

REPORT 2015

ON THE WAY TO THE "BEST CHILDREN'S UNIVERSITY":  
THE SUPPLY AND DEMAND RELATIONSHIP UNDER  
THE PRINCIPLE OF PARTICIPATION. OPPORTUNITIES AND  
CHALLENGES RAISED BY THE CHILDREN'S UNIVERSITY



INTERNATIONAL SYMPOSIUM







<b>„ON THE WAY TO THE BEST CHILDREN’S UNIVERSITY“ – INTRODUCTION</b>	<b>4</b>
<b>OUR CONGRESS IN A NUTSHELL (URSULA PIETSCH-LINDT)</b>	<b>8</b>
<b>OPENING &amp; WELCOME I (PROF. DR. DR. H.C. TASSILO KÜPPER)</b>	<b>9</b>
<b>OPENING &amp; WELCOME II (ANGELA SPIZIG)</b>	<b>11</b>
<b>OPENING &amp; WELCOME III (DR. WOLFGANG HENNIG)</b>	<b>13</b>
<b>LECTURE I: CHILDREN AND SCIENCE (PROF. DR. BARBARA BRÜNING)</b>	<b>17</b>
<b>LECTURE II: WHAT IS A UNIVERSITY TODAY? (PROF. DR. HANS-JOACHIM ROTH)</b>	<b>23</b>
<b>PANEL DISCUSSION: WHY WE DO (NOT) HAVE A CHILDREN’S UNIVERSITY! (DR. JOSEF KÖNIG)</b>	<b>36</b>
<b>LECTURE III: COLOGNE CHILDREN’S UNIVERSITY. IN TOUCH. (URSULA PIETSCH-LINDT)</b>	<b>42</b>
<b>KEY NOTE: HOW AND WHY DO WE GET STUDENTS FROM FIRST GENERATION, LOW INCOME TO HIGHER EDUCATION? (NGONDI KAMATUKA)</b>	<b>48</b>
<b>WORKSHOP I: “CHILDREN’S UNIVERSITY AS THE BEST UNIVERSITY” BETWEEN SCHOOL AND UNIVERSITY – POSSIBLE FORMS OF TRANSITION</b>	<b>64</b>
<b>WORKSHOP II: “CHILDREN’S UNIVERSITY AS THE BEST UNIVERSITY” – FOR WHOM? CHILDREN’S UNIVERSITY BETWEEN SUPPLY &amp; DEMAND</b>	<b>67</b>
<b>WORKSHOP III: TAKING PART IN THE “BEST UNIVERSITY IN THE WORLD”: PARTICIPATION AND ORGANIZATION.</b>	<b>70</b>
<b>LECTURE IV: MATHEMATICS – A SILVER BULLET TO THE BEST CHILDREN’S UNIVERSITY? (PROF. DR. DR. TASSILO KÜPPER)</b>	<b>77</b>
<b>LECTURE V: MODEL IN CONCRETE: THE MCMASTER CHILDREN AND YOUTH UNIVERSITY IN CANADA – BUILDING BLOCKS TO ENGAGEMENT (SANDEEP RAHA)</b>	<b>84</b>
<b>LECTURE VI: THE FIRST DECADE - HISTORY FIGURES AND RECENT DEVELOPMENTS OF KINDERUNIS (CHILDREN’S UNIVERSITIES) (CHRIS GARY)</b>	<b>87</b>
<b>PARTICIPATING SCIENTISTS</b>	<b>96</b>

## „ON THE WAY TO THE BEST CHILDREN’S UNIVERSITY“ – INTRODUCTION

*Astrid Costard, General Manager of KölnerKinderUniversität, University of Cologne*

The international conference, “On the Way to the Best Children’s University: the Balance between Supply and Demand in the Light of Participation”, was held at the University of Cologne from 8 to 10 May 2014. The conference was sponsored by the Ford Motor Company Fund – Global Giving, and supported by EUCU.NET together with Cologne University’s Alumni Association. This meeting of lecturers and organisers of children’s universities from fifteen countries was concerned with the status and the function of the children’s university within the overall educational landscape and what this status and function should ideally be.

The initial starting point of the discussion was a comparison of children’s university with “real university”. Praise from nine-year-old Elisabeth in Vienna (Austria) puts it succinctly: “I know the children’s university is the best university in the world.” This statement contains not only praise for the children’s university, it also gives cause for critical reflection upon both the position of children’s universities in the overall educational landscape – as “hybrids” between formal and informal education – and creates an awareness of university education and the role of universities within child and adolescent education.

According to a EUCU.NET survey (see Gary/Iber), the opening up of all kinds of universities to children has been an ongoing process since the first children’s university was founded in 2002 in Tübingen (Germany). At the same time – and this also emerged during the Cologne conference – this process has been nothing if not controversial (see König). If we accept as starting point an educational system based upon a variety of educational institutions, each suitable for children, adolescents or young adults, universities would appear to be designed to enable young adults to acquire qualification. This age differentiation can be considered valid, given the insight provided by modern childhood research which reveals specific development-stage-dependent capabilities that alter as children grow older (see Brüning). Thus many researchers claim that children are still, as regards their cognitive and social abilities, at a preparatory stage leading to adulthood (see Brüning). This circumstance would, at first sight, appear to question the suitability of a children’s university based upon university lecturers trained to teach young adults. So, what can the university as an institution contribute to the formal educational system provided for children?

Statements about children and their special relationship with science at both children’s universities and at our conference nearly always refer to a frequently observed special curiosity, a thirst for knowledge, a motivation to learn on



the part of both children and scientists (see Küpper/Pietsch-Lindt). It is precisely this curiosity which the university can utilise in order to break through the rigid principle of age-homogeneity and subsequently provide a legitimate learning forum for children and young people in the form of children's universities. If statements such as that of nine-year old Elisabeth in Vienna (as well as similar documentation found in evaluations of the Cologne Children's University) are to be believed, the courses offered within the university framework would, on the whole, appear to fulfil the expectations on the part both of the participating children and of their parents (see Scheinemann/Raha): one must bear in mind, however, that the specific conditions pertaining to children's universities render it easy to fulfil these expectations: the tailor-made – because interest-orientated – and elaborately prepared courses on offer, the cheerful and patient professors and lecturers holding the courses, the high ratio of guidance and support, not to mention the inclusion of the entire family (see Scheinemann/Raha).

Participants of the conference noted that the institution children's university propagates methods of passing on knowledge independent of, and sometimes even contrary to those available at school (see Scheinemann/Raha). These methods take into account the fact that the children's university is perceived as an opportunity to acquaint children with the distinctive features and fascination of a given subject, removed from the confines of school. Conference participants demonstrated, for example, what this approach can bring with regard to mathematics when transmitted with imagination (see Küpper). Within the framework of the children's university, learning should – indeed must – be fun. It is free of all school connotations and must satisfy the participants. It is for this reason that interactive activities during sessions (see Brüning) have become such a prominent feature: they can include working independently, but also simply savouring the sheer "magic" accompanying, for example, chemical reactions set in motion through knowledge (see Hennig) at children's university sessions. Children can, furthermore, contribute to the success of such a "best university" by being treated as equal partners in research, by allowing them to participate in the organisation and formulation of the aims (see résumé Panel III, Pietsch-Lindt). Equally, they can be motivated by being allowed to act as lecturers (see Küpper).

A part of this inherent pleasure, then, must surely be a joy in formulating one's own questions, a joy in one's own acquisition of knowledge to the point of the production of knowledge (see Scheinemann/Raha; Roth; Pietsch-Lindt), a joy in Eureka and thus in the onerous but fascinating process of communication. This implies that the children's university contains a message from scientists to children, that there is personal satisfaction to be gained from pursuing a university career, in delving deeper into a particular subject (see Küpper). At the same time, children's university seeks to motivate children and young people; in this capacity it can, first of all, play a part in their self-orientation as to a later choice of career.

In other words, children's university aims to prepare and lend shape to transitions: as an educational topos it balances between formal and informal education. As intermediary it seeks to acquaint schoolchildren with university and its remit – also in the hope of winning children later on as students. Secondly, it remains an inescapable fact that the university world as experienced by children is not that later experienced by young adults. What makes the children's university so special for all involved are the skills possessed specifically by children as a consequence of their development stage, of their craving for interaction. Thirdly, there is the demand structure, i.e. the dependence of what is supplied on what is in demand; what's more, one might also highlight the festival character, the special nature of the children's university for all concerned (see Pietsch-Lindt).

If the university is to propagate transitions and wishes via the children's university in order to win children as future students, then it must face the importance of including children from socially disadvantaged and family backgrounds far removed from the world of education (see Kamatuka). Kamatuka describes the social benefit afforded by such inclusion while at the same time openly posing the question as to how serious the intentions of the universities really are. Kamatuka makes it quite clear that merely offering access to universities is not sufficient, but that additional support is required if students from such backgrounds are to acquire their degrees successfully. Roth regards the concept of competence orientation as providing such a support structure because it places the onus primarily upon the university, not on the student, to provide study conditions which enable students from all social backgrounds to complete their studies successfully (see Roth). Children's universities are perceived as being part of a process of opening up to society. The general public, and thus potential students from socially disadvantaged or non-academic families, thereby receive the opportunity to become acquainted with the world of science and with the processes of knowledge production. Nevertheless, certain questions remain unanswered: why are some children not reached by the courses on offer? How can the children's university create a programme that fully takes into account all inclusion requirements? How can we generate demand, for example through forms of outgoing educational work and PR activities? What, then, is needed from the overall framework within which the children's university takes place, from the professionalism of the organisers and the lecturers? What "visionary blueprint" would make sense if we are to achieve our goal of including children from non-academic, educationally disadvantaged families? Panel II at the symposium in particular provided an opportunity to address this issue and brought to light a variety of approaches.

The SiS Catalyst Conference, "Visionary or Fantasy", held in September 2014, carried further both the concrete realisation and also the theoretical discussion of possible concepts in the context of this issue. In the process, it became

clear that herein lies the real challenge for the institution children's university.

This array of perspectives places a rigorous interrelationship between children's university and regular university on the one side and the framework of the social assignment of the educational system as a whole on the other. At this point, Pietsch-Lindt once more highlights the difference between the university as an organisation for formal learning and the children's university as a non-formal educational service. Regarded from Foucault's philosophical point of view, children's university can be perceived as being a "heterotope", i.e. a counter-, or other place or space. This applies in two senses: on the one hand it enables children to interpret known places (such as their grandparents' living room) in a new way, thus lending such places new functions. On the other, we are able, within the concrete spatial confines of the university, to leave behind us the functions ascribed to it by the educational system. Where required, it thus becomes possible to counteract established assumptions. Such a self-conception enables children's university to perceive itself as an educational service rendering possible educational processes, unhampered by any need to achieve learning targets.

Diverging perspectives emerged during the course of the conference regarding the relationship between children's university and school. Children's university can claim to arouse children's interest in science by addressing issues and areas not constrained by any curricular considerations. This approach emphasises the total independence of children's university from school when it comes to shaping its courses and content. Of course, a curricular proximity to the syllabus can act as a stimulant, too, and motivate teachers to co-operate with the children's university. Seen from the inclusion point of view, such a co-operation between school (as an institution involving every single child through compulsion) and children's university (in its capacity as an institution based upon the principle of voluntariness and thus subject to the laws of supply and demand), would appear worthy of consideration. These and other important insights emerged clearly from the discussion (see the summaries of Panels I and II).

Children are and will always remain the exception at a university. To whatever degree we are able to stabilise and professionalise what is on offer at a children's university, we may posit that it is precisely this "specialness", as compared with everyday school life, which makes attendance at a children's university so attractive to children. We can only surmise that for the lecturers it is the variety of age-groups in their audiences that motivates them to participate voluntarily. This supposition is, however, backed up by surveys carried out among lecturers. University celebrates itself in festival guise, as the exception removed from the everyday. In such guise it can present science and research as a complementary path towards reaching children, be it in order to contribute to their education, be it to bring university or science and research within the focus of their children's horizon.

This conference would not have been possible without the support of numerous persons and institutions. Special thanks must go to the Ford Motor Company Fund – Global Giving, to the Cologne University Alumni Association, to the European Children’s Universities Network, EUCU.NET, to SiS Catalyst – Children as Change Agents for Science in Society, to the “Studiobühne” theatre Cologne, to all lecturers, discussion moderators and student assistants. Special mention should be made of the conference moderator, Prof. h.c. Nicholas Allen.

## OUR CONGRESS IN A NUTSHELL

*Ursula Pietsch-Lindt, General Manager of KölnerKinderUniversität from 2003 - 2014, University of Cologne*

At our international congress, the team of the Cologne Children’s University proudly welcomed more than 80 guests from 15 countries. The participants, altogether children’s university key players and academic experts, followed our invitation to discuss and jointly work on the main objective: how to develop future educational concepts for children’s universities in light of structural changes such as demographic development, migration and globalisation.

Welcomed by the former rector of the University of Cologne, Prof. Tassilo Küpper, and the vice mayor of Cologne, Angela Spizig, Dr. Wolfgang Hennig, a representative of Ford Europe (programme management sustainability/corporate citizenship) held a short and concise welcome speech on Ford’s social responsibility and link to education with the Ford Fund. After an introduction to the programme and the special practices planned for the workshops, held by the director of the Coordinating Office for Science & the Public Sphere of the Faculty for Human Sciences, Prof. Hartmut Meyer-Wolters, the common work of the conference started. The dean of the Faculty for Human Sciences, Prof. Hans-Joachim Roth, began with an inspiring lecture on the university’s role today. Altogether seven lectures focusing on questions surrounding the difficult status of children’s universities and their educational relevance were delivered.

Mainly the keynote speech by Dr. Ngondi Kamatuka, director of the Center for Educational Opportunity Programs at the University of Kansas, and also Sandeep Raha, assistant professor at McMaster University in Hamilton, Canada, emphasised the social momentousness of all these efforts. The audience was especially interested in hearing about the diversity of children’s university experiences from different countries, followed by animated discussions – each of them excellently moderated by Prof. Nick Allen. All three workshops – guided by experienced facilitators – dealt with successful, but also difficult facets of children’s universities.



## OPENING & WELCOME I

*Prof. Dr. Dr. h.c. Tassilo Küpper, University of Cologne, Former Rector*

Dear Mrs Mayoress Spizig, dear Dr. Henning, dear Prof. Allen, Ladies and Gentlemen, about 11 years ago I had the pleasure as rector at that time to welcome a large number of children to the first Cologne Children's University. Since our present rector Prof. Freimuth as well as Prorektor Langer must unfortunately attend to other duties today, Prof. Freimuth asked me to welcome you on behalf of the university at this international congress devoted to discussing "ways to the best children's university".

Eleven years ago, when we adopted the idea of a university for children and launched our own programme, it was not obvious at all that this initiative would develop in such a brilliant way. Of course, the enthusiastic statement by Elisabeth, a nine-year-old former participant of the children's university in Vienna which you'll find in the flyer of this conference, is an excellent feedback. But on the other hand there was quite some scepticism to overcome as well. Why should a university with such a large number of regular students already exceeding our capacities take over additional duties?

Is it sensible (fair?) to draw children into lecture halls in addition to their school activities, or should they rather enjoy more time to play? These thoughts remind me of a story told by Fritz Pleitgen, former head of the Cologne radio and TV station WDR, which we had gained as a media partner for the first Cologne Children's University. In his foreword to the programme of our first children's university he recalled the story of a Fijian chief visiting the US. When the chief realised that children were "locked up" in so-called schools at the age of 6, he was shocked and asked: "Why such nonsense? Isn't that the time when children should learn something?" Pleitgen then continued: "And now we even want children to attend universities!", but quickly added the key statement about the idea: "Real professors who know everything meet children who want to know everything. That sounds like a real adventure! ..."

And in fact: it has been since then and still is! The positive feedback proves that it is indeed a great experience for the children, that it is not a burden at all but that they enjoy it. The children become familiar with a new and largely unknown institution, and the early familiarity with the university might stimulate an interest in further studies and possibly lead the way to continue as regular students later on. Delivering lectures to children is a challenge and a new experience for the professors as well, and we must be grateful that so many have actively supported our programme. In addition, developing and presenting such lectures can be used as an interesting experience for students and can function as an

interesting element in the teacher training programme. Last but not least, due to the usually great public resonance children's universities are excellent marketing for the universities.

Nevertheless, after more than a decade of obviously successful performance it seems to be appropriate to discuss and evaluate the whole process and to check if, for example, we have succeeded in addressing children of all social backgrounds or if participation has been restricted to children growing up in families already familiar with academia? Besides all the positive feedback, does the experience of participation in a children's university contribute to a significant change in the attitude towards science or the universities? Such questions and much more will be discussed at this congress, which has been organised in close cooperation with the international network of Children's Universities EUCUNET ([www.eucu.net](http://www.eucu.net)) and the multinational European Project "SiSCatalyst. Children as change agents for science and society" ([www.siscatalyst.eu](http://www.siscatalyst.eu)). It has been made possible by generous support of the Ford Foundation and our Alumni organisation KölnAlumni, which we gratefully acknowledge.

