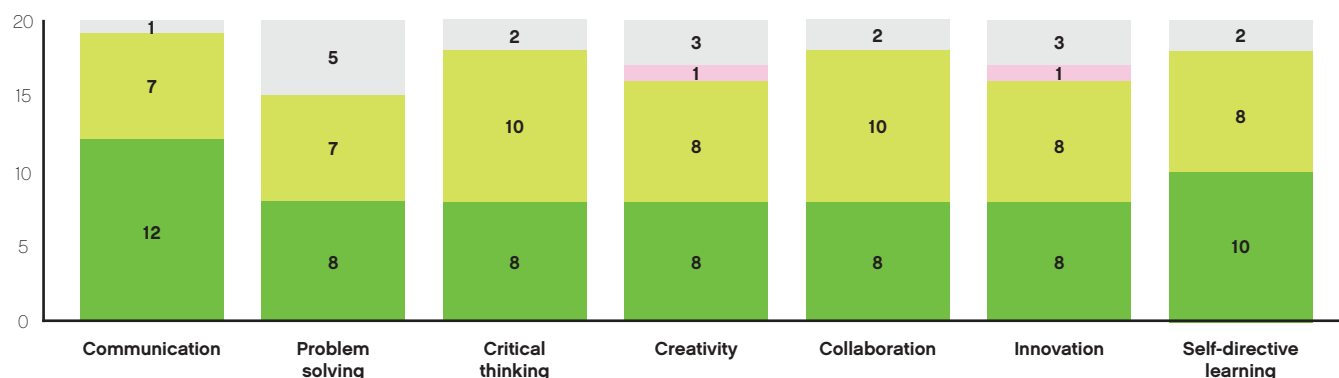


Base: 105 school teachers, with level of agreement that each skill is a core component of learning shown as total number of responses.



# Findings – Skills teaching

## LEGO® EDUCATION SCHOOLS



Base: 21 LEGO Education Innovation Studios, with level of agreement that each skill is a core component of learning, shown as total number of responses.



Comparing both sets of respondents, the findings show that LEGO Education schools were more likely than non-LEGO Education schools to report that all of these skills were core components of learning. The exception was problem solving, which showed equal levels of agreement between the two sets of respondents that developing this skill was embedded in their schools.

Although critical thinking was regarded as one of the top three most important skills for the future, teachers from non-LEGO Education schools were less likely to say that this was a core component of learning than any other skill apart from innovation. Respondents from both sets of schools were mostly likely to agree strongly that developing communication skills was a core component of learning.