Finally, I would like to thank the organisers for their initiative to attract this meeting to Cologne.

It is also a welcome opportunity for me to thank the whole team, and in particular Ms. Pietsch-Lindt, not just for the organisation of this congress, but for all the effort and enthusiasm devoted to the Cologne Children's University.

I wish you a pleasant stay at the University of Cologne, inspiring discussions, good luck and success in finding a "way to the best children's university".

## OPENING & WELCOME II

*Angela Spizig, Mayoress of Cologne*

Dear Prof. Küpper, dear Prof. Meyer-Wolters, ladies and gentlemen,

I thank you all very much for inviting me here today to the University of Cologne and I am very happy to attend the opening of the international conference "On the way to the best children's university: the supply and demand relationship under the principle of participation". They have taken on quite a lot!

This conference brings together experts to collectively give thought about how to improve the dialogue between academics, children and young people. Ladies and gentlemen, together you want to find ways of learning: not only with children but from children. And by doing so you raise questions and issues of social change that you want to help shape. I would even say: have to shape.

Where, if not at the universities, should visions be realised and real paths built from these visions? Here the educational landscape can lead the way for a rapidly changing modern society. Thus the work of the children's universities can offer perspectives that should be the navigator for the ensuing shaping processes.

Under the principle of participation you are looking for possibilities and challenges in the children's universities. The challenge, for example, is to find ways of offering all children, even those with educationally disadvantaged backgrounds, opportunity of access to children's universities, allowing children to participate on equal footing and improving the collaboration between school and university; but you also want to highlight the image of science that is presented at the children's universities. In short: you open eyes and ears and increase awareness.

With the aim of a sustainable development of talents, that stretches across a lifetime but also embraces society, you focus on the fruitful effect of participation. This is one of the greatest challenges of an effective educational system. More and more there should be a focus on the importance of daily decisions in terms of sustainable development and design. This also means learning to develop new perspectives and re-examining one's own daily decisions, the well worn path. So with a collective responsibility we can all shape the world of tomorrow.

The future and children – for many people this means the same. “Our future is the children” or “the future belongs to our children” – no matter what perspective we have on this subject, it is important to convey the responsibilities for shaping this future as early as possible.

We all wish for strong children. Carried by a wave of curiosity and pursuit of learning we can strengthen our children's confidence in their own abilities. And with this growing confidence they can face the challenges of our time and create their own decision-making powers.

We want to invest in our children. We want to trust in our children. They are also our future!

## OPENING & WELCOME III

*Dr. Wolfgang Hennig, Ford Motor Company, Programme Management / Community Involvement / Sustainability Strategy, Cologne*

Executives, scientists, educational experts, congress participants, on behalf of Ford-Werke GmbH, it is a great pleasure to give an opening address from a premium partner's perspective.

Some of you may know that Ford's European headquarter is located in Cologne. We have 24,000 employees in Germany, and 17,300 of them in Cologne. In our opinion, the University of Cologne is the right place for this inspiring international children's university congress. The history of Cologne goes back more than 2,000 years, and its multi-cultural atmosphere is also reflected by the diversity of Ford employees. As a family-owned company, we are dedicated to family values and social responsibility. That's exactly the reason why Ford is very proud to support Education@University this year as a premium partner.

As you may know, our company founder Henry Ford was a technical and social pioneer. Bearing this in mind, we act as a Corporate Citizen – considering all 3 dimensions of sustainability: economic, environmental and socio-cultural. This ties in with the Ford brand promise: "Go further" or – in German – "Eine Idee weiter". How do we walk the talk of our corporate culture? Especially at the Ford Site in Cologne? Our Corporate Citizenship approach means that we support community life and society with our know-how, manpower, time, mobility and money – primarily in 3 directions:

1. Corporate Volunteering; 2. Mobility Sponsoring; 3. Strategic Social Investing.

1. Corporate Volunteering: this is almost self-explanatory. The specifics are: Ford employees can take 2 days off from their regular work at Ford and invest their time to engage with the community. Our German volunteering programme "Ford Community Involvement" was established in 2000 – boosting ecological, social and cultural projects: some 140 per year with over 900 Ford employees involved. Currently, more than 1,400 projects have been implemented, and working time is all supported by Ford. We co-operate with hundreds of non-profit partners to practically assist various community actions. Worth mentioning in the congress's context: many Ford volunteers work in the area of education, supporting schools and students with mentoring, workshops, job applicant/candidate training or the hands-on maintenance of school gardens. The list of supported projects is as long as it is diverse. Our volunteering motto is: anything goes – if it makes sense. Corporate Volunteering is of strategic relevance for the Ford family globally,



characterised as a “triple win situation”, and world-wide some 26.000 Ford volunteers were engaged last year (2013). This win-win-win results from employees’ community engagement while changing their perspective in a setting of informal learning; this means “Service Learning” in a new context and a different reality of life. The outcome is: value generated at 3 levels: (i) for Ford employees, (ii) community/society; (iii) at the corporate level, for example better educated, socially skilled and more highly motivated employees via job enrichment. All in all, this is “smart business” because a social cause goes hand in hand with a business cause.

2. Mobility Sponsoring: it is not surprising that Ford refers to its core business. We support many non-profit organisations and community initiatives with vehicles, free of charge. Last year alone, 74 additional projects in the Cologne area benefited from our mobility support.
3. Strategic Social Investments via the “Ford Motor Company Fund”: globally, we have identified 4 key areas of social investment: 1. Education; 2. Road Safety; 3. Sustainability/Environment; 4. Community Life. Regarding Education, it is evident why the University of Cologne, as a center of excellent education, is a strategic partner for us. We decided to financially support projects such as the children’s university and the international congress in 2014, Pupils’ Lab, Girls’ Researcher Club, as well as the academic education of teachers and teach-the-teacher seminars.
4. Let us remember that education is a Human Right. The outcome of good education is more than knowledge, but also personality development and the building of many skills – including social skills. And metaphorically, education is the hope and future for everyone. Not only in the framework of individual “life-long learning”, but also collectively, education is an everlasting story, contributing to mankind’s self-determined cultural evolution. Teaching young people is the best we can do for the sake of the individual and society – reflecting humanistic principles.

Back down to earth and to Cologne: children’s university is an excellent and prototypical example of a sustainable concept and action plan. It is a straightforward and highly effective tool to approaching children at an early age and to endorse curiosity and excitement about asking questions, learning and better understanding what is going on in our complex world. It is important to enlarge the “educational tool box”, and children’s university is an outreach tool well allocated in the educational landscape. Finally, this specific educational approach also compensates for what may be

lacking and what is highly required: to involve children into decision-making processes at various levels.

Children are important stakeholders for many reasons, but also because they will in future face consequences of decisions made today. The good news: children are change agents for a society's development. That is a great chance and a challenge for all of us and for universities, too. The bottom line is: education is a top investment to make everywhere and anytime. We are convinced that this kind of social investment will pay off for society in the mid and the long term.

A few weeks ago, the Cologne Children's University programme ended with an outstanding performance. That is great for the university, for all children who participated, and it is also good for Ford as a premium partner. It has to be highly acknowledged that some 120 university volunteers were involved in lectures, workshops and huge organisational tasks: they all made this success happen and helped teach future scholars. Finally, we contributed to the next level of education with inclusion: we cared for 500 socially disadvantaged schoolgirls and boys with migration backgrounds or from low-income families. A special shuttle service was organised for these young people to bring them from their schools to educational events at Cologne Children's University.

This was a first-class education for children in the "second row" – they all had the chance to deep-dive into the fascinating world of science. This was a good example of how mobility made the difference and helped improve education. These university ("edutainment") events were impressive and mind-opening for many pupils and will positively influence individual school careers. The Cologne Children's University can be proud to report a record figure: since the launch in 2003, the number of attendees has reached an all-time high: after an average of 800 during previous year, this already high number has now increased by 60% to nearly 1,300 visitors. This has made a significant social impact!

To conclude with the two well-known key players in the educational game: children and teachers with their specific relationship. Teaching and learning is primarily a matter of emotions. Children want to explore, investigate and discover the world; this is a basic scientific approach. The best we can do is to motivate and assist young people to discover the world's "secrets". For them, it's magic, for us, it's science. And remarkably, both perspectives are "real". With regard to teachers, we may wonder whether teaching is rather more a passion than a profession. In any case, teachers are everyday heroes – anywhere. Teachers act as multipliers and potential game changers to let little change agents grow and help them to manage all future tasks and work ahead to build a better world. For this, education is essential in the development of society and culture.

All educational experts and teachers who were with us for three days (May 8-10, 2014) will, for sure, benefit from this outreaching congress and lively discussions. The solid ground is your – the participants' – strong commitment and

dedication. Enjoy exchanging good practices and experiences, identifying and managing challenges ahead. I am confident that you will succeed in developing a joint vision for next-level education. Last but not least: the congress's motto, "On the way to the best children's university"/"Unterwegs zur besten Kinderuni", perfectly corresponds with the Ford brand promise. So please: Go Further!



*With special thanks to the great moderator of the symposium:  
Prof. h.c. Nicholas Allen  
Theatre Educator, Personality trainer Art of Debate, EUCU.NET*

*Prof. Dr. Barbara Brüning, University of Hamburg*

## 1. Childhood in the 21<sup>st</sup> Century

The concept of childhood was unknown until the end of the seventeenth century. "Childhood was restricted to the very earliest years, i.e. to the phase during which the tiny human being is unable to fend for itself (...); the moment the child can do so, it was regarded as an adult, without further ado" (Ariès 1978, p. 46). It was only with the Swiss teacher and philosopher, Jean-Jacques Rousseau, that attitudes towards children and the relationship between children and adults began to change. In his book, "Emile", Rousseau emphasises the emotional and cognitive independence of children who therefore need to be led towards adulthood under the circumspect guidance of a teacher (cf. Rousseau 1993, pp. 29/30).

Using empirical methods, modern child research has expanded on the basis laid down by Rousseau with his concept. The premise is that children are independent personalities with their own qualities and capabilities, all of which differentiate them from adults. They are in a specific phase of their development which represents a "socialised preparatory, transitional phase on their path towards adulthood" (Heinzel 2000, p. 17). This phase embraces both social and developmental characteristics. By taking these into account, it becomes possible for scientists to communicate with them successfully within the framework of the children's university.

Hartmut von Hentig is of the opinion that, in the twenty-first century, childhood can be divided into four sociological categories: media childhood, school childhood, city childhood and future childhood (Hentig 2000, pp. 32-35). By media childhood he means that children are aware of many aspects of reality in a mediatised fashion and therefore have difficulty in linking them up. Therefore, a university lecture needs to endeavour to place social and natural-scientific phenomena in a larger context. Herein also lies an advantage over the school environment, which often tends to pick out specific fields, as these are pre-ordained by a given syllabus.

School operates primarily within organised timetables, subjects and methods; free thinking and research are not the norm. It is here that the children's university can "tune up" both the children's urge to research as well as their reflexes – independent from any syllabus and performance requirements.

Any natural science lecture must bear in mind that nowadays childhood means city childhood. Children and young people have few or no elemental natural experiences anymore. That is to say, they are hardly aware of the basic processes, do not experience things like blossoming, growing and decaying. The children's university could, for instance, be in a



position to present a project based upon “Touching, Smelling and Tasting”.

Hartmut von Hentig defines another childhood category: future childhood. By this he means that children inhabit a world planned by grown-ups, within which it becomes harder and harder for them to realise ideas or plans of their own. The children’s university is in the position of being able to offer another possibility: precisely because it lacks a curriculum, it can encourage children to think further and to experiment further, thus realising ideas of their own which are not limited to their immediate environment and requirements

## **2. Children’s specific development-oriented abilities**

Quite apart from the social determinants of childhood, there are developmental-psychological aspects of this phase in their lives. By taking these into account, a children’s university event is in a position to present important ideas and theories in an intelligible and effective manner.

### **2.1 Children are capable of wondering about the world**

Children do not know their way around the world as well as adults do. For this reason, many things that seem quite normal to adults appear wondrous to them. For instance, the switch from day to night and back. Children observe certain natural phenomena and then ask questions such as: “Why does the sun sink into the sea every evening?”

2,000 years ago, the Greek philosopher Aristotle realised that human beings assimilate knowledge because they are “driven” by their ability to wonder at the world: “It has always been amazement that has driven human beings to philosophise. First, they wondered at anything that bothered them because they were disconcerted. They then gradually took several steps further and began to ask about the moon, the sun, the stars and the origins of the universe” (Aristotle, 1987, pp. 21/22).

Anybody preparing a lecture for the children’s university should right at the outset take into consideration what Aristotle called the children’s ability to wonder, to question: for example, a lecturer could open his or her lecture with a puzzle that the children have to solve at the end. If an experiment is to take place, a lecturer could ask children before beginning what result they expect. The excitement will mount to see if the actual result emerges at the end.



*A picture-puzzle book, drawing on children's university experience, has been published for 8- to 10-year-old children called, "Can Happiness Be Bought for Money?" The book reflects the opinion of the French philosopher Sophie Germain (1776–1831), that "There Is No Total Happiness on Earth".*

## **2.2 Children have no complex world experience**

In the book, "The Journey of the Little Sun", which aims to help younger children grasp certain physical phenomena, the little sun declares: "Rays of light always move at the speed of light; in fact, it would be more accurate to speak of photons, rather than rays of light, for these are the tiniest particles" (Gruber 2006, p. 41). A concept such as the speed of light is very abstract and beyond the grasp of most children. In a lecture dealing with such a phenomenon – something totally beyond children's intuitive faculties – children need to be given the opportunity to experience it for themselves: while trying to define what the speed of light is, the children could rise from their seats and then move, first slowly, then quickly and then as fast as they can. This activity would give them some idea about speed. Subsequently, one would have to explain to them that a person would have to move millions of times faster in order to come anywhere near the speed of light.

## 2.3 Children possess reflective capabilities of their own

Children are quite capable of thinking for themselves and figuring out the connections between different phenomena – their reflective capabilities are often underestimated by adults. Thus, comments such as “The soul is invisible” (Sophie, aged 10) or “Space is infinite. It’s just like numbers: you can go on and on counting forever and still never get to the end” (Leonard, aged 11) makes it quite clear that children can develop their own profound thoughts about the world (Brüning 2008, p. 117). The philosopher Karl Jaspers pays tribute to children’s amazing cognitive powers: “Anyone bothering to collect examples could produce a wealth of examples of children’s philosophical abilities. The objection that children will have picked it all up from their parents or from others cannot be applied to their serious reflections. (...) Children have a genius of their own which is lost as they reach adulthood” (Jaspers 1998, p. 11).

During any children’s university lecture, children should constantly be given tasks that encourage them to carry on thinking later, back at home, too: solving a puzzle, formulating a hypothesis for a scientific experiment or conducting research on any given historical period. This arouses their curiosity and thus develops their problem-solving orientated thinking. After a lecture, they will, as a result, set about finding a solution. Problem-solving orientated thinking means that children need to learn how to remain patient with themselves and with others, for the solution may not be immediately apparent and may render them impatient as a result. This was pointed out nearly 2,500 years ago by the philosopher Theano of Croton. In a letter to her friend Eubule, she emphasises the importance of children acquiring the virtue of patience whilst considering difficult questions. They thereby learn to carry tasks through until they have been fully dealt with. She makes the key point that life requires intellectual effort, as does pondering the world (cf. Theano 2010, pp. 26-28)

## 2.4 Children only have a partial ability to perceive things in the abstract

Children’s cognitive potential has been investigated, among others, by the Swiss developmental psychologist Jean Piaget. As early as the 1930s, he defined the different phases of children’s cognitive development as being, in principle, threefold: he begins with birth and continues through childhood into adulthood. For Piaget, cognition is a process related to aspects of Immanuel Kant’s theory of cognition, including the principles of space and time, of causality. In the course of human maturation, this is steadily developed. He defines three stages: the first embraces pre-operative thinking between the ages of 3 and 6 years, whose prime aspects are the development of the child’s competence to execute and to act. The second stage, which the majority of children attending the children’s university are in, is that of undertaking concrete

operations. Children now primarily orientate themselves by means of concrete situations and examples. Only at the end of this stage are they capable of comprehending reversibility. By this we mean the ability to grasp a given situation by reversal. This competence presupposes the ability to free oneself from any fixation on concrete objects or situations. Reverse thinking implies that children are able to form groups and discern independent criteria such as sorting according to size, colour or geographical specifics: "All people who are born in Athens are called Athenians."

Reversibility and hypothetical thinking are characteristics which do not reach full fruition until the formal operation stage, which begins at the age of 11 to 12 years. At this level, a child's thinking is able to free itself completely from concrete conceptions and able to carry out formally logical thought processes. In addition to this, young people are able to systematically categorise the conclusions they draw from their thinking and both to question and to reverse them on a meta-level: for example, all planets revolve around the sun is the premise. The reversion of this conclusion is not, however, that all heavenly objects circling around the sun are planets. The explanation for this is to be found in the mathematical set theory: the heavenly objects form the superset, the planets form a subset of this superset. Children remain unable to comprehend such formally logical operations because they have not yet mastered aspects of the set theory. Such cognitive operations therefore require clarification when explained within the framework of the children's university. For instance, both types of quantity could be charted on the smart board. By orientating oneself by means of Piaget's cognition levels while preparing a lecture, one can avert the danger of talking in too abstract or formally logical a fashion. Visible concrete examples help children follow and comprehend even difficult thought processes.

## **2.5 Children do not yet possess a complex conceptual vocabulary**

Science makes use of many abstract concepts in order to tie together the different aspects of reality, examples of this being the concepts of philosophy or of the gravitational field. Even though children may already have some notion of these concepts, they usually do not know that these link together several different conceptual determinants. For this reason it is necessary, in any children's university situation, to clarify all primary determinants made use of in the subsequent lecture; for example, short definitions of all concepts can be given. The following conceptual definition of "philosophy" is from a philosophy lecture given to 8 to 10 year-old children at the 34th Protestant Church Congress in Hamburg in 2013:

The word "philosophy" comes from ancient Greek. It is comprised of two words, the word "philos", which in German means friend, and the word "sophia" which means wisdom. So philosophers are "friends of wisdom". Philosophers pose questions to the world such as: "Where does the world come from?"; or "What is happiness?" and then try to find



the answers. Philosophers at universities have made philosophy their profession.

A further means of explaining might be the conceptual pyramid which visualises an abstract concept. At the top of the pyramid we place the concept requiring explanation and beneath it, layered in order of importance, the words used



to clarify our concept. It is quite possible for several words to be placed alongside one another in other words for them to be awarded the same level of importance. Or one might say that each level of the pyramid represents activities which have to be performed one after the other: let us, therefore, take the concept "philosophy" as our example:

## 2.6 Children do not think within larger contextss

Children will discuss themes such as, "Heavenly objects in space?"; or "Can one buy happiness?" in a problem-orientated fashion, on the basis of their own experience. It is therefore necessary during a lecture to guide them towards the larger context of a given theme in individual cognitive steps, one by one. One must on no account ignore their life-experience to date. In my lecture, "Can one buy happiness?" for 8- to 10-year-olds I therefore carried out the following cognitive steps: Step: Arriving at a consensus with the children, creating an image of the children's reactions on the smart board based upon their own past experiences, complete with subsequent documentation.

Step: Presentation of the fairy-tale, “Hans im Glück”, which explains the concept of immaterial happiness in the sense of “money won’t buy you happiness”.

Step: Presentation of the counter-position, “Money for good marks at school”, from the book “What You Can’t Buy for Money,” by the American philosopher Michael Sandel, which sets out to show that “Money can buy you happiness”.

Step: Interim clarification regarding the two given positions amongst the children themselves. This, in turn, leads to group reflection as to why some children will decide differently from others, including subsequent documentation on the smart board.

Step: Introductory overview of the several philosophical positions on the question of material and immaterial happiness aimed at showing that, in the philosophical tradition, there exist cogent arguments for both positions.

Step: Renewed clarification amongst the children themselves, together with a summing-up: Which philosophical position has convinced us? For what reasons?

The children came to the “Happiness” lecture with their own personal opinions which, in general, tended towards the view that money cannot buy you happiness. By presenting the various philosophical positions, the benefit for the children lay in the recognition that there can be excellent reasons for a counter-position, given that “philosophers aren’t in agreement, either” (Antje, 9 years old).

## 2.7 Children require interaction

Ninety-minute lectures are quite an effort for younger children. They have to contain their locomotive urges, listen and cope with new cognitive challenges. Various social forms need to be observed if one is to maintain their attention over a long period of time: for example, questions as to possible results of an experiment and the children’s subsequent reactions. Or one might plan from the outset to involve one or two children in conducting experiments. As far as the social sciences are concerned, it might be possible to work out experiments with thought-processes such as: “What would happen if human beings were incapable of being happy? What would they be missing? ”

Lecturers should always take heed of questions interposed by the children and briefly discuss these with them. With some problems (for instance whether or not one can buy happiness with money), a vote can be taken and then evaluated together. At all times should the children feel that they are being involved in the development of the thought-process. Only when they recognise that a question is relevant to their own lives – however complicated and abstract it may be – will they take an active part in seeking a solution. The children’s university is quite different from school. It aims to

present to children the latest scientific insights within a wider context and makes greater intellectual demands on children, requiring them to concentrate for much longer on one problem than is the case at school.

On no account, however, should the children's sensual abilities, their experience or their outlook be neglected. After all, it was Immanuel Kant who pointed out some time ago: "A concept without outlook remains empty" (Kant 1979, p. 818).

## Bibliography

- Ariès, Philippe: History of Childhood. Munich 1978.
- Aristotle: Metaphysics. Stuttgart 1987.
- Brüning, Barbara: Children make the Best Philosophers. Leipzig 2008, 2nd edition.
- Gruber Martin u.a.: The Journey of the Little Sun. Troisdorf 2006.
- Heinzel, Friederike: Methods of Childhood Research. Weinheim/Munich 2000.
- Von Hentig, Hartmut: Preface to The History of Childhood, in: Ariès, Philippe: The History of Childhood. Munich 1978, pp. 7-44.
- Jaspers, Karl: An Introduction to Philosophy. Munich 1998, 21st edition.
- Kant, Immanuel: Critique of Pure Reason. Berlin 1979.
- Rousseau, Jean-Jacques: Emile or On Education. Stuttgart 1993.
- Theano: Letters of an Ancient Greek Philosopher. Edited by Kai Brodersen. Stuttgart 2010.
- Sandel, Michael: What Money Can't Buy You. The Moral Limits of the Market. Berlin 2012.

## LECTURE II: WHAT IS A UNIVERSITY TODAY?

*Prof. Dr. Hans-Joachim Roth, Dean of the Faculty of Human Sciences, University of Cologne*

In this lecture, I aim to map out some of the changes that have taken place in recent years in universities. I do so on the basis of many years of experience in the development of a degree course, first as course-dean, later as dean of a newly founded faculty. This will be followed by an overview of certain parallels in developments in the fields of both academic

and children's learning processes. In a third section, I shall examine the possibilities available to children's universities of finding their rightful place in the light of today's new challenges.

There has been a fundamental transformation concerning the university as a "universal" place of learning in state hands into a social institution acting in a partially entrepreneurial manner whose aim is to develop competence in the context of training and competitive research participation. Universities are no longer primarily defined in terms of imparting cultural traditions and securing high-level knowledge. Like other social institutions, they are today involved in processes that generate a powerful change-dynamic. The shaping of this change has thus subsequently acquired a far greater importance. The image of an ivory tower – with all due respect to top-level scientists and their need to secure free space for their work – can no longer be the model for scientific work, because newly won liberties within university working conditions are inevitably accompanied by increased administrative tasks. State control at many levels is much reduced in the light of increased university autonomy in the twenty-first century. This, however, in turn requires the development of decision-making and control processes in the universities themselves. This can be seen both as an opportunity and as a burden. Today, universities and faculties thus face the task of balancing out this challenge.

The dynamic created at the research level by the production of knowledge must be accepted as an important factor in the transformation of universities. The liberation from the parameters designed by the state, together with a truly empirical change or reinforcement of science, has led to a greater emphasis on research on the part of scientists. This, in turn, has been encouraged by new guidance instruments. However, because funds available for research have not linearly increased, a stronger orientation towards research and also competition can be discerned among academic colleagues. This development can be clearly observed in the field of externally funded research. Certainly funding available to major research institutions has increased, but not commensurately with the increase in empirical research, as can be seen by the increase in applications for funding projects. In 2012, funding in Germany by the DFG (German Research Association) was raised by 20 million euros. The funding quotas, however, have continued to sink. The same can be observed in the case of EU funding: more researchers are competing for these funds.

At the degree-course level, we are no longer merely dealing with imparting and reproducing canonical scientific knowledge, but rather with profiling degree courses. Where we used to refer to secured and shared knowledge, today we can observe that in our planning processes we are dealing with USP's (Unique Selling-Points). What can a given university achieve particularly well? In what aspect does it have a better-defined profile than other universities? How can it become more efficient? While accepting justifiable criticism of this "race for progress", we should not overlook that it has led to a



much stronger and quantitatively greater imparting of research content in degree courses. This becomes especially apparent when we observe the methodological developments that have taken place in university teaching: while previously one hardly even considered anything other than lectures, seminars, excursions, experiments and practical experience, recent years have seen the introduction of entirely new formats. These range from micro-formats such as tandem learning and individualised learning programmes within blended-learning concepts to the organisation of teaching events with many participants such as Massive Open Online Courses – so-called MOOCs. The current hype about Learning by Research reveals quite clearly that research is increasingly becoming a key element of university training. That is, the production of knowledge as a competency is gaining in significance. It is also replacing the traditional combination of reproduction and reflection.

What does this imply in the context of planning and carrying out children's universities? To start with, I have become aware of something of a correspondence on this matter: take, for example, the already mentioned emergence of learning by research, and it immediately becomes clear that this process has equivalents in other educational areas. Child psychology, as one area, has long since been aware that children are not "unready adults" who therefore have a certain deficit, but that their development takes place according to principles of their own. Children's learning cannot be described by means of any intentionally unfolding reason, any objective spirit. Rather, children possess specific skills and strategies much earlier than used to be assumed. In other words, autonomy and independence are not only an aim but, in fact, already a tool on children's development paths. The popular phrase of the "competent infant" makes this quite clear.

This concept of competency has clearly caused considerable change in this field. (In academic circles, it has become common practice to indulge, as a matter of duty, in "concept-bashing". At the very least, one must suggest that one has reservations about the concept and is, in fact, only making use of it because it has been required in module descriptions since the Bologna reform; or the university management or one's dean's office or some such institution likes to hear it used, its being, of course, per se lowbrow and pragmatically pursuing neoliberal ideologies.) Universities, too, should inform us what competencies they wish to instil in their students rather than setting out aims and themes. What is far-fetched about this? The concept of competency indeed offers us a major advantage in that it does not set out simply what students must achieve by means of their individual efforts, but rather reverses the burden of proof. It is thus not just the individual who has to achieve something, but the educational institution that has to prove it has provided conditions for its students that enable them to achieve what has been set out to achieve. Behind this, there lurks an image of the student which presumes that they can all achieve both in principle and in disposition, provided that their qualifications to study have

been considered and that suitable working conditions have been provided by the university. We are, therefore, setting out from the premise of assuming the competency of young people who are, in principle, competent when they arrive at the university and not “blank sheets”. This is precisely what the accreditation process is there for. The expression “fit to study” in our accreditation applications is not a section which informs us of the individual capabilities of students, but rather a listing of institutional requirements for which one is responsible if one’s academic learning is going to be successful. That is why certain relevant emancipatory and diversity measures need to be listed in detail. The university must prove that is capable of achieving its competencies in taking into account the diverse qualifications of its students. In schools this has for some years now been termed learning capabilities.

The outdated concept of talent began to be criticised and then seemingly buried some 40 years ago, but it took this concept of competency to once and for all put an end to its dominance. Seen thus, competency results in a democratising effect in that it does away with elitist educational concepts. Equally, it undermines any academic predilection for compartmentalisation. Years ago, a situation existed in which the respect accorded to any given field of study was not necessarily defined by its research output. Rather, there existed a respect proportionate to how difficult it was to complete one’s studies in that course. In other words: a high failure rate in exams stood for extreme difficulty, and high difficulty stood for great importance. In contrast, disciplines with low drop-out rates, ones requiring little extra study time and those with high success rates were perceived as being a “doddle”. This has changed, although there are still scientists who bemoan the fact: study success is no longer defined in terms of distinguished rarity. For the vast majority, what now counts is the success quota of the given institution. Subjects with high failure rates now have to justify themselves and provide proof in what manner requirements are accompanied so that they remain, in principle, achievable. The onus of justification now rests with the other side: it is now no longer the fault of students if there is a massive failure rate, but that of the institution. At the same time, the students’ own potential to act autonomously is much greater now. This is, for instance, the case in North Rhine-Westphalia, where there is no longer any required attendance. This can, of course, be discussed critically. My concern, however, is to show that with the popular concept of competency, we have a changed view of students as learning subjects and of academic study at universities. This, in turn, no longer has anything to do with the old concept of giftedness or with an elitist ideal of a free education in the spirit of “masters amongst themselves”. This term for academe, coined by Schleiermacher, as a model for a free university too easily ignores just how limiting a role economic and cultural capital, gender as well as social and ethnic origin play in these “free” educational processes.

We may indeed also discover these processes at other levels within the education system. It all starts with the competent infant. It is, by now, standard at the elementary level to speak of children as builders of their world. In the context of school, concepts have gained acceptance that emphasise, for example, a constructivist teaching-concept. Concepts that emphasise individual activity and self-regulation during the learning-process have also gained acceptance. How often, especially in the media, do we read about children as being active and competent users of the media, not only for their studies but also as an integral part of their daily lives? The concept of the teacher has changed as well: alongside many other models of teachers as moderators or escorts-in-study, the idea of the “reflective practitioner”, as defined by Donald Schön, has certainly exercised considerable influence. This image of the teacher as a practitioner who is constantly assessing and critically examining his or her own teaching empirically in reflective loops before newly adjusting it, emphasises, along with a research orientation, precisely the nature of this process in the development of the teacher: the teacher is never fully qualified and then able to teach according to a set pattern. The teacher rather remains in a permanent process of continued training, incorporating the latest developments in education and school research along with subject-specific findings. The dividing line separating research (at university) and practice (in school) has, therefore, not been done away with, but it has certainly become less impervious. This is all the more true given that, on the other side, at the university one may discover similar processes of a greater practice orientation – principally by means of more practical experience during the course, but also at the research level itself. The major increase of empirical investigation both in educational research and subject didactics has, in turn, not only resulted in raising learning performance, but also led to much more intensive research into school systems by means of interviews and ethnographic methods.

With regard to the above-mentioned discussion concerning responsibility, we may discern a further development: the PISA studies aim their monitoring not so much at pupils’ performance abilities and possibilities for more effective learning. They perceive their objective, rather, as that of “system monitoring”. I.e., they are testing the efficacy of the school system as we know it. They share this focus with the massively increased process of evaluation in education during this century. Although in public debates over so-called “risk-groups”, the problem is still often allocated with the concerned persons themselves, the PISA process is nevertheless concerned with something quite different: the results achieved by pupils serve, in the final resort, to evaluate the efficacy of the education system and to reveal any risks lying in wait that may lead to a systematic lack of success by given groups.

What, then, are the implications for the planning and carrying out of Children’s Universities? As far as I can see, this transformation offers us a real opportunity for this form of social positioning of universities. University is no

longer an aloof and remote seat of learning with enormous cultural prestige, but rather a social institution. Given the growing necessity not only of imparting knowledge, but also of knowledge production, universities are forced to concern themselves more intensively with the conditions provided for the reception and processing of its knowledge base. While accepting this dynamic development of the knowledge base, we must remember that its half-life, too, has decreased, whilst the methodological instruments available for enlarging this knowledge base are becoming ever more refined, albeit ever more complicated. There is no need to recall Karl Popper's postulate that science can only be legitimised in terms of its fertility. If the university is to maintain its connection with society and society's development, it is going to have to open up for the members of society on several levels. We should not overlook the fact that competency in understanding scientific knowledge is now greater, as is the readiness to question it critically, both in society at large and in its specific fields of practice. For example, this becomes very clear in the field of educational research. Even children are much less prepared to accept a statement as true or correct just because an adult, let alone a professor, has stated it be so. This development, namely the questioning of scientific knowledge in terms of its sense, its fertility, its conditions of origin and its consequences, represents a progress of enormous value in the history of knowledge and science. It would, therefore, appear to me to be absolutely essential to lead interested children at an early stage not only to scientific knowledge, but also to its conditions of production.