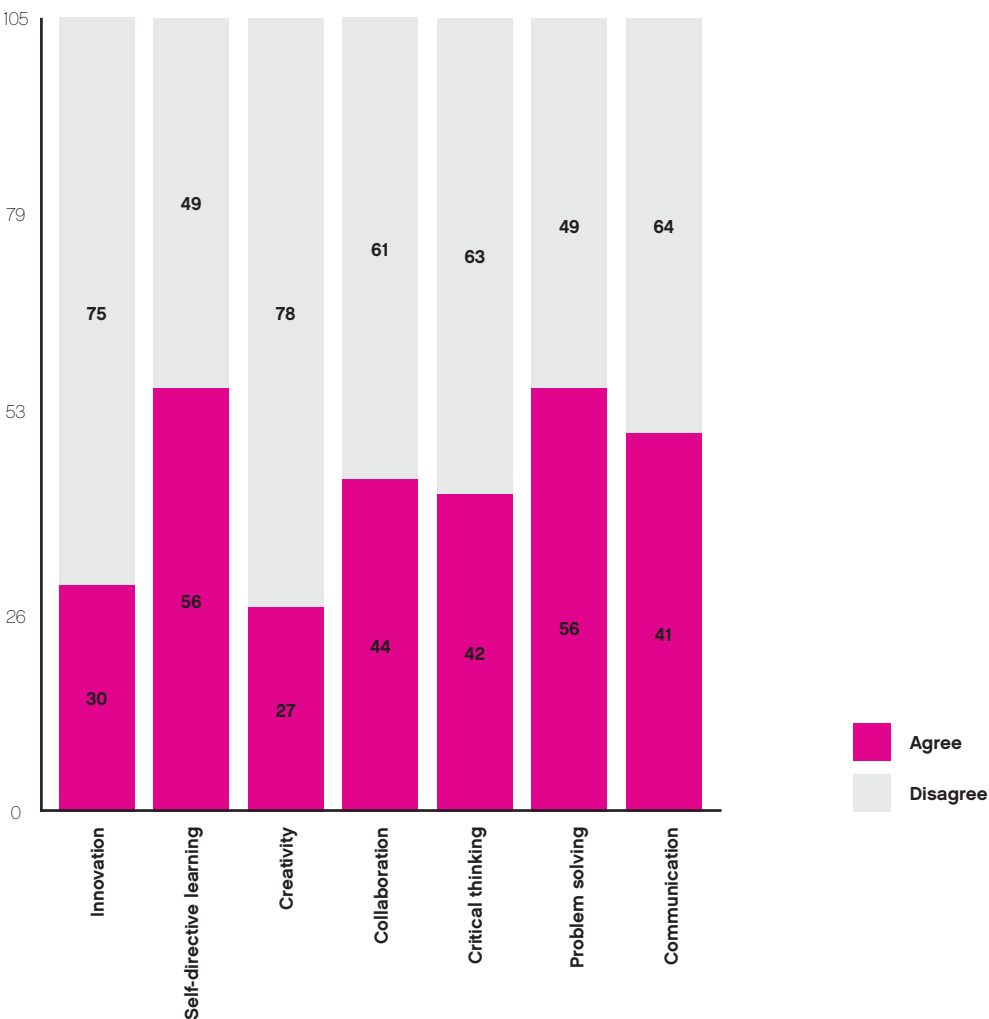
Both sets of respondents were then asked to what extent they believed that each of these skills was now more of a priority for learning in their schools compared with five years ago.

The findings are shown in the next two charts.

# Findings – Skills priorities

Are these skills more of a priority now in your school than they were five years ago?