Like the transition of the universities, the organisation of children's universities faces real challenges. I do not intend to examine in greater depth the altered administrative conditions of academic work, even though they are more than a mere concomitant nuisance. Quite the contrary: they constitute the constitutive prerequisite of a modern university today. More important here, however, is the challenge presented by the afore-mentioned competency orientation. The challenge presented by this, together with the aspects already examined, has a further dimension, and this is of major importance regarding the organisation of learning processes and teach-learn situations. I am referring to a way of handling knowledge that does not merely find expression in its reproduction and in reflection, but rather requires both application and standpoint. I consider this method to be more suitable regarding children's assimilation of knowledge than the old principle of deductive, theoretical knowledge. Right from an early age, children who ask "why" do not really want to hear the reason or the cause: They often tend to just switch off then. What they really want to hear is what the point of something is, what can be done with it, how it fits into their everyday lives? To put it succinctly, they think not so much historically, or backwards, as forwards, functionally. In circles concerned with infant-teaching, it has in recent years become fashionable to regard children as little philosophers. There may be examples of this, but here, too, I remain sceptical. My

scepticism is based not only on my observations of my own children over many years, but also on my various pedagogical experiences in schools and in extracurricular organisations. Children tend, rather, to be little rationalists who want to grasp how a thing functions, what can be done with it, rather than having to comprehend extensive historical-scientific classifications. We have to lead them towards such classifications, and here the children's university can be of great use.

It would be stretching the point too far to maintain that the natural curiosity of children renders them all little researchers. We must never overlook that many children's curiosity is quickly sated. Children possess shorter concentration and attention spans which must always be taken into consideration. It may well be that the researcher who has spent half a lifetime pondering over some problem and then publicises his conclusions in some wonderful book is nowadays the exception. Today, the production of scientific knowledge tends to be more dependent upon the rhythms imposed by the availability of funding: usually some two to three years. This process cannot, however, be applied when dealing with the time perception of children. So we have a real problem regarding how to adapt it so that it may be adequate for children.

However, we already know this from university teaching. After all, students do not have that much time at their disposal. They rather have to complete a complete degree course (up to Masters-level) within a given period of time. Scientists usually regard this average period of time as being too short for research projects. In recent years, we have grown ever more accustomed to defining research and learning by means of periods of time and to breaking them up into their component parts. This methodical framework is a good example of what I am referring to. In my opinion, it is precisely this which presents to children an excellent opportunity to shape small-scale research processes. In these, we are not merely dealing with the reproduction of a known experiment in a school laboratory, but with children's independent planning and realisation. This links up with the project method that has been in use in schools for years. It was devised and defined 100 years ago by Dewey and Kilpatrick and is concerned with real solutions for problems relevant to children's own lives.

This, in turn, would imply that the children's university can in no way merely be some academic recreational paradise in which a programme is offered that has been devised to satisfy child-like requirements. Neither may it strive to be simply entertaining. In fact, we are aiming at communicating what is characteristic and specific about scientific work. This does not intend to distinguish it from the already mentioned project method: becoming aware of a problem, observing it, researching into it, developing a hypothesis that might explain it, methodically examining this hypothesis, registering the ensuing results, critically reflecting upon them and discussing them with others, and only then considering solutions. It is an important task to acquaint children with this long path and to arouse their interest in following it.



Before we simply declare children to be “little researchers”, we must, on the one hand, consider the differing time rhythms into which we divide learning and research processes as well as the differing attention and concentration spans. On the other, we must also consider that of children’s different interests in order to achieve a matching of research and children. Children are indeed capable of concentration when a topic catches and interests them. However, they concentrate in a different manner and also differ in the way they focus their attention in any given direction. Allow me to relate something I actually experienced about ten years ago.

It concerns an enquiry into the linguistic developments at a German-Italian bilingual primary school. We conducted conversations with several members of staff in both languages at the beginning and at the end of the school year. Our aim was to find out how their bilingual fluency was developing. At some point, a teacher asked me whether I might not visit the school, as the children were interested in what we were up to and what we were doing with the recordings. Having, at that point, just completed a report, we resolved to shorten the presentation of the results and make space for the children’s viewpoint, all of whom were at the beginning of their third year. To this end, we shortened the texts on our overhead transparencies a bit and relieved them of a lot of specialist jargon; we slightly simplified the statistical tables and illustrations, but only marginally. The setting was the standard one for lectures: the children listened for about 30 minutes and then there was a discussion. Although we invited them to ask questions whenever they liked if they had problems understanding, nearly all the children listened attentively. Their ensuing questions revealed that they had indeed listened closely and sometimes linked up ideas that had been mentioned at differing points in the lecture. Towards the end, we noticed a slight unrest in one corner of the room which culminated in one pupil impatiently raising his hand. He asked me something I had not expected at all, in a stormy state of excitement: “Are you really a real professor?” He had hardly finished before I was faced with an even greater disturbance: chairs were shifted, concurrence was loudly voiced, some pupils called out: “Yes, exactly!” In order to comprehend this obvious change of mood, I began by asking back why he might think I was not a real professor. Accompanied, once more, by further agreement, the reply was: “Because you haven’t got white hair, a long beard and don’t wear glasses. And, you haven’t got a white coat on!” The teacher appeared somewhat mortified and wanted to intervene. It was clear to me, however, that the pupils were far more interested in something quite different from what was going on in the research project – they were concerned with digression from norm expectations and with images requiring a perception dissonant within the given situation. It must, of course, be added that this school was in a socially disadvantaged part of the city and most of the pupils came from families without much cultural capital. This we had already assessed. They simply wanted to know what a professor was, whether he was

a perfectly normal human being, whether he, too, had children of his own and whether they, too, had to attend school or were able to learn entirely at home. They wanted to know what a university looks like and whether I did, in fact, don a white coat when there, etc. We then devoted the rest of our time to discussing these matters.

The children subsequently left – belatedly but clearly satisfied – for their break. There is something else I learnt from this: even younger children are capable of concentrating on complex issues for longer periods of time. They are also prepared to put other matters aside in order to do so. They nevertheless do not let go of other questions that latently interest them and eventually request that these, too, be addressed. School socialises us to focus our attention and blend out what is deemed trivial. At university, we expect questions always to be pertinent. However, we also know that there are many questions which pupils, and later students, never ask for fear of appearing incompetent. This socialisation remains problematic because the craziest chance or brainwave can play a major role in regard to discovering connections in matters of research. The most creative ideas are not necessarily born when faced with a blank piece of paper or with freshly prepared test tubes. They rather tend to occur by chance, during interaction, for instance thanks to totally unexpected questions.

The second important thing I thus learnt was that for children, the university remains, more or less, terra incognita, even when, as is the case in Cologne, it is situated fairly centrally. It is impossible for them to form an image of it if they have no opportunity of getting to know our institution. Equally, it was valuable for me to see just what images dominate in the minds of children concerning the people who work at universities. I am not relating some experience dating back to the nineteenth century, but to one experienced in a major university town at the beginning of the twenty-first century. Even here and now, I received from the children an image of the professor that had no empirical relevance to reality even when I was a student. Even in TV programmes on scientific topics, the majority of professors onscreen hardly live up to this image. We all know that research is often seen in connection with laboratories. But this image of the professor with a long beard together with white hair and glasses – not to mention female professors! – reveals at an iconic level how children process commonly accepted images of given professions. It also reveals what preconceived images a children's university is dealing with. This remains true even in cases where children are so well socialised that they perhaps no longer feel any need to ask questions. And it displays how children process social positions in society as a whole.

I would like to depart from my example and conclude with an examination of some of the challenges facing universities today. At the beginning, I mentioned that universities have in recent years acquired greater autonomy, not only as regards study and research, but also as regards how funding be spent: financial autonomy. This entails not only major advantages, but also major responsibilities. Although this is a matter for constant and controversial discussion, the

majority of universities in North Rhine-Westphalia feel that the advantages of this autonomy outweigh any disadvantages. In my opinion, a slim book by Jan Masschelein and Simon Maartens provides a balanced discussion of this question. In the book, the authors survey what they call the “European Educational Area” at the university level and confirm what has meanwhile become a thorough economisation of this area. This is discussed less at a discernible level and more, in great depth, at the level of the concerned individuals. Masschelein and Maartens speak of a fundamental transition in the relationship of universities to their students, who are now referred to as customers. At the beginning, I referred to the fact that rivalry and competition were now key planning criteria for universities. The introduction of so-called credit points as the currency of a study course points in this direction. However, in Germany a somewhat retro concept of “performance points” dominates. Our two authors – trained by Michel Foucault to analyse bio-political processes as being a “regime” – emphasise the contrasting view of this attitude, namely that students are no longer perceived as “objects waiting to be instructed”, but have become “responsible, independent partners”. (Masschelein/Maartens 2005, 18).

“The learner is, thus, himself responsible for what he learns and for the development of his human capital. However, he does sign a contract with others as regards what the given learning-environment has to offer. This environment, in turn, allows the learner to achieve and to increase his potential, his capital. Hence, the instructing instance is now providing a service” (ibid.).

The growing attribution of autonomy, self-responsibility and independence to the individual (p. 21) learner is thus the counterpoint to a study concept emphasising the hierarchic pupil-master relationship. This, in turn, leads to a changed relationship of individuals to themselves: they thereby learn “to develop a productive, entrepreneurial relationship with themselves”. But this equally applies to the institutions – to schools as much as to universities (ibid.).

We can observe this transition at times when tangible economisation developments are in progress. One example may serve to illustrate this: in 2007, the introduction of study fees (or “study contributions”, as they were somewhat euphemistically termed) in North Rhine-Westphalia, resulted in a totally changed relationship of interaction at our university. Students began to make demands and expressed criticism not as strongly as in former times on political issues, but rather concerning their study environment. They demanded conditions that allowed them on the one hand to study within the standard time spans, and on the other the freedom to take the time they needed themselves. The latter proved to be the case particularly at the Masters level. The reason given for these new demands was that they were paying for what they were being given. So the university adapted to this new situation and set up what they called “quality-management units”, which were able to react effectively to these new processes. These units initiated lecture and course evaluations and also





began setting up several service-oriented support and advisory centres, for example the Student Service Centre. They also organised completely new possibilities for self-learning in the fields of e-learning and blended-learning. They expanded the available IT structures and created areas for individual and small-group learning.

The “contracts”, as Masschelein and Maertens call them, are subject to close judicial scrutiny in order to ensure the positions of the respective partners (i.e. they have to be able to hold their own in a court of law). Such scrutiny is standard procedure in the business world. As a result, examination regulations have increased threefold.

We can thus see that an economisation of education is not necessarily only about money and economy. It rather pervades the system organisationally within a few years and even influences the role structures of those involved in this system. One might, at this point, emphasise the equalising effect of the economy: relationships are no longer established by some already existing hierarchy. They are rather established by virtue of the transformation potential of the available



*Impressions of: G\_L\_A\_S\_S\_music*

*A project group of the Cologne Children's University and the Ensemble musikFabrik (conducted by Melvyn Poore and Axel Porath) performed an impressive concert with special glass instruments*





capital. However, we must not forget that this fair ideal of equality on a free market cannot prevent social and educational inequality resulting from differing capital available: it is more likely to reinforce this inequality.

At this point, it is the job of the education system to help improve things on all levels: this begins with education and support in schools during childhood, but is true also with regard to university. The increase in the number of students at universities entails an increase of the level of academic education in our society. But at the same time it remains the duty of universities to be geared to a greater number of students, all of them requiring a changed form of support. I do not intend at the end of my talk to pursue this aspect in greater depth. I prefer to bring in my own experiences in primary school here in Cologne, to point out that here, too, children's university has a contribution to make: that of affording children and young people a glimpse of this academic world which they would otherwise not acquire. This in turn means working not only with the so-called highly gifted who are probably able to gain their bachelor at the end of their schooldays in any case. Such young people are highly-prized, but a university that aims to be more open towards society is bound to think in broader terms: it must, above all, give as many children as possible an idea of and a feel for (a) how the world of science functions, (b) how the processes of producing knowledge develop and (c) how exciting this process can be. It must also, of course, make clear that this requires hard work and a lot of time. It is never enough just to don a white coat and set up test tubes. It has to begin with observing the unexpected, the not immediately explicable and, thirdly, the hindrances resulting from our expectations of normality which, in turn, lead to questions such as: "How can this function better?", "What do we need this for?", "Where does this come from?", "How can we change this?".

Part of this new process, moreover, is to permit questions about beards and glasses. Right from the outset, one of the key tasks of scientific work has always been to interrupt the stream of normality by means of questions, to call into question any claim that the world simply is the way it is.



*Panel discussion: Why we do (not) have a children's university.*

*Moderator: Manfred Höffken*

*Journalist, former editor of the West German Broadcasting Company (WDR).*

## PANEL DISCUSSION: WHY WE DO (NOT) HAVE A CHILDREN'S UNIVERSITY.

### Statement I

*Dr. Josef König, Former Head of the Press Office, University of Bochum*

One is tempted to tell universities and institutions of further education to just “stick to the job”. Old-fashioned as the saying may sound, not everything that is up-to-date is necessarily worthwhile. There is no need for universities to madly chase after every fashion. This is especially true with regard to Children's Universities. The functions of a university are laid down by law: research, teaching and – more recently – technology transfer. The universities are underfunded by the German states responsible for guaranteeing these functions. And yet, underfunded as they are, the universities burden themselves with additional functions such as Children's Universities, which do not belong to their core operations.

In Bochum, where I served for some time as the university's press officer, six regional universities co-operate in a joint children's university. For two days every two years, the Auditorium Maximum of Ruhr University Bochum is populated by some 1,800 pupils from local primary schools. The children are offered a mixture of lectures, performances and interactive sessions. Professors pretend to be show-hosts, research fellows man the stands, janitors heat the rooms and act as ushers. In addition, for months whole teams of marketing specialists have been in action planning, securing personnel and venues, printing and distributing posters and flyers, sending out press releases, carting chancellors or vice chancellors to podiums to welcome one and all. All this results in costs, conservatively estimated, of somewhere between 50,000 and 100,000 euros.

Of course children's eyes glow bright, the noise-level rises. The university has its own fascination. But let's be honest: are primary pupils really a university's main target group? Is it really the job of a university to entertain small children using the costliest appliances and highly-paid specialists? Do they have nothing better to do? I doubt it. I doubt whether such activities have any lasting effect, or that children really learn anything, let alone are animated in any way to start their own research, puzzle over things for themselves. I doubt whether one single primary school pupil has ever been motivated, as a result of all this, to come and study at this university later on.

In the meantime, these funds are lacking elsewhere in the universities. Rain seeps through the ceilings, 500 or more students cram into overfilled lecture halls, hanging around in unaired corridors, waiting for too few individual tutorials. Technical equipment for teaching and research is lacking and the student–professor ratio is 1:80 or 1:90. That

is the bitter truth. Yet in the meantime, universities indulge in marketing, upgrade such departments, treat themselves to Children's Universities and other all too dear activities. All this ensures splendid photos for TV and news magazines, and they are in the media for a fleeting day.

## Statement II

*Susanne Kretschmer, Doctoral Candidate, University of Bonn*

The children's university is often the subject of criticism, despite its huge success: no lasting effect, elitist, the lecture as a form useless when working with children, children being misused as marketing tools for universities – these are but some of the charges levelled against this institution.

Unlike schools, children's universities offer forms of informal learning. Thus, it is inappropriate to expect lasting effects in the form of an examinable acquisition of knowledge. On the contrary, the format thrives specifically on its voluntary nature, on its openness, together with the thrill of delving into exciting and "adult" realms. The children's university offers an incentive to pursue such explorations into complex materials and reveals the world of academic ritual. It fosters curiosity and broadens horizons (and thus it is comparable more with pedagogical work carried out with children in museums than with school). My study reveals that all children, the exceptionally talented as well as the socially disadvantaged, profit from participation in the children's university and experience this as a personal enrichment. Each child assimilates the experience individually. The educational value of the children's university rests precisely in this liberty and is thus in concordance with the Humboldt ideals.

Focusing on lasting effects with regard to any acquisition of knowledge is based upon a misunderstanding, namely that the children's university serves a political campaign in support of scientific and technical disciplines. In addition, it is often claimed that children's universities are merely compensating for deficits in primary and secondary education, thus evading further PISA shocks. The children's university as an institution is not there to support any political programme, but rather represents the university as a social institution. In an exemplary manner, it displays by means of the typical structure of the lecture what university represents: public accessibility, a variety of disciplines, commitment to veracity and neutrality. Along with other public relations work in universities, the aim of the children's university is to reveal their institutional value to society and to protect their autonomy as places of public reflection.

The lecture is far from being an outdated didactic form – quite the contrary. It maintains its legitimate position, alongside other forms. Ideally, it can, as Schleiermacher expressed it, "excellently display scientific thinking by making use



of the object in question while ... explaining the construction of the object". It thus provides a compact overview over any particular field of knowledge. Given that the target group is composed of children, the lecturer is forced to employ extreme clarity and vividness; thus scientists, in turn, learn to express themselves intelligibly while remaining academically correct. In this manner, the children's university can claim to do its bit in helping develop successful forms of popularising scientific research. This, again, leads to greater participation in science by further sections of society. The need for high-quality discussion remains central against the background of the "medialisation" of the sciences: thus, far from being the concern merely of university press offices, the children's university should rather be that of the pedagogical faculties themselves.

### **Statement III**

*Dipl. Journalist Pia Schreiber, Jade University, Wilhelmshaven*

The presented project focusses on Children's Universities and their sustainability. My theoretical research is supported by a field study in which I worked together with two scientists and several groups of children, analysing the sustainability of the scientists' lectures and the impact of a didactical training for the scientists. I did in-depth interviews with the participating children and scientists. Moreover, I sent a questionnaire to the organisers of children's universities to obtain a wide data base about the different projects. One of my main results is that science communication for children can be done in at least three different ways – scientainment, scienceperience or scienceteaching: The term scientainment describes a rather passive way of science reception in which science is communicated in an entertaining way. On the one hand, many people think critically about this form of science communication because they see the danger of a trivialisation and even falsification of important content in favour of entertainment. On the other hand, there is the positive aspect that, through scientainment, one can reach people who otherwise would never hear anything about science. The term "scienceperience" describes an active form of science reception. It means the communication of science with the help of its very close experience, leading to a better understanding and internalisation of content. In the sense of scienceperience, children experience science while trying out experiments on their own. Scienceperience is therefore a very direct form of science communication which cannot reach a mass audience and provides depth rather than broadness, which does not mean that it cannot be entertaining. Scienceteaching refers to the way science is communicated mostly in schools, where teachers only teach in a one-way direction, providing information and talking without interaction or a hands-on approach. One of the leading quality characteristics of science communication is sustainability.

These three forms of sustainability can be summed up as follows:

1. Sustainability with regard to content  
Children remember very well and for a long time the content of a presentation and are able to use their knowledge for further learning processes.
2. Emotional sustainability  
Science communication which is emotionally sustainable is able to awake enthusiasm for a topic so that the recipient wants to know more about it and goes on being interested in it.
3. Sustainability with regard to the system

This form of sustainability is reached when you manage to link all the different parts of the system of science communication with each other and let them enrich each other. This calls for children's universities that cooperate with schools, teachers who use television science programmes for children and additional programmes which accompany children and adolescents until they start their studies. The goal is therefore not only the communication of science, but also the systematic scientific input up to the start of studies and the provision of a broad understanding of what science is and how scientists work. After my empirical analysis, I was able to conclude that children's universities do not utilise their potential regarding sustainability and the different people involved in the project have different expectations.

## Statement IV

*Michael Seifert, Präsident European Children's Universities Network (EUCU.NET)*

Over the past 12 years, universities have offered the study format children's university alongside other formats. They have done so because of a desire to present themselves as institutions open to dialogue, thus fulfilling the duty to present their work to society at large. In this manner, children can formulate scientific questions and become acquainted with scientific methods at an early age. They encounter professional "scientists" and even "science" itself. Scientists, in turn, are thus able to reach out to aspiring scientists. Of decisive importance is that children are thereby helped to overcome any hesitancy or trepidation they may feel with regard to future academic study and so acquire a fear-free approach to university while still at school.

Two aspects are gaining steadily in importance: many tertiary institutions are making an enormous effort to reach out to educationally disadvantaged social strata by means of such children's universities, thereby motivating these children to subsequent academic study. Viewed internationally, Germany definitely lags behind in this field. Secondly, universities are now determined to more strongly involve children themselves in the further development of children's universities, thus lending them a voice of their own within the institution university.





*Participants willingly seized the conference's opportunity for social networking and deeper discussion of the day's topics.*



## LECTURE III: COLOGNE CHILDREN'S UNIVERSITY. IN TOUCH.

*Ursula Pietsch-Lindt M.A., General Manager of KölnerKinderUniversität from 2003 - 2014, University of Cologne*

In 2008, the University of Cologne adopted a so-called CLAIM, or slogan, as it is more commonly termed. This slogan aimed to poignantly highlight what is special about the institution. Experts finally selected: "University of Cologne. Good Ideas. Since 1388." The children's university in Cologne entered into the spirit of this slogan and in turn formulated: "Cologne Children's University. In touch. Since 2003." This recourse to the university at large by children's university participants associates childlike playing habits such as creeping up on or catching up with someone and possibly startling them. Or pretending, a classic element in the behavioural repertoire of childish imitation.

What happens if this message is not to serve merely as a PR slogan, but as motto, as a key motif? What do we mean by "In touch"? What are we aiming at? Is it meant both temporally and spatially? In other words: "We, the children's university students, are at your door. In about 6 years, we will be inside!" Does "In touch" mean the immediate proximity to this – our university with all its stipulations: institutional, scientifically-strategic, educationally-theoretical and economic? Or does "In touch" refer rather to children's university's basic orientation towards the classic model of a university in the tradition of Humboldt?

"In touch" also, however, clearly implies the difference from the original CLAIM, or slogan:

1. The temporal difference, 1388/2003, is clearly recognisable.
2. The spatial difference: space and the aims of children's university are delineated by a relative indeterminacy, for it is indeed in touch, but its accessibility remains uncertain.

This indeterminacy has its origins in the lack of any spatial presence of children's university in the educational sphere. In our invitation to this conference, we already mentioned this spatial indeterminacy. Children's university has no curricular structures; it is not tied to any institution. The term is in no way protected – anyone can offer a children's university: a tourist office or a sport club. In other words, it is unpretentious in the demands it makes. In addition, children's university cannot claim to be a part of the standard extracurricular education repertoire, often defined as "extracurricular advancement" of children and young people. Most such work concentrates on the so-called "creative" subjects such as music, theatre, art, tapping the abilities of experts outside of school.



So where, then, is this “other place” which is children’s university?

We might term this spatial indeterminacy in relation to the usual educational institutions as OTHER PLACES in the sense implied by Michel Foucault. With this aim in mind, he coined the term heterotopia. In his radio lecture in 1966 (Foucault 2005), he describes this spatial indeterminacy as follows:

“Amongst these several spaces there are those which differ totally from the others, which, indeed, refute and to a certain extent even cancel, replace, neutralise or cleanse them. These places are, thus, OTHER PLACES” ... “created in a person’s head” ... “in an in-between place”, between their words, at the heart of the tales they relate, or in some indeterminate space of their dreams, in the caverns of their hearts; in other words, in the shady glades of Utopia” (p. 9).

As examples for such other places, he names psychiatric clinics, old people’s homes, prisons, Jesuit colonies, barracks, cemeteries and cinemas, as well as theatres, museums and libraries – i.e. specific spaces that have describable and definable tasks to perform. These, however, have in common that they override the intended tasks in favour of counter-forces that they unleash. Heterotopias thus acquire, on the one hand, spatial concepts determined by actually existing spaces while on the other hand rejecting them at the same time. They thus create a threshold situation which enables access to and from other spaces.

I am prepared to stake the claim that Cologne Children’s University is just such another space, a heterotopia contrasting with recognised, standard educational spaces. Allow me to examine to what extent this claim is justifiable.

First, why? What does the heterotopia hold out for this non-place, “children’s university”? Can children’s university be comprehended in terms of its being a threshold to what is “other”, both in terms of school and of extracurricular education? And would it then be this very surplus which has rendered children’s university viable, or even capable of survival? Is this precisely because it allows for an extended definition of what education is by virtue of its being a “counter-space”?

Before we settle upon any agreement on this question, our concept requires a more specific definition. Heterotopia always means the relational space, i.e. that space which people determine as a result of their relationship with points, elements, things and other people. They thus set out to establish placements which “do not lead back to one another and which are incapable of joining together” (Foucault 2005, p. 38).

Foucault describes his heterotopias by formulating their principles. Allow me to name 3 of the 6 principles regarding Foucault’s heterotopology which I believe to apply, at least in part, to the children’s university.

1. (Foucault's 4th principle): Heterotopias stand in a relation to temporal faults. As examples, he names museums and libraries which endeavour to exist outside of time and which strive for an eternal archive; he also mentions events such as fairs which aim to suspend normal time perception.

(Regarding 1): With its compact programme, that of a sort of "festival", Cologne Children's University displays aspects of a temporary heterotopia. It takes place not during school hours, but rather outside normal working hours, such as in the evening or at weekends. Courses, projects and the like in no way subscribe to a regular "school lesson" timetable. Indeed, most things on offer ignore temporal factors such as frequency (no limit on how often any individual attends different events), age-limits (young people can take part in any project that interests them) and transcend standard limitations, thus highlighting the unusual time structure.

2. (Foucault's 5th principle): "Heterotopias possess a system of opening and closing which isolates them from their surroundings". I.e. tickets for entry are required, there are ushers and rituals. These are spaces which are at once completely open, yet remain separate and closed off. Foucault uses as an example the South American house of the eighteenth century. These remained ostensibly open to all passers-by, but in fact one had access only to one room. In this, one could stay while remaining unable to enter the interior of the house. In other words, callers easily deluded themselves that they were welcome guests.

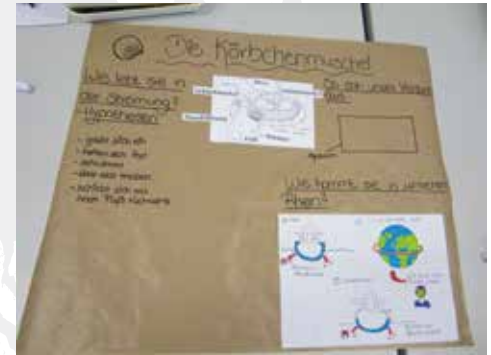
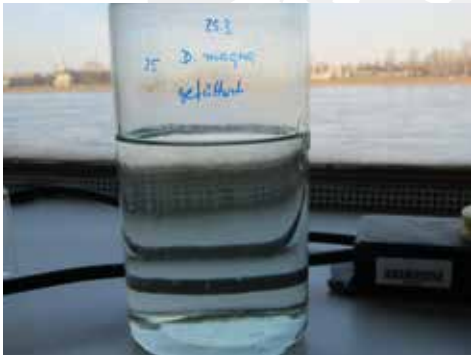
(Regarding 2): Are children's university students in precisely this situation? Their "study book" functions as a sort of ticket of entry – yet even this is actually a "sort of", for they are not regular students but remain guests. Nor are they really registered: they have thus erroneously succumbed to a semblance, the false assumption that they have been welcomed in as guests. Thus, they too have access to a room – at the front – without truly being inside.

3. (Foucault's 4th principle): a heterotopia possesses the ability of being, in but one place, several rooms, can fuse several in themselves incompatible placements into one." It can also, for example, "reveal, render visible a number of places which are totally foreign to one another".

(Regarding 3): The programme on offer at the Cologne Children's University enables a shifting positioning, a counter-positioning context in alien and unusual spaces not normally intended for such use, within which courses of action can be set in motion. Perspectives of fields of study do not so much fuse, in any scientific or interdisciplinary sense. Rather, transdisciplinary access is enabled.

I would like to name five concrete examples from the current Cologne Children's University programme, which you can find in your conference folder, that might be described as being heterotopias.

# 1. Ecological Rhine Station



The so-called Ecological Rhine Station is a former river ship whose upper decks are used as a research laboratory by the aquatic research department of the Zoological Institute: particularly, invasive animals are studied, species that newly entered the Rhine.

The children's university offer is devised and carried out – in competition, what's more – annually by student-teachers especially for ten to twelve year-olds as a structured teaching unit. The children are able to experiment with water-fleas, study basket shells and other insects. The best teaching unit is then realised in the form of a workshop. Here, we have a fusion of the following distinct factors: fixed teaching structures on board a ship, "an undulating space" that represents Foucault's heterotopia in a nutshell (Foucault2005, p. 46).

The children's university students thus experience an unsettling space within the surroundings of the city of Cologne that they know so well. They take leave of their own terra firma.

They have to be prepared to enter into the spirit of this new learning space, motivated by their own biographical experience. This, then, affords them the opportunity to discover a, for them, new world of knowledge. However, they do so within accustomed learning structures, with their ordered procedures and yet in a totally new environment. What's more, they make use of previously unfamiliar tools and methods. As one youngster wrote: "I once saw water-fleas at home and want to know whether they can really run on the surface of the water."

## 2. Seismological Station



The Seismological Station also represents a heterotopia. This research station is situated in a poky former family home that affords the children a certain sense of security. The station's prime objective is to scientifically register and evaluate earthquakes in the northern Rhine area, its theme thus being the instability of the tectonic structures beneath the surface. Here, geologists use the latest technical processes to register even the tiniest movements of the ground. The children's university students, in turn, now experiment themselves, right here where researchers collect data, using scientific methods. The students use hammers to make the ground about them quake, place seismographs into the ground. They can then follow on the seismograph how the movements they have themselves caused are reflected on the seismogram. The research station mutates into a social space within which they can experience sensually their own energy. In addition, they thus discover the historicity of science: for example, the simple seismograph with its cylinder, paper and stylus, the pendulum seismograph which is no longer in use. This way, students become aware of the never-ending process of research.



### 3. The glassblowing workshop attached to the Inorganic Chemistry Institute



Here, children's university students experience how an everyday commodity they know well is used to produce varying glass receptacles in an unusual context. In this particular glassblowing workshop, the focus is on the functionality of glass.

Which instruments and appliances do I need in order to measure, to heat or to filter? Which specific apertures and coils are required for which experiments? Do all chemists require glass receptacles? Along with this knowledge, they also learn about becoming a master glass maker and about the required training. In this specific space, devoted to providing equipment required for research, children's university students are provided with glass tubes which, on this occasion, are not intended for use in the chemistry institutes but are rather put to a new purpose: bought into a tonal progression similar to that of a xylophone, they can then be used to compose a melody. Spaces thus overlap, the sound produced acting as stepping stones to a musical experiment.



## 4. Drama at the University Clinic



Knowledge concerning the emergence of disease and its treatment is normally to be found within clinical confines. At school, the focus is to transmit knowledge about health. At the Cologne Children's University, things are quite different: here, all concerned are expected to have the courage to take up the challenge of "Truth or Dare?", developed by "SiS Catalyst" (Science in Society <http://www.siscatalyst.eu/>), making clear that it is not just "fun" to focus upon controversial themes. For example, the project "Expedition Cancer" created a counter-space within which biological-medical knowledge from the lecture-hall became, by means of theatre improvisation, a story which, in turn, led to a book.

## 5. Grandparents' Living-Room as temporary museum



In this field-study project called "Tales from the Living-Room", children's university students research objects and their origins, the actions and rituals of their grandparents' day-to-day lives in their living rooms. Thus, they experience a space for what it is, its noises and other phenomena. Ethnologists acquainted the children's university students with the methodology of the questionnaire, of participatory observation. In the meantime, art teachers did the same with the artistic strategies of aesthetic research: photography, observation, description, collection, organisation, archiving and making up stories.

The research work first of all created a certain disorder and re-arrangement in the living rooms concerned. However, a new order was subsequently created for the objects considered important by the children, for a brief while, in the museum.

## Conclusion

What is the value of all this, what benefit for the children's university as counter-space? All the examples described above of the children's university as heterotopia create new spaces of interaction by virtue of their questioning other spaces. They thus enable children's university students to collaborate on creating ever new arrangements of spaces, tasks and relationships. They create new, different areas of encounter for their natural curiosity. The children's university students experience individual encounters with professions they had not previously known, together with ways of accessing knowledge, and begin to formulate questions they then put both to the phenomena themselves as well as to the scientists. In a "learning process relative to the here and now" (Rauschenbach 2012), they experience how to gain access to a world they are going to need if they are going to lead independent lives within our complex, knowledge-based society – regardless of their scholastic or academic qualifications.

In conclusion, let me return to Michel Foucault: he explicitly terms children as being aware of these counter-spaces and names, for example, "the Indian wigwam in the attic" (Foucault 2005, p. 10). He means, of course, their ability of being at once at home within a given and physical structure and also far, far away, their ability to imagine foreign styles of life and to act them out. However, he adds the following caveat: "These counter-spaces have not, to be honest, been created by the children alone. Indeed, I believe children never invent something. It is rather the adults who have invented the children and have whispered their wondrous secrets into their ears. The adults are subsequently amazed when the children then trumpet these selfsame secrets out loud" (Foucault 2005, p. 11).

If the children's university succeeds in this process, whereby children's university students raise their own voices, ask their own questions, trumpet them out, as a result of the scientific messages picked up at that very children's university, then the children's university is indeed "In touch" with education.