## NON-LEGO EDUCATION SCHOOLS

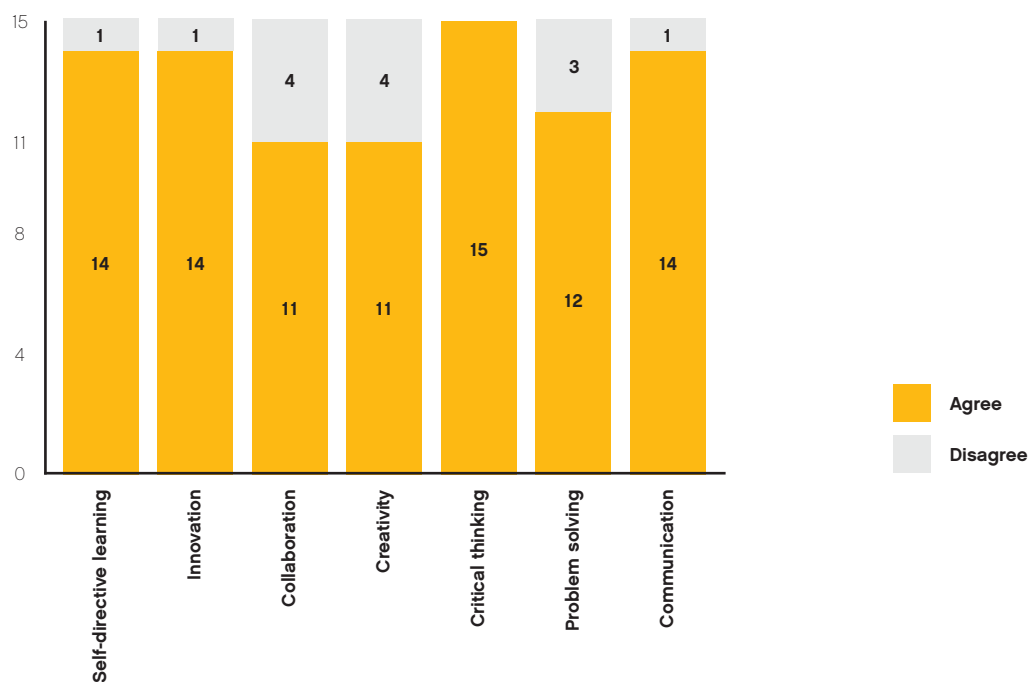


Base: 105 school teachers, number of respondents agreeing that each skill is now more of a priority than five years ago.

# Findings – Skills priorities

Are these skills more of a priority now in your school than they were five years ago?

## LEGO EDUCATION SCHOOLS



Base: 21 LEGO Education Innovation Studios, total number agreeing that each skill is now more of a priority than five years ago.

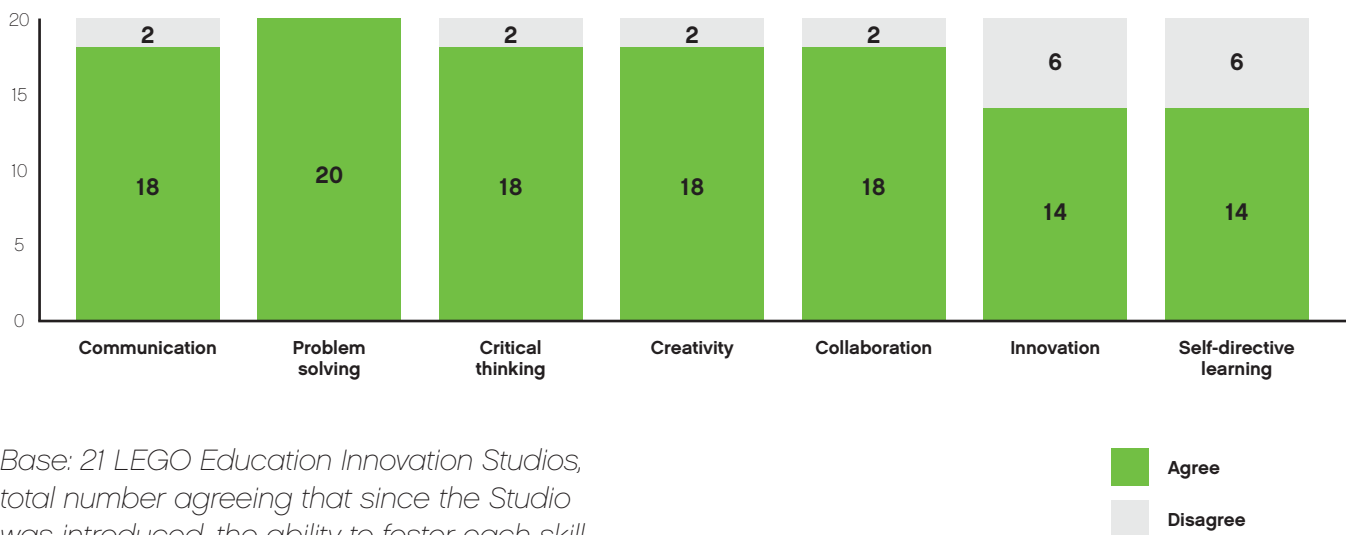
# Findings – Skills priorities

The findings showed that all seven of the skills highlighted here were now a bigger priority than they were in the past for both sets of respondents. However, a higher proportion of respondents from LEGO® Education schools agreed that developing these skills in their students was now more of a priority than it was five years ago.

For non-LEGO Education schools, self-directive learning and problem solving were the areas more likely to be a priority now than they were five years ago. In contrast, creativity and innovation were the areas that the fewest number of respondents said had grown in importance, with a relatively small number of respondents highlighting these.