## Bibliography:

- Michel Foucault: Heterotopia. The Utopian body. Two radio lectures, translated by Michael Bischoff. Frankfurt/M. 2005
- Ariès, Philippe: History of Childhood. Munich 1978.
- Michel Foucault: Of Other Spaces. In: Barck, Karlheinz et.al. (Editor.) Aisthesis. Perception Today or Aspects of a new Aesthetics, Leipzig 1992, P. 34 - 46)

Michel Foucault, Of Other Spaces, Heterotopias

<http://www.foucault.info/documents/heteroTopia/foucault.heteroTopia.en.html>

Thomas Rauschenbach, A Fresh View of Education. In: Impulses (Research magazine of the German Youth Institute) Nr. 100,/2012; Munich 2012

„Truth or Dare?“ <http://www.siscatalyst.eu/lodz>

Documentation: „Forum of experts on the acceptance of out-of-school education“ 13.12.2011 Berlin. Publ. Federal Ministry for Family, Seniors, Women and Youth, Berlin April 2012.

## KEY NOTE: HOW AND WHY DO WE GET STUDENTS FROM FIRST GENERATION, LOW INCOME TO HIGHER EDUCATION?

*Ngondi Kamatuka, Ph.D., Director of Educational Opportunity Programs, School of Education, Kansas University*

### Introduction

Guten Morgen!

I have been invited to give a talk on the access and success of low-income and first-generation college students served by the University of Kansas's Center for Educational Opportunity Programs (CEOP). The United States Department of Education defines low-income as an annual income of 33,525 USD for a family of four, and defines the first-generation college student status as that neither parent of the student possesses a four-year college degree.

In keeping with the theme of the conference, the thesis of the presentation deals with the overarching question of why it is critical that universities open their doors to low-income and first-generation college students. Perhaps, more importantly, the question should be, how does society benefit from the inclusion of low-income and first-generation college students in fulfilling the mission of any university?



I serve as the director of the Center for Educational Opportunity Programs of the Achievement and Assessment Institute of the University of Kansas. I will share information on the mission of the University of Kansas and how CEOP fits into this mission as well as address the underlying thesis of the afore-mentioned question on why institutions of higher learning should welcome low-income and first-generation college students on their campuses.

Although CEOP serves students of all ages, and given that European children's universities serve younger children, my presentation focuses on the age group of 6th and 7th graders served by the University of Kansas Educational Talent Search Program. Having said that, the objective of my presentation this morning is to touch on the following areas:

1. A historical perspective on the participation of low-income and first-generation college students in higher education in the United States
2. Mission Statements
3. Relevant Data
4. Summer Programmes

## **Historical Perspective**

In 1954, the Supreme Court of the United States of America in the legal case *Brown versus the Board of Education* ruled that racially segregated elementary and secondary schools were inherently unequal. This action of the Supreme Court led to the integration of public schools in the United States (Kahlenberg 2013).

The launching of the Sputnik satellite by the former Soviet Union on October 4, 1957, caused our nation to put more resources into the study of hard sciences and foreign languages in our schools. This action provided massive support for the gifted student education programmes. The heavy investment in these areas resulted in a large number of students not adequately served by the educational system, leading to this group, the majority of whom were low-income and first-generation college students, not receiving quality education. This forced the nation to question if there were any benefits to society if the nation educated the few, the gifted students.

In his first State of the Union Address in 1964, President Lyndon B. Johnson declared "an unconditional war on poverty that . . . we cannot afford to lose." A task force was established and prepared legislation to "begin the attack that the Johnson administration declared would forever eliminate poverty from the richest nation on earth" (Grout 2003).



## University of Kansas Mission Statement

**Instruction:** The university is committed to offering the highest quality undergraduate, graduate, and professional programmes, comparable to the best obtainable anywhere in the nation.

**Research:** The university attains high levels of research productivity and recognises that faculty are part of a network of scholars and academicians that shape a discipline as well as teach it.

**Service:** The university first serves Kansas, then the nation and the world through research, teaching, and the preservation and dissemination of knowledge.

**International Dimension:** The university is dedicated to preparing its students for lives of learning and for the challenges educated citizens will encounter in an increasingly complex and diverse global community.

**Values:** The university is committed to excellence. It fosters a multicultural environment in which the dignity and rights of the individual are respected. Intellectual diversity, integrity, and disciplined inquiry in the search for knowledge are of paramount importance.

## Center for Educational Opportunity Programs Mission Statement

The mission of CEOP is to empower historically underrepresented and economically disadvantaged students to advance their achievement in higher education. CEOP strives to increase academic success, college access, and graduation rates by using research-driven strategies to assist individuals in overcoming financial, academic, social, and cultural barriers to higher education. Our mission complements the overall mission of the University of Kansas to educate leaders in a global community.

## Wyandotte County Data

“Today, more than ever, education equals opportunity. In fact, college-level learning is now seen as key to individual prosperity...” (Lumina Foundation 2012). This may be true. However, there are so many barriers society has failed to erase that render this statement hollow. The target area served by the University of Kansas Educational Talent Search Program is Wyandotte County, located in north-eastern Kansas. Specifically, the students served by the Educational Talent Search Program reside in Kansas City, Kansas, which is located in Wyandotte County. The data presented in the following tables give the challenges faced by students in Wyandotte County. Table 1 shows the educational attainment of Wyandotte County.

USA	KANSAS	WYANDOTTE COUNTY
Less than 9 <sup>th</sup> grade 4.87%	3.65%	30.3%
9 <sup>th</sup> to 12 grade, no diploma 7.65%	5.86%	Not Available
H.S. graduate including equivalency) 27.07%	24.96%	Not Available
Some college, no degree 22.10%	24.96%	11%
Associate Degree (2 yr) 8.44%	8.37%	Not Available
Bachelor's Degree (4 yr) 19.18%	21.27%	Not Available
Graduate / Professional Degree 10.70%	10.86%	Not Available

*Sources: Kansas Kids Count Data Book, 2011; Kansas Statistical Abstract, 2011; US Census, 2009 American Community Survey; US Census, 2010; Alliance for Excellent Education, 2010; Kansas State Department of Education, 2011; Center for Educational Opportunity Programs Survey, 2011.*

The data of the target area, as shown in Tables 1 and 2, do present enormous barriers on access and success for students in the target area. Low educational achievement, poverty and high dropout rates present major impediments of educational access by low-income and first-generation college students. How can parents help their children with course selection, so that their children can take a rigorous curriculum? Who are the role models for these students? Who can help them with the university application process? Who might help them with the cumbersome, complex financial aid application process?

These questions are at the heart of the access and success problems faced by low-income and first-generation college students into higher education. As Vincent Tinto (2013) argues, access without support is not opportunity. He goes on to state that because many low-income and first-generation college students lack appropriate academic and social support, making them unable to translate the financial support they receive through the Pell Grants into college success.

## Research:

Waindotte County (Kansas) \*

- ▶ 35% of families live at/below 150% of poverty
- ▶ Low-income - family income at 150% of poverty level (\$33,525 for a family of four)
- ▶ 56% households with children under 18 receive food stamps
- ▶ 55% persistence average (2006-2010)
- ▶ Dropout rate 14% (versus Kansas 5%)

When we talk about access to and success in higher education, it is critical that we ask ourselves the following questions:

1. Is the university climate one that fosters full participation of marginalised students in all the activities of the university?
2. Given their socio-economic status, do we expect them to perform well in our classes?
3. Do we believe in them?
4. Are they truly full-fledged members of the academy?
5. What support system do we provide once they are on our campuses?
6. Does the university curriculum teach all students the contributions made by ethnic minority scholars?
7. Are our universities really welcoming of low-income and first-generation college students?

### Academic Under-preparation

Low-income and first-generation college students are woefully underrepresented in rigorous curriculum. On average, they score low on the standardised tests. The main reason for this is the lack of participation in rigorous curriculum. Research also shows that low-income and first-generation college students are less likely to partake in academic and

social activities which lead to success in college (Yang/Kesar 2009). As Table 3 shows, academic under-preparation has led to a high dropout rate of 21% for the low-income and first-generation college students in target schools. The college-attending rate of 25% for low-income students is unacceptably low.

## Lack of Pertinent Information

The college application information does not trickle down to low-income and first-generation college students from the school guidance counsellor's office, and definitively not from parents. College campus tours are unheard of, and low-income and first-generation college students see the university as something that is not within their reach. Can you really blame them, given the picture I just painted for you?

### Research:

Wyandotte County (Kansas)

USA	KANSAS	WYANDOTTE COUNTY
Less than 9 <sup>th</sup> grade 4.87%	3.65%	30.3%
9 <sup>th</sup> to 12 grade, no diploma 7.65%	5.86%	Not Available
H.S. graduate including equivalency) 27.07%	24.96%	Not Available
Some college, no degree 22.10%	24.96%	11%
Associate Degree (2 yr) 8.44%	8.37%	Not Available
Bachelor's Degree (4 yr) 19.18%	21.27%	Not Available
Graduate / Professional Degree 10.70%	10.86%	Not Available

**Sources:** *Kansas Kids Count Data Book, 2011; Kansas Statistical Abstract, 2011; US Census, 2009 American Community Survey; US Census, 2010; Alliance for Excellent Education, 2010; Kansas State Department of Education, 2011; Center for Educational Opportunity Programs Survey, 2011.*

- ▶ Dropout rate for low-income and first-generation college students 21% (CEOP Survey 2011)
- ▶ College going rate for low-income and first-generation college students 25% (CEOP Survey 2011)
- ▶ College going rates:
  - ▶ Kansas 63.7%
  - ▶ U.S. 63.3%
  - ▶ Wyandotte County KCKPS 53%

### Financial barriers

Tuition hike has placed university affordability out of reach for low-income and first-generation college students. The Pell Grant, the only government grant designed to help students attain university education is seriously underfunded. Mortenson argues that “the Pell Grant programme is in urgent need of expansion to effectively serve the rapidly growing population of low-income students seeking higher education” (Mortenson 2013).

### Educational Talent Search Program

The programme is funded through a grant from the United States Department of Education and serves 1,000 students between the ages of 11 and 27. However, to keep it more in line with the European children’s university’s demographics, I will concentrate on the services provided to students through the Career Horizons (11 years) and Discover Technology programmes (12 years). These two programmes serve 40 students each for a total of 80 students. They participate in an on-campus academic enrichment summer programme on the campus of the University of Kansas.



## Summer Programs

Career Horizons and Discover Technology Selection:

At the beginning of the year, students and parents are informed of the activities in which their children must take part throughout the year in order to participate in the summer activities on the campus of the University of Kansas.

## Services and Activities provided

- high-quality tutoring
- initial postsecondary course selection
- assistance in preparing for college entrance examinations
- information on the full range of federal student financial aid programmes and benefits
- assistance in completing financial aid applications
- personal and career counselling
- information and activities designed to acquaint adolescents with the range of career options (role modelling is an important aspect)
- exposure to the campuses of institutions of higher education and to cultural events
- academic classes
- mentoring programmes

## Early Student Monitoring and Intervention

Research shows that early monitoring and appropriate interventions are critical in terms of student academic performance. Data show that students who are monitored early before taking the ACT, a college entrance examination, are more likely to be ready for college than similar students not monitored (Staying on Target, ACT, 2012).

## Global Learning Opportunities

Global learning opportunities for low-income and first-generation college students are not a required activity of the United States Department of Education of TRIO programmes. However, through my participation in the SIS-Catalyst grant and EUCUnet, where I have met dedicated colleagues, many of whom are here this morning, have led us to think outside the box.

The University of Kansas has signed a Memorandum of Understanding agreement with the Univerzity Komenskeho (Comenius University) in Bratislava, Slovakia, for a partnership. The partnership will facilitate an exchange programme between the two institutions. Further, the partnership will allow ten 12 year olds from two middle schools in Bratislava to visit the University of Kansas and participate in the Discover Technology Program, and for ten 12 year old Educational Talent Search students from Kansas City, Kansas, to visit Bratislava. The question has been posed, what is the reason for doing this? Simply stated, low-income and first-generation college students are also citizens of the world, our home, Planet Earth, and they, too, have the capacity to contribute immensely to our very existence. Low-income and first-generation college students deserve to be given every opportunity to acquire the necessary skills in a global learning environment.

## How Does Society Benefits from The Participation of Low-Income And First-Generation College Students In The Academy?

The answer to this question lies in the following points.

1. Providing quality to ALL leads to an educated citizenry, which will lead to informed decisions to be made for the benefit of society.
2. Education is a critical investment in human capital and leads to a healthy society.
3. Scientists, authors, artists, engineers, and many other occupations are the catalysts to advancing humanity, and we need more.
4. More citizens become gainfully employed.
5. More people pay taxes.
6. Less people depend on social support for basic human needs.
7. We become competitive on the world markets.
8. It costs less to educate people than to put them in prisons.
9. We become a more tolerant society and have appreciation for other cultures.

In March 2009, President Barack Obama set a goal that by the year 2020, the United States of America, will regain its position as the nation with the highest percentage of its population holding college degrees and credentials. The Educational Talent Search programme is determined to do its part in fulfilling this goal. The following tables provide information and data on the University of Kansas Educational Talent Search “Career Horizons” and “Discover Technology” summer programmes.



Center for Educational Opportunity Programs

## Summer Programs

CAREER HORIZONS



DISCOVER TECHNOLOGY



Goals of the Summer Programs  
General Information  
Demographics of Participants  
Typical Day  
Outcomes

## College Access Summer Programs

# Goals of Programs

### CAREER HORIZONS

- Explore career possibilities
- Enhance understanding of self
- Increase potential for academic and occupational success
- Develop a positive peer network

*Exposure to a university campus and interaction with faculty and students*

### DISCOVER TECHNOLOGY

- Enhance computer technology knowledge
- Enhance understanding of self
- Increase awareness of math and science related career opportunities
- Develop a positive mentor/peer network

## College Access Summer Programs

# General Information

### CAREER HORIZONS

- 1995
- US Department of Education TRIO funded
- 10-12 staff (directors, mentors, instructors)
- No cost to student
- Budget
- Reward College Tour (3 days)

### DISCOVER TECHNOLOGY

- 1999
- US Department of TRIO funded
- 10-12 staff (directors, mentors, instructors)
- No cost to student
- Budget
- Reward College Tour (4 days)

## College Access Summer Programs

# Typical Day

### CAREER HORIZONS

7:00am Bus transportation to University  
8:00am Breakfast & Team Connections  
9:00am Career Exploration Class  
10:00am **Career Self-Awareness Class**  
10:30am Snack & Team Connections  
11:00am Science Exploration/Lab Class  
1:00pm Lunch in College Cafeteria  
2:00pm Careers & Computer Class  
3:00pm Recreation Class  
4:00pm Team Connections & Wrap-up  
4:30pm Bus Transportation

#### Saturday

Same schedule in AM  
Families Workshops  
Celebration Luncheon

### DISCOVER TECHNOLOGY

7:00am Bus transportation to University  
8:00am Breakfast & Team Connections  
9:00am **Computer Exploration Class**  
10:00am Career Exploration Class  
10:30am Snack & Team Connections  
11:00am Science Exploration/Lab Class  
1:00pm Lunch in College Cafeteria  
2:00pm Careers & Computer Class  
3:00pm Recreation Class  
4:00pm Team Connections & Wrap-up  
4:30pm Bus Transportation

#### Saturday

Same schedule in AM  
Families Workshops  
Celebration Luncheon

*6 full days (8.5 hours per day) Monday- Saturday  
Intensive, fast paced, engaging, interactive*

College Access  
Summer Programs <sup>11, 12</sup>

# Outcomes

### CAREER HORIZONS

- 664 Participants
- Gained confidence in career decision making skills
- Increased number of possible careers
- Congruency between their interests and careers considering  
Over 60% of participants attend college

### DISCOVER TECHNOLOGY

- 478 Participants
- Increased awareness of math and science related careers
- Improved computer skills
- Gained confidence in math and science and career decision making skills
- Over 68% of participants attend college

*"I never imagined going to college until I was a part of these amazing programs."*



## Research Findings

- Over the past 13 years, **436 students** have increased awareness of math and science related careers, improve their computer skills, and develop positive relationships with their mentors through participation in this program.
- Over **68%** of students who attend the Discover Technology Program go to college (compared to the **35%** of comparable students from that target area).
- For those students who remain connected to the Talent Search programs, **85% to 95%** are admitted to and attend college.

*Sources: O'Brien, Karen, Rebecca Dukstein, Stacey Jackson, Merideth J. Tomlinson, Ngondi A. Kamatuka (1999). Broadening Career Horizons for Students in At-Risk Environments. Career Development Quarterly, March 1999; Flores, Lisa & McCloskey, Charlotte, University of Missouri-Columbia & Rebecca Dukstein, University of Kansas TRIO Talent Search. Discover Technology: Promoting Career Planning Among At-Risk Middle School Students. Paper presentation, 2002.*

*Sources: (4 Research Findings Table) O'Brien, Karen, Lynette Heim Bikos, Kimberly Epstein, Lisa Flores, Rebecca Dukstein, Ngondi Kamatuka (2000). Enhancing the Career Decision-Making Self-Efficacy of Upward Bound Students. Journal of Career Development, 2000.*

### National Data

In order to provide contextual meaning to the data of the University of Kansas Educational Talent Search Program, the following tables provide national data.