In LEGO Education schools, critical thinking was the one skill area that respondents said had grown in priority the most, with communication, innovation and self-directive learning all seeing big increases in their relative importance over the last five years.

LEGO® Education schools were then asked a follow-up question: **Since the introduction of the LEGO Education Innovation Studio in your school, do you think there has been an improvement in your overall ability to foster any of these skills in students?** The responses are shown in the next table.



# Findings – Impact of studio approach

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The findings showed very high levels of agreement that the introduction of a LEGO® Education Innovation Studio had improved these schools' abilities to develop each of these seven skills in their students. Those skills that were deemed the most important – communication, problem solving and critical thinking – all ranked very highly.

## 21<sup>ST</sup> CENTURY SKILLS

To test views about skills development further, we also asked teachers what they understood by the term '21st Century skills' and, depending on their understanding, whether they believed teachers need to consider any new or different teaching techniques in order to develop these skills.

The most popular response among both LEGO and non-LEGO Education schools to the question 'what are 21st Century skills' was **computing/ICT**, with respondents from LEGO schools in particular highlighting the importance of **programming and coding skills**.

Non-LEGO Education schools were more likely to say that enabling self-directed learning and independent learning skills were crucial, and this group also mentioned 'problem solving' more frequently.

Other responses from LEGO Education school respondents included 'teamwork', 'problem solving' and 'independent learning'.

In order to facilitate the learning of these skills, the majority agreed that new teaching techniques were needed. Among the suggestions for what might need to change in order to develop and facilitate these skills were:

- Allow children to make their own mistakes, find things out for themselves, and be independent learners
- Teachers need to be more adaptable, creative, and share and transfer skills better
- Teachers need a better understanding of ICT and programming
- Lessons need to be more interactive.



# Findings – Impact of studio approach

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**Other feedback included a view that schools were constrained from being creative and innovative by the curriculum and that the Ofsted inspection regime reinforced this constraint.**

Among LEGO® Education school respondents in particular, other ideas included:

- Encourage learning through fun, playful approaches
- Take a more vocational approach, with links to industry
- Ensure lessons are interactive
- Make more use of LEGO Education materials.

## LEGO EDUCATION SCHOOL OPINIONS

“Children need to be left to make their own mistakes to develop their own ideas.”

“Yes – they [teachers] need to adopt more open styles of lessons with more focus on independent learning.”

“LEGO Education engages children by doing different things, so they are learning without realising they are learning.”

## NON-LEGO EDUCATION SCHOOL OPINIONS

“Teachers have to accept it if the pupils want to push something beyond what you set out to do...it becomes less of a teacher-led experience and more of a teamwork one.”

“We teach computer language at our school (Raspberry Pi), and encourage students to use mobile phones, ipads, weblinks. They all love to submit homework using new technology and you don't get the old excuses like ‘the dog ate my homework’.”

“We need to embrace technology more fully and allow the pupils freedom to develop using these technologies. We should be more facilitators than direct teachers and be competent in the use and understanding of technology and its role in the 21st century.”

# Findings – Improving skills teaching

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## HOW TO IMPROVE SKILLS FOR THE FUTURE

**To test attitudes and beliefs around creativity, the curriculum, the importance of hands-on learning and other current issues, we asked both sets of respondents to state how far they agreed or disagreed with five statements, which were:**