*Sources: 2011-2013 Civil Rights Data Collection, <http://ocrdata.ed.gov>, 2012.*

## National Data

- ▶ Access to preschool is not a reality for much of the country. About 40% of public school districts do not offer preschool.
- ▶ Suspension of preschool children: black students represent 18% of preschool enrollment but 42% of preschool students suspended once, and 48% of the preschool students suspended more than once.

## National Data

- ▶ Access to school counselors- nationwide, one in five high schools lacks a school counselor.
- ▶ Disparities in high school retention- **12%** of black students are retained in grade nine, about double the rate that all students are retained (**6%**). Additionally, Students with disabilities served by IDEA and English learners make up **12%** and **5%** of high school enrollment, respectively, but **19%** and **11%** of students held back or retained a year, respectively.

Career Horizons 2013 serves a diverse population of 6th grade students



Discovery Technology Summer Camp 2013 - Increases tech/math/science awareness for 7th grade students



## Hands-on Activities

Caring Adults  
4:1 Student/Staff Ratio

*"I still remember my mentor, Ms. Hernandez-Castro, and how she made me feel like anything was possible as long as I put in the effort. Career Horizons made me believe that college was a possibility and not just a dream."*





## Alumni Student-Centered Research Based Structured Fun



*"The most important thing about the program for me was the exposure to a college campus with a group of students and staff excited about higher education."*



Positivity \* Friendships \* Role Models \* Engaged



## Summary Points

Bringing it all together:  
College Access!



## Questions



## List of References & Citations

- ▶ 1. *A Stronger Nation Through Higher Education*, A Special Report from Lumina Foundation, March 2012.
- ▶ 2. *Lumina Foundation*, 2010; *Chronicle of Higher Education Almanac*, August 26, 2011; *Kansas Statistical Abstract*, 2011.
- ▶ 4. *Kansas Kids Count Data Book*, 2011; *Kansas Statistical Abstract*, 2011; US Census, 2009 American Community Survey; US Census, 2010; Alliance for Excellent Education, 2010; Kansas State Department of Education, 2011; Center for Educational Opportunity Programs Survey, 2011.
- ▶ 5. *Kansas Kids Count Data Book*, 2011; *Kansas Statistical Abstract*, 2011; US Census, 2009 American Community Survey; US Census, 2010; Alliance for Excellent Education, 2010; Kansas State Department of Education, 2011; Center for Educational Opportunity Programs Survey, 2011.
- ▶ 6. *Developing 20/20 Vision on the 2020 Degree Attainment Goal: The Threat of Income-Based Inequality in Education*, The Pell Institute, May, 2011.
- ▶ 7. Lumina Foundation, 2012.

## List of References & Citations

- ▶ 8. 2011-2013 Civil Rights Data Collection, <http://ocrdata.ed.gov>, 2012.
- ▶ 9. *Developing 20/20 Vision on the 2020 Degree Attainment Goal: The Threat of Income-Based Inequality in Education*, The Pell Institute, September 2009.
- ▶ 10. Yang, H., Kezar, A., *Financial Education in TRIO Programs. Institutional Policy Brief*, University of Southern California; The Pell Institute, September 2009.
- ▶ 11. Flores, Lisa & McCloskey, Charlotte, University of Missouri-Columbia & Rebecca Dukstein, University of Kansas TRIO Talent Search. *Discover Technology: Promoting Career Planning Among At-Risk Middle School Students*. Paper presentation; 2002.
- ▶ 12. O'Brien, Karen, Rebecca Dukstein, Stacey Jackson, Merideth J. Tomlinson, Ngondi a. Kamatuka (1999). *Broadening Career Horizons for Students in At-Risk Environments*. *Career Development Quarterly*; March 1999.
- ▶ 13. O'Brien, Karen, Lynette Heim Bikos, Kimberly Epstein, Lisa Flores, Rebecca Dukstein, Ngondi Kamatuka (2000). *Enhancing the Career Decision-Making Self-Efficacy of Upward Bound Students*. *Journal of Career Development*, 2000.

## Additional Sources

- ▶ Kahlenberg, Richard. Pell Grants: Higher Education's Brown v Board of Education. Reflections on Pell, June 2013.
- ▶ Grout, J. Milestones of TRIO History, Par I, Reprinted from opportunity Outlook, The Journal of the Council for Opportunity in Education, January, 2003.
- ▶ Tinto, V. Access Without Support Is Not Opportunity, Pell Institute, 2013.
- ▶ Mortenson, T. The Federal Pell Grant Program: Alternative Futures. The Pell Institute for the Study of Opportunity in Higher Education, Reflections on Pell, June 2013.
- ▶ ACT, COE, The Condition of College and Career Readiness, 2013.

## Thank You!

### Early Intervention College Access Programs

For additional information regarding this presentation and/or the College Access Summer Programs, please contact:

Dr. Ngondi Kamatuka - [Kamatuka@ku.edu](mailto:Kamatuka@ku.edu)

University of Kansas  
Center for Educational Opportunity Programs  
Achievement & Assessment Institute  
Lawrence, KS - United States



*Workshop I: "Children's University as the Best University" between school and university – possible forms of transition  
Moderator: Torben Roug, University of Copenhagen*



## WORKSHOP I: "CHILDREN'S UNIVERSITY AS THE BEST UNIVERSITY"

### BETWEEN SCHOOL AND UNIVERSITY – POSSIBLE FORMS OF TRANSITION

*Moderator: Torben Roug, University of Copenhagen*

The children's university shapes transitions: As an out-of-school educational institution, it stands between formal and non-formal education. In its role as facilitator, it aims to familiarise schoolchildren with university and its tasks – also in the hope that some or many of these children can be won as students later. The subject of this panel, therefore, will initially be the question of what trademarks of the children's university identify it as a university and differentiate it from school and other out-of-school offerings. As this distinction is dissolved, the common interests and the potentials of a partnership with school and out-of-school institutions is to be addressed, which – perhaps – is a necessary prerequisite in order to shape children's future transitions. How much school does the children's university need in order to simultaneously be able to correct the school's selection criteria? What is the "price" of the partnership and what is the "profit" for both sides? What common interests can move the children's university and other out-of-school educational institutions to co-operate? What distinguishes the children's university, compared with other university offerings, when it comes to facilitating transitions – and what is needed for this?

In Panel I, it was made clear that science enjoys considerable prestige, with positive connotations in society as a whole. As a result, the children's university, too, is perceived in a positive light. It is easier from such a starting point to work out the possibilities and strengths inherent in a co-operation between children's universities and schools.

One advantage is that as far as the children's universities are concerned, we tend to be dealing with highly-motivated lecturers and organisers. Contact with similarly motivated teachers, so experience shows, creates a real possibility for co-operation between children's university and school. Long-term co-operations can lead to the development of new areas of interest which, in turn, leads to a wider spectrum of projects. This is to the advantage of both sides. A consensus emerged that children's university can be regarded as an offer within the school framework which can improve the school culture and complement curricular targets with scientific sessions. Limits do exist, however, including subject-related ones, which are given as a result of the discrepancy between curricular targets and the thematic variety inherent in a children's university.

Viewed from the point of view of society and/or the community, such a co-operation with schools should therefore lead to its reaching children regardless of their family backgrounds. Projects on offer should bring all children closer to a perspective of university, also in terms of cultural capital, thus encouraging broader inclusion. Current political and cultural discussions of this desire to achieve inclusion needs to be grasped by children's universities and utilised strategically. Children's universities could, for example, pursue specific communal aims, developing regionally anchored projects. This would, in turn, further develop the outreach of universities and shore up their positive public image. The long-term aim could, then, be to secure and standardise such an exchange between school and university to such a degree that it could become a fully accepted part of the work of both institutions. Thereby, it could also offer a stable educational perspective, thus becoming independent of any personal involvement on the part of motivated individuals in both institutions.

These aims are hampered by the fact that such co-operations between schools and universities are dependent upon personal contacts. Given the fast staff fluctuation at universities, such contacts tend to die out quickly. In addition, we must remember that the resulting workload for both schoolteachers and university lecturers giving of their time voluntarily is both considerable and time-consuming, which stands in the way of continuity and any fast increase. We must not underestimate the demands made by children's universities on lecturers by such integrated courses on a didactic level. It is simply not always possible to fulfil the expectations aroused by children's universities, sometimes owing to lack of resources. Thus, it is important to make a prior analysis just what resources are going to be required. The children's university at the University of Copenhagen may serve as example of how the provision of ample funding enables the use of paid and trained students both as assistants and as ushers. An added benefit for both universities and students is inherent in their additional training in the field of science communication skills.

A further hurdle should be mentioned: the existing mutual mistrust between the various institutions, which first needs to be overcome. The danger is that children's universities could be overwhelmed if it is to be their job, where necessary, to "train" teachers and parents, whose consent is usually required, to coax them towards the children's university and communicate the potential relevance for schools. Differing aims and approaches on both sides would appear to render a comprehensive process of communication necessary, whose aim it should be to define the stakeholders and then achieve the inclusion of all involved. A considerable organisational effort is required in order to adapt to the specific institutions involved. There was consent that at present there exist two relatively distinct education circles which come together temporarily in order to form a common forum. At this point, the question arose as to whether it might be necessary to centralise, to a certain extent, this communication between the institutions university and school and institute it at a



higher organisational level; all the more so when we consider that we are, in reality, dealing with an institutional topic.

All in all, the importance of this communication with schools and pupils was accredited high priority by all panel participants. Some considered the development of a joint programme beneficial. It did, however, become clear that dedication, enthusiasm and creativity (along with tenacity) are not sufficient in themselves to achieve these aims. The availability of plentiful funding is also going to be essential if we are to be able to pursue all necessary steps over a longer period of time. It was, at the same time, pointed out that accompanying and continuous assessment was going to be required as well. One aspect of the discussion which emerged was that in order to foster co-operation between universities and schools, it would be helpful if national organisations could offer suitable incentives.



*Workshop II: "Children's university as the best university" – for whom? Children's university between supply and demand.*

*Moderator: Jolanta Różowska, Malopolski University for Children*

## WORKSHOP II: "CHILDREN'S UNIVERSITY AS THE BEST UNIVERSITY" – FOR WHOM? CHILDREN'S UNIVERSITY BETWEEN SUPPLY & DEMAND

*Moderator: Jolanta Różowska, Malopolski University for Children*

The children's university is organised under conditions of demographic upheaval, of migration and globalisation, which may expand – or also limit – children's educational opportunities. An international comparison needs to be undertaken in order to address why children are not reached by the children's university offering, although they should be. What characteristics (for example, first generation, low income, giftedness) can be considered as identifiers of certain groups that need special forms of access to, or offerings at the children's university? Following from these rather theoretical issues, the subject of my talk will be how a programme can be designed to satisfy inclusion requirements. How can demand be prompted, for example, through forms of relevant educational work or public relations work? What does this demand both from the parameters within which the children's university takes place and from the professionalism of the organisers and lecturers? What "broad outlines" are advisable in order to achieve the inclusion of children from educationally remote or educationally disadvantaged families? And what small steps are possible in order to achieve these goals within parameters that are perhaps limiting?

Panel II concerned itself with questions regarding the orientation (Astrid Costard General Manager of KölnerKinderUniversität, University of Cologne) The Workshop was moderated by Jolanta Róowska, Malopolski University for Children) of children's universities given overall social conditions including demographic transformation, migration and globalisation. In the course of the panel discussions, it became clear that the aims of children's universities can only be defined in terms of the overall social expectations regarding education. Demands are, in particular, being made for the inclusion of children from non-academic, educationally disadvantaged families. The panel thematised the necessity for the development of clear aims and strategies for realising real inclusion, amongst which the building of trust must assume a key role. Thus, the readiness to welcome all children to children's universities is the result of a conscious decision made on the part of children's university organisers.

The need to define the stakeholders of children's universities is clearly of prime importance, along with communication and discussion with the stakeholders. For this inclusion of children from non-academic families to succeed, university lecturers, students, teachers, parents and children need to be included in the discussion, together with all their

requirements, so that in the long term a climate of mutual trust can be established and lasting relationships built up. In their discussions, panel participants regarded such a climate of mutual trust as being essential, even though in some ways the participation of parents can be viewed with a certain wariness.

In order to open up access and to reach the target groups, it is surely wise to seek intermediaries. It is here that co-operation with teachers can make sense. It is necessary to search for imaginative and unusual routes of access. Moreover, outreaching educational work is essential and it is necessary to adjust the parameters of children's universities in accordance with the objective of removing barriers – for example through fees that are as low as possible, or no fees at all. It would also make sense to make use of as many media as possible in order to improve access for all children. It was emphasised that the message ought, at the same time, to imply that children's university is a project that is fun and comes with plenty of interaction on the part of the participating children.

It emerged that efforts to align children's universities more with considerations of inclusion need to be more closely linked with empirical research and its methods of data gathering. Whilst it appears, on the one hand, necessary to acknowledge, through self-observation, the limits inherent in children's universities, it remains essential, on the other hand, to define the parameters within which steps towards inclusive activities on the part of children's universities can be quantified and evaluated. One important question, for example, is in what way child-students ought to be registered. Data gathering is vital here in order to ascertain whether intended aims are being reached. A greater effort is required here in order to develop manageable forms of data gathering and evaluation and also to find suitable criteria for the assessment of the effects being achieved.

One concrete aim is clearly discernible with regard to university education: to help improve conditions so that they may have a positive effect on the study-performance of students from non-academic backgrounds. In other words, to educate them more effectively, for example, in their STEM subjects and to offer them assistance in shaping their career plans. At this point, I want to mention the importance of forms of mentoring: their aim should be to increase the diversity of students and lecturers at any given university.



*Workshop III: Taking part in the "best university in the world":  
Participation and organisation.  
Moderator: Peter Brammer, University of Göttingen*



## WORKSHOP III: TAKING PART IN THE “BEST UNIVERSITY IN THE WORLD”: PARTICIPATION AND ORGANISATION.

*Astrid Costard, General Manager of KölnerKinderUniversität, University of Cologne.*

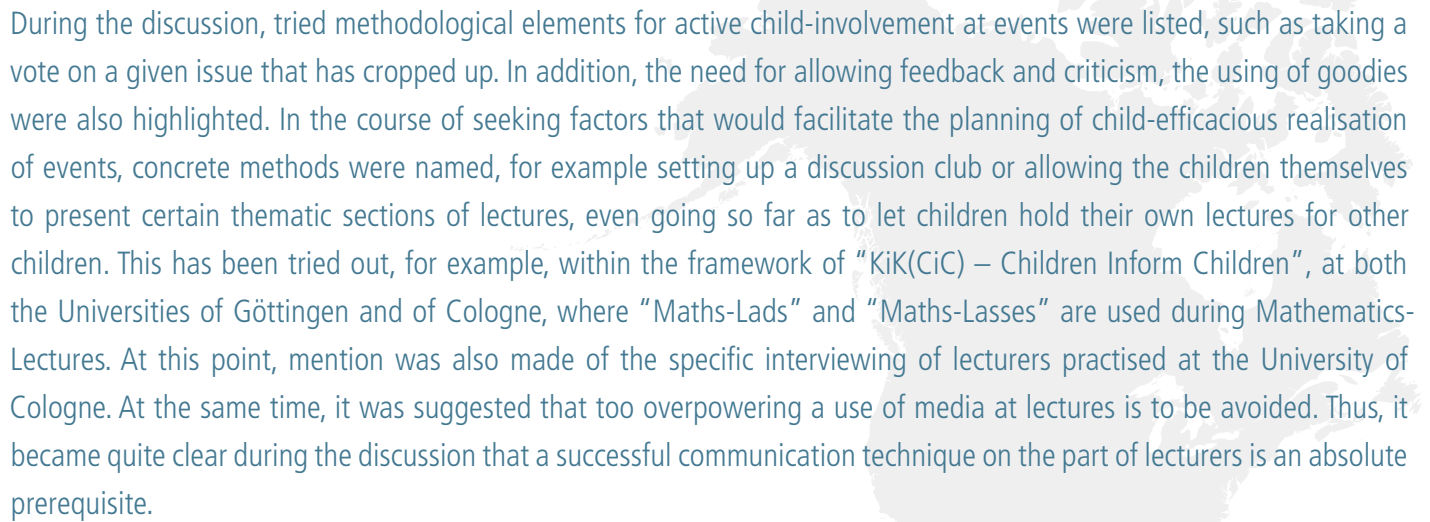
*The Workshop was moderated by Peter Brammer, University of Göttingen*

The panel will address children’s opportunities to take part in and co-shape the children’s university and thereby future science communication as well. Initially, it will be asked what models of child participation at the different levels – within events, when organising the children’s university – already exist, or respectively what ideas are awaiting implementation. What roles for children are conceivable in such models: idea givers for programme contents, lecturers, advisors to the organisers of the children’s university? What parameters and what requirements in terms of professionalism are necessary at the different levels? The practice-based dialogue is to be supplemented by addressing the goals connected with participation: what effects are anticipated among children for the children’s university and – perhaps even – for university? Does child-sensitive dialogic science communication exist, what are its characteristic features and what is it able to achieve?