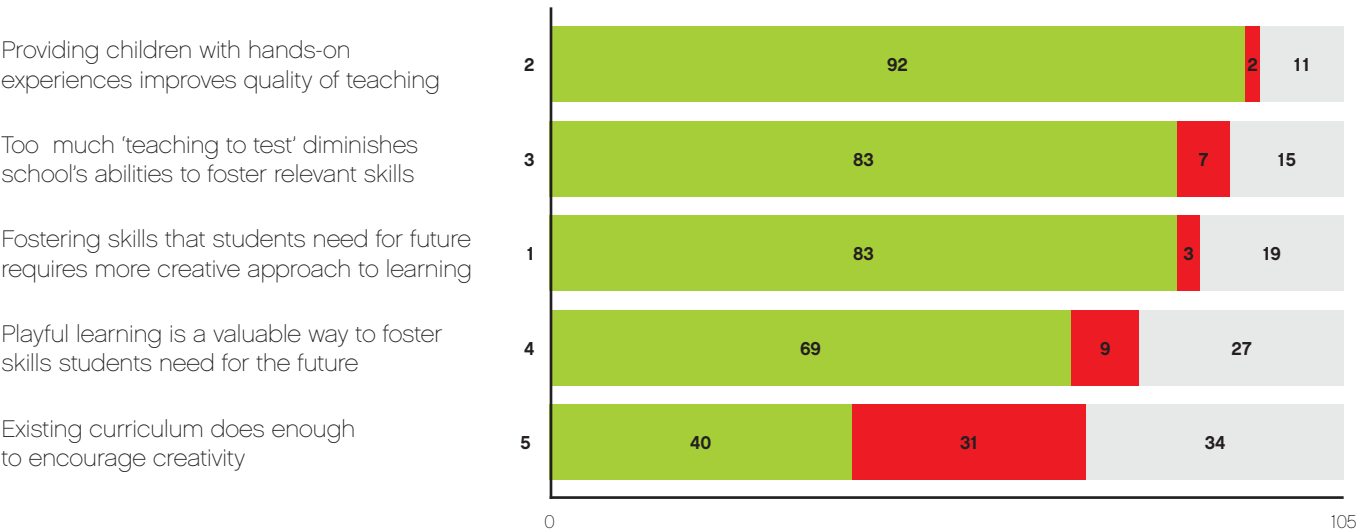
- I** Fostering skills that students will need for the future requires a more creative approach to learning
- II** Providing children with more hands-on experiences improves the quality of learning
- III** Too much 'teaching to the test' diminishes schools' abilities to foster relevant skills
- IV** Playful learning is a valuable way to foster skills that students will need for the future
- V** The existing curriculum does enough to encourage creativity.

The findings for both sets of respondents are shown in the following two charts, which show the numbers who agree strongly or tend to agree, and those who disagree strongly or tend to disagree with each of the statements.

# Findings – Improving skills teaching

How strongly do you agree or disagree with each of the following statements?

## NON-LEGO® EDUCATION SCHOOLS



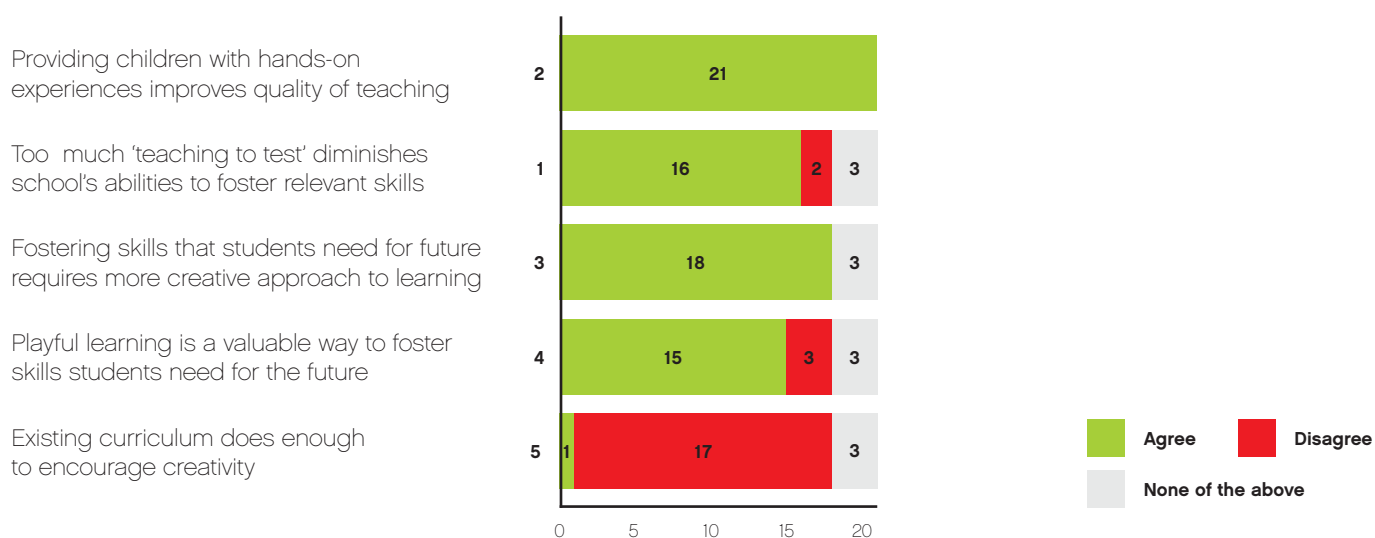
Base: 105 school teachers, number of respondents who agree strongly/tend to agree and disagree strongly/tend to disagree with each statement.



# Findings – Improving skills teaching

How strongly do you agree or disagree with each of the following statements?

## LEGO® EDUCATION SCHOOLS



Base: 21 LEGO Education Innovation Studios, total number of respondents who agree strongly/ tend to agree and disagree strongly/tend to disagree with each statement.

The findings showed overwhelming support for the importance of hands-on learning, with all of the LEGO Education school respondents agreeing with the proposition that it improves the quality of teaching.

# Findings – Barriers to skills teaching

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**Both sets of respondents also agreed that too much teaching to the test has a negative impact on the ability of schools to develop the kind of skills that their students will need for their future lives.**

Both sets of respondents' also demonstrated very strong support for the proposition that more creative approaches are needed to help develop the crucial skills for the future that we have been discussing.

LEGO® Education schools were more likely to agree that playful learning was a valuable way of fostering the kind of skills that students will need for the future and they were also much more likely to disagree with the statement that the existing curriculum does enough to encourage creativity, with 17 out of 21 (80%) disagreeing with this statement, while less than a third (30%) of teachers from non-LEGO Education schools disagreed.

## LEGO EDUCATION SCHOOLS

### **Creative approach to learning:**

"Across the education spectrum it is too exam-based. Most children will go into careers not yet invented, so if their education is too narrow they are not ready for work in the future."

### **Hands-on experiences:**

"Lots of children are not academic and find things like maths difficult. If they have practical activities, hands-on approach they will learn quicker by actually doing something than just by being told about something."

### **Existing curriculum and creativity:**

"The structure of the curriculum now is so narrow - based in the 1950s – it is a retrograde step, which stifles creativity and imagination."

### **Playful learning:**

"Learning through play is really important – it's a different way for children to learn. They can pick up Maths concepts - averages, mean, mode, median can be taught using LEGO models. It really heightens the children's performance and it is fascinating to watch them using it and learning from it."

# Findings – Barriers to skills teaching

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## NON-LEGO® EDUCATION SCHOOLS

### Creative approach to learning:

"Children need to work things out for themselves, rather than be spoon fed exam work."

### Creative approach to learning:

"Testing and paperwork have removed innovation creativity and spontaneity from the curriculum."

### Teaching to test:

"Education is far too target driven and this stifles teachers creativity."

### Hands-on experiences:

"Too much theory is demotivating."

## 4. THE IMPACT OF LEGO EDUCATION INNOVATION STUDIOS

Why did UK schools adopt a LEGO® Education Innovation Studio in the first place? We asked the 21 participants in this research and they told us that the top three reasons were:

- I To advance teaching
- II To build links – with employers, with other schools and with the local community
- III To help deliver STEM subjects.

Other reasons included that it would help their school to be more creative and offer more hands-on learning; that it could help to promote the school; that it may help to secure funding and that it could help to improve the teaching of core subjects.

# Findings – Creativity

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**Just about all of the respondents agreed that they have achieved what they hoped by becoming a LEGO® Education school.**

"It has enhanced our ability to deliver STEM. The educational benefits have been huge and we have not regretted taking up the offer – too good to resist."

"It has made teaching mechanics and robotics easier."

"Massively – we use it after school in a club and send groups to the studio from Science, Technology and Enterprise subject areas."

"We are always looking for new ideas and new ways of developing creativity - not a specific target but it is aiding creativity."

"Massively – we use it after school in a club and send groups to the studio from Science, Technology and Enterprise subject areas."

We also asked schools with an Innovation Studio to name the one area of skills development where they believed the studio has made the most difference. The most common responses are shown in the graphic, with creativity, collaboration and problem solving the skills most frequently mentioned.

## CREATIVITY

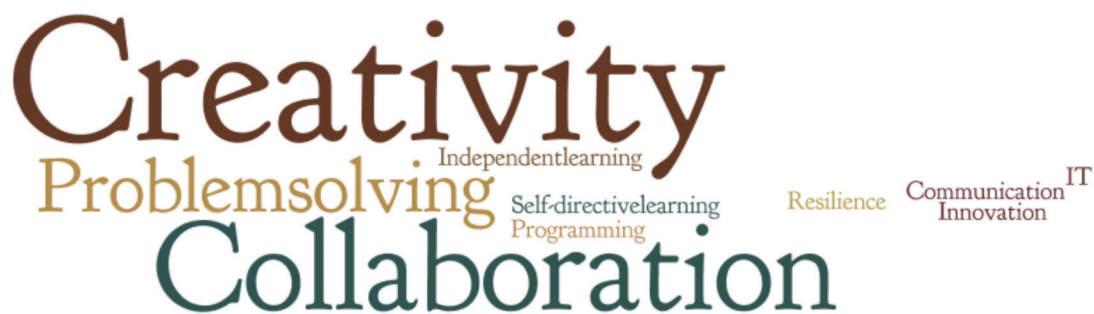
"Some of those children who are our more reluctant speakers and writers can create something meaningful with LEGO that they can talk about naturally."

## COLLABORATIVE WORKING

"Robo-cricket- we give children tasks to program the robot as a cricketer to do batting, bowling, running between the stumps and it really works."

## PROBLEM SOLVING

"Children often won't work out something the first time they try it, and have to have several attempts and learn from their mistakes."





# Key Findings

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## **The following lists the most important findings of this pilot study:**

- Teachers believe that more creative, innovative approaches are needed to help students develop the skills that will be required in the coming decades
- Teachers agree overwhelming that opportunities for hands-on learning are valuable and valued – children must be able to try things and make mistakes
- Teachers agree that teaching to the test dulls creative approaches – and that the current curriculum doesn't do enough to help creativity flourish
- Communication, problem solving and critical thinking are regarded as the most important skills that schools should develop in students
- Computer programming and ICT skills in general are regarded as particularly important 21st Century skills
- Schools with LEGO® Education Innovation Studios are more likely to say that developing skills such as problem solving and communication are embedded in their own schools' ways of doing things
- Schools with innovation studios say that the studios have helped to develop creativity, collaboration and problem solving the most in their students.

# Conclusions



# Conclusions

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As this report highlights in the Executive Summary, LEGO® Education believes that this study calls for more focus on the following areas:

## **1. STUDENTS NEED TO DEVELOP A BROADER RANGE OF SKILLS**

Teachers acknowledge that a broader range of skills are needed for the future. This means not simply subject-specific skills such as the ability to do long division, but communication, critical thinking and problem solving, to name the three skills that teachers highlight as the most important. Encouragingly, it seems that these kinds of skills are now a higher priority in schools than they were in the past.

Teachers also highlight the growing need for digital and ICT literacy, with those from schools with LEGO® Education Innovation Studios stressing the importance of programming and coding skills in particular.

## **2. HANDS-ON LEARNING SUCCEEDS**

The findings show very strong support for hands-on learning and how this approach, with the right environment and the right tools boosts student engagement, improves outcomes and better prepares students for their futures.

The research indicates that schools with innovation studios are more likely to have embedded approaches that develop the skills to help students thrive. We acknowledge that the total sample size of teachers is small, but the findings are in line with feedback we have received from other schools with innovation studios, which put hands-on learning into practice. It indicates a desire to ensure that STEM and other subjects are taught in a way that motivates, engages and inspires students – and shows clearly that ‘creativity’ is not something confined to arts subjects.

# Conclusions

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## **3. A MORE CREATIVE, PROGRESSIVE APPROACH TO TEACHING AND LEARNING IS WELCOMED**

The research makes clear that teachers have an appetite for more creative, hands-on approaches to teaching and learning. They believe this progressive, playful attitude and practice is a great way of unlocking an interest in learning, improving performance and transforming classrooms into places where students of all abilities and ages can make a connection with the subject matter and their classmates. Whether in STEM or other subjects, creative approaches engage students in whatever it is they are learning.

Creative approaches benefit teachers, too; teachers recognise that they need to become more flexible and adaptable to enable their students to try new things and not be afraid of making mistakes.

The evidence from schools with LEGO® Education Innovation Studios in particular indicates that a greater focus on creativity plays a central role in teaching the 21st century skills that their students will need in life and in the workplace.

Teachers acknowledge that their role is changing, especially with STEM subjects. Many of the teachers we spoke to and surveyed recognise that imparting knowledge is not enough if their students are to make real progress.

With classes of technology-savvy students, teachers are becoming enablers and facilitators, supporting and leading their students to become self-directed and self-motivated learners who find things out and make new discoveries for themselves.

# Conclusions

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## 4. LEARNING IS FOR LIFE, NOT JUST FOR TESTS

As the skills and creativity debate moves on, it is heartening to see that the appeal of teaching hands-on, engaging lessons seems greater than ever. At LEGO® Education we will continue to play our part in making this happen as we are convinced it is better for both teachers and students, leading to better outcomes in the long run.

But with concerns about performance measures that may encourage teaching to the test and worries that the national curriculum may be too prescriptive, let's hope that schools are able to find the time and space to deliver inspiring lessons that help the new generation discover the joys of learning. If they do, the benefits will go on being reaped long after every student has sat his or her final exam.

# Recommendations



# Recommendations

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- 1 Teachers should be given support and resources to enable them to lead and facilitate more progressive approaches to STEM lessons to allow for more playful, creative and hands-on learning
- 2 Opportunities for hands-on learning should be embedded throughout the curriculum to ensure that students of all abilities have the chance to learn by doing
- 3 Creativity should not be regarded as a 'nice to have' and restricted to arts subjects, but as fundamental to successful teaching and learning in STEM and other subjects
- 4 Schools should ensure that non subject-specific skills for the future such as communication, problem solving and critical thinking are integrated throughout the curriculum
- 5 Creative approaches towards teaching and learning should be given more credit than they are given now when inspecting and evaluating school performance.



# About LEGO® Education

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Learning is at the heart of LEGO Group's values and central to everything we do. Our Education Manifesto outlines our belief that children need support to become systematically creative, active and collaborative learners.

We think this needs a more playful, imaginative approach to learning combined with – not divorced from – logic and reason.

We believe that children can make their mark by designing and creating their own solutions to problems and that simply acquiring knowledge isn't enough. With a growing recognition that people primarily think and learn through experiences rather than through abstract calculations and generalisations, we provide the tools that enable teachers to facilitate creative, hands-on classes.

This boosts student engagement, improves outcomes and 'future proofs' the classroom by making new connections with versatile resources and new technology.



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