The discussion in PANEL III focused on the participation and co-determination of the children themselves at children’s universities. It became clear that considerable participation on the part of children already exists at children’s universities and is dependent on the varying aims linked with such participation. Aspects of child-sensitive, dialogic communication in terms of didactic-methodological elements within individual events were specified, the aim of these being to take children seriously within their given potential. Fundamentally valuable aspects of this, as observed in Stephanie Johanna Herting’s Master’s thesis at the University of Göttingen, are that we regard children as experts within their own experience realm and also facilitate their thematic comprehension by using content-related connecting factors. Here, one problem might be of matching up children’s experience realm with the perspectives opened up by research.

Emphasis was placed, in relation to overall interaction with children, on the importance of using a natural and age-appropriate language on the one hand, and the specific avoidance of “difficult” foreign words on the other. A willingness to observe the limits of children’s concentration-spans and, where necessary, to make use of surprise effects in order to regain their concentration were called for, as well as a readiness, where desirable, to react to surprises caused by the children themselves. It might thus make sense to display a certain flexibility throughout the duration of any given project.





During the discussion, tried methodological elements for active child-involvement at events were listed, such as taking a vote on a given issue that has cropped up. In addition, the need for allowing feedback and criticism, the using of goodies were also highlighted. In the course of seeking factors that would facilitate the planning of child-efficacious realisation of events, concrete methods were named, for example setting up a discussion club or allowing the children themselves to present certain thematic sections of lectures, even going so far as to let children hold their own lectures for other children. This has been tried out, for example, within the framework of “KiK(CiC) – Children Inform Children”, at both the Universities of Göttingen and of Cologne, where “Maths-Lads” and “Maths-Lasses” are used during Mathematics-Lectures. At this point, mention was also made of the specific interviewing of lecturers practised at the University of Cologne. At the same time, it was suggested that too overpowering a use of media at lectures is to be avoided. Thus, it became quite clear during the discussion that a successful communication technique on the part of lecturers is an absolute prerequisite.

At the organisational level of children’s universities, special mention was made of the possibility of including children in the selection of themes for lectures and projects. This can be achieved by means of questionnaires, brainstormings and the taking of a vote or, too, by means of e-mail or the internet. The instance of a placing of responsibility on children by the Cologne Children’s University Council goes one step further: it invites children to edit the texts announcing courses, to test events and even to draw up the rules governing visits to courses at Cologne Children’s University.

A totally different problem area was discussed as to whether sponsors have any influence on the definition of the aims of children’s universities: for example by actually helping shape these definitions or, perhaps, by creating greater free spaces for the realisation of ideas. To these, we might add the question of evaluating the shaping of children’s opinions as well as the overall, fundamental question as to whether the use of specific methodological-didactic elements could lead to the children being influenced in a possibly inadmissible fashion.

This discussion concerning the aims of the children’s university in the light of participation centred on the potential gain for the children concerned. It became evident that one important aim is the strengthening of already existing interests on the part of children, and, in addition, encouraging children to concern themselves with new themes and questions, possibly even to arouse their passion for some topic and their desire for new experiences and to comprehend both the world and themselves. The feeling was that such aims can be achieved if the children’s universities, for their part, take a board perspective of permitting questions and encouraging children’s curiosity at various didactic levels. The panel made clear the breadth of potential with regard to children’s participation. Such participation can function as a fundamental

principle of a children's university, practised at all levels by means of continuous, comprehensive child-participation. It can, however, also be interpreted in terms of using specific methodological-didactic elements whose aim is to encourage the sheer joy to be had in the acquisition of knowledge and research.



*Cologne Children's University – Impressions  
Guided campus tour with Albert and Jenny by the KinderUni-Rat*





*The Cologne Children's University – Impressions*  
*Scenic reading from the first Cologne Children's University book "Expedition Krebs" ("The Cancer Expedition")*

Samuel Horn & Robert Panthera Krause

# EXPEDITION KREBS

Ein Buchprojekt der  
KölnerKinderUni



*Samuel Horn & Robert Panthera Krause: Expedition Krebs. Ein Buchprojekt der KölnerKinderUni.  
atp Verlag. Köln, 2014. ISBN 978-3-943064-06-3*





*The Cologne Children's University – Impressions  
Children's University Chorus*





## LECTURE IV: MATHEMATICS – A SILVER BULLET TO THE BEST CHILDREN’S UNIVERSITY?

*Prof. Dr. Dr. h.c. Tassilo Küpper, University of Cologne, Former Rector*

It is a great pleasure for me to present some of our contributions to the Cologne “Kinderuni” and a few theoretical considerations which we had in mind when we started the experiment in 2003. By now we can ascertain that our investigation has successfully grown since then. As I have tried to convince my colleagues at the university to participate in this additional task, I have always felt obliged to contribute with a lecture myself. Since we have covered new subjects each year, our experience amounts to 10 lectures dealing with mathematical topics, which we expected to be of interest to children. Later on I will outline a few of these ideas.

The title of the lecture given to me for my contribution today sounds rather ambitious. Fortunately there is a question mark and at the end, and you may decide for yourself how to answer this question. Looking back on our experience, I am convinced that lectures on mathematical topics definitely should be part of a “Kinderuni” and that the special requirements of a mathematical lecture for children nicely exemplify the challenges in general.

If you browse through the various flyers describing the programmes of other children’s universities which have been made available at this conference, you will notice that there are few lectures in mathematics. Is there a reason for this abstinence? Of course, if you think about explaining a mathematical topic and compare this task with the demonstration by Professor Feuer-Meyer and Dr. Müller on experiments in Chemistry and Physics, with spectacular effects involving explosions, fireballs, frozen flowers and a song presentation with funny voices under the effect of Helium, you can imagine the challenge facing any lecturer. Mathematics as a subject appears to be polarising in public perception: while some admire it greatly, others are repelled by it. Usually both statements are often rather emotional and lack a true understanding of the topic.

More than ever, mathematical knowledge and understanding is an important feature in our technologically based society. Far too small a part of society is aware of the amount of mathematics which forms the background of many procedures we rely on in daily operations, such as codes used in secure communication, optimised systems in traffic and engines, data condensation making MP3 players possible, image processing, efficient computations providing reliable weather prediction and much more. In my opinion, the impression of mathematics gained at an early age at school is

important, and for that reason motivating teachers plays a key role. In addition, I am convinced that attractive lectures at children's universities may also be used to stimulate a long-lasting interest in a fascinating subject which truly deserves the title "Queen of Science".

In the following section, I will present a few ideas about our concept of a children's university in general, then discuss mathematical aspects and at the end briefly describe some of the approaches we have selected.

## Recalling the beginning

In Germany, the first systematic approach can be dated to 2002 when a "Kinderuni" took place with great success at the University of Tübingen, with lectures documented in the book by the founders Ulrich Janßen and Ulla Steuernagel: "Die Kinder-Uni – Forscher erklären die Rätsel der Welt". The idea quickly spread, supported by the "Hochschul-Rektoren-Konferenz" and aroused interest in many other universities. Being rector of the university here at that time, I took up the idea as well and already in the summer of 2003, we were able to organize the first Cologne Children's University.

Support by the Cologne Radio and TV station WDR, in particular by the very popular TV-programme for children "Die Sendung mit der Maus", helped us to reach a large audience of approximately 4,000 children who attended the 21 lectures in September 2003.

Although the University of Cologne constantly attracts many students in all subjects and is faced with high teaching duties, we voluntarily decided to add the additional tasks that lectures for children entail because we wanted to appeal to the natural desire for knowledge in children, to demonstrate that science can be fascinating and to let the children experience within the unknown sphere of a university. Preparing lectures on pretentious scientific subjects in such a way that they are comprehensible to children aged 8 to 10 is a great challenge and requires remarkable skills and often new ways of seeing the topics in order to present them appropriately. Having gained that experience several times, I realise that involving students who want to become teachers in the preparation and presentation of such lectures can serve as an excellent contribution to the education of future teachers. And there are more benefits: lectures for children usually attract a lot of public attention; hence participation provides excellent marketing for the universities.

Children should enjoy the lectures, and participation in the "Kinderuni" should be pleasure, not a duty. They should feel inspired and gain experience and insight instead of just accumulating additional facts. For this reason, the topics should be complementary as much as possible to subjects taught at school.

Of course, this consent was not shared by everybody. There were considerable reservations and claims that such

activities do not belong to the core tasks of a university. Considering the “Kinder-Uni” as a limited activity, we started the adventure nevertheless. The positive feedback proves that it is indeed a great experience for the children. They become familiar with a new and widely unknown institution, and the early contact with the university might stimulate an interest in further studies and possibly lead the way to continuing as regular students later on.

## The concept

The general concept is developed along the lines of understanding key ideas, results, relations and methods, without (much) previous knowledge. As far as Mathematics is concerned, we have to deal with specific difficulties:

- Mathematics polarises, typically it is considered as fascinating or rejected.
- Mathematics is abstract: this reflects its power and at the same time its weakness with regard to being easily understood.
- Mathematics is built up almost linearly: usually, advanced ideas need previous definitions and results.
- Mathematics aims at insight rather than just at arithmetic.

These difficulties questions arise when discussing which subjects are appropriate and how Mathematics should be presented at a “Kinderuni”? A wonderful example can be drawn from a well-known story about the young Gauss. Already at school, Gauss was regarded as very gifted, and usually he was quickly done with exercises.

To keep him busy, the teacher told him to sum up the numbers from 1 to 100. He was surprised when Gauss showed up after a very short time presenting the correct answer: Instead of summing up all the numbers he had found an efficient way, based on intuition, by rearranging the terms in such a way that the result became available by a simple multiplication.

Another example refers to compute the infinite series  $1 + 1/2 + 1/4 + 1/8 + 1/16 + \dots = ?$

While the analytical approach requires some knowledge of limits and series, the geometrical view provides an easy and straightforward access as the area of simple squares, by successively decomposing the unit square appropriately into rectangles half the size.

Inspired by such nice examples, a general approach can be set up to choose a topic satisfying the criteria:



- Familiar to children, if possible with a local reference
- Exhibiting a surprising or hidden mathematical background
- Serving as an introduction to more general mathematical ideas

Mathematical riddles, some magic tricks, games, toys, various kinds of sport or mechanical constructions offer plenty of suitable examples from which to choose appropriate subjects.

The following list contains such lectures, delivered at the Cologne “Kinderuni” in recent years:

How Mathematicians Helped Ensure That the Kaiser Bell in Cologne Cathedral Could Toll Again (2004, T.K. with D. Weiß)

Thrice Zero is Zero is Zero. What’s so Special about Zero? (2006, T.K. with D. Weiß)

Mathematical Puzzle, or “Isn’t That Paradoxical?” (2007, T.K. with D. Weiß)

The Numeral Two. Or: How Fast Can Wildfire Spread? (Arenberg, 2007)

How Maths Can Help you Win! ( 2008, T.K. with D. Weiß)

Cryptology (2009, O. Krimmel)

Ways In and out of the Labyrinth (2010, T.K. with O. Krimmel and Mathekids Julia, Eva, Viktor)

Sun, Coins & Wheels: Maths In a Circle (2011, T.K. with J. Barz, H. Kochanek and Mathekids Henri, Julius, Maxim)

Stars, Flowers and Spikes, Blunt or Sharp? – that’s what a Spirograph Can Do (2011, Kaenders)

“ZDVKDEHQ JHKHLPVFKULIWHQPLWPDWKHCX WXQ?” – Secret Codes (2012, T.K. with J. Barz , S. Kohlhasse and Mathekids Johanna, Eva, Marika)

What Do Animal Trails, Friendship Bracelets and Fancy Wrapping Paper Have in Common? (2012, Kaenders)

Crazy Strings and Confused Knots – Mathematics and Magic (2013, T.K. with J. Barz, S. Kohlhasse and Mathekids Lukas, Timon, Maximo)

Why used Cologne to be (almost) Perfectly Round? (2014, T.K. with J. Barz, S. Kohlhasse and Mathekids Lilian, Paul, Mert)

The topics concerning secret codes, encryption, patterns, mazes and labyrinths are explained by means of many entertaining stories and interesting mathematical ideas. Quite often games rely on a mathematical background. Of course, knowing a good strategy leads to success, thus confirming: Maths helps to win!

To give some further impressions, let us look at a few examples in more detail:

“How Mathematicians Helped Ensure That the Kaiser Bell in Cologne Cathedral Could Toll Again”: The title refers to a remarkable event which happened at the end of the nineteenth century, when the construction of the famous Cathedral of Cologne, which originally had started in the year 1248, finally came to an end. The Cathedral of Cologne grew to a widely recognised symbol of German patriotism in newly unified Germany. With regard to that role and acknowledging the sponsorship of the Prussian king, the citizens of Cologne wanted to crown this monument by a very large bell – in fact the largest free swinging bell. So, they suggested to the king that they acquire the necessary material by melting guns captured in the recently ended war with France. The whole process sparked intense public discussion and there are a lot of interesting stories surrounding it. When eventually the bell was placed in the tower of the cathedral in 1875, surprisingly, it did not work as expected: there was no sound because the clapper remained in the centre of the bell, never hitting its walls. This very strange phenomenon triggered a fierce discussion, including plenty of sarcastic and humoristic comments and poems which illustrated this mysterious disaster. Shortly afterwards, though, a mathematics teacher from a nearby town was able to explain the hidden mechanisms leading to the failure. Modelling the system of bell and clapper as a double pendulum, he figured out that a specific combination of just four parameters could lead to such an unusual effect. The mathematical model is easily explained to children. The effects of the choice of parameters determining the oscillations can be demonstrated using a smaller model of the bell. This story, full of local reminiscences, can be extended in a natural way to discuss mathematical aspects of oscillation ranging from the simple motions of a single pendulum to the more complex behaviour of a double pendulum, resulting in chaotic motion. Furthermore, the abstract concept of oscillation can be used to understand the importance of such mechanisms in completely different areas, such as mechanical, biological or chemical oscillations or even medical phenomena such as the heartbeat triggered by oscillations in cells.

“Thrice Zero is Zero is Zero. What’s so Special about Zero?”: The German title of the lecture refers to a popular Cologne carnival song which makes fun of mathematics at an elementary school in the very heart of Cologne, by ironically demonstrating mathematical skills using multiplication with zero. Using this commonplace property of zero as an entrance to a more subtle look into the historical rise of zero as a mathematical concept offers a rich variety of phenomena related to these special properties. The double meaning as a value, resp. a symbol to mark an empty space in a row of numbers went along, for example, with confusion in the origin of mathematical thinking in ancient Greece. A lovely humoristic poem plays with the idea: a single 1 sitting lonely on a bench shows how the value on the bench is increased when joined by one, two, three, ... zeroes and, on the other hand, how quickly it vanishes if the 1 disappears. In the original German


version of the poem, there is an additional effect due to the double meaning of the word “bank” denoting bench as well as monetary institute. Unintentional disregard of the elementary rule “no division of zero” ended in one of the famous disasters of computer science, when the steering system of the large warship “Yorktown” broke down, leaving the ship out of control for days. A closer look at that simple rule can be used to explain that the origin of the infinitesimal calculus according to Leibniz and Newton may be seen as the appropriate way to concretise “division by zero” within the limit of characterising differentiable functions. Long before real spaceships left our planet, the nowadays common “countdown” was designed by Fritz Lang in his movie, “The Journey to the Moon”, using the dramaturgical features of zero.

“Why is the shape of the medieval Cologne (nearly) circular?”: A look at medieval maps of Cologne and of other cities such as Paris or Aachen shows a clear circular shape. Is there a mathematical reason for such a construction? This question leads to the ancient problem facing Dido, the Carthaginian queen, who was granted a piece of land she could surround with the skin of a cow. Cutting it into strips and forming a circle, she managed to gain a large area of territory. The solution to this mathematical problem was already known to the Greeks, although a formal proof is not recorded. A nice and rather simple proof of this result, based on simple geometrical arguments, was figured out by the famous mathematician Steiner. Shortly afterwards, thanks to the young mathematician Dirichlet, who had been educated in Cologne, discovered an inconsistency in Steiner’s proof, since his argument had been based on the existence of a solution to the said problem. In the case of the example in question, it is clear: in general, this existence needed to be established as well. Thus, Dirichlet initiated the development of the calculus of variations, an important branch of modern Applied Mathematics.

Thanks to this local context, the hidden and surprising mathematical background, together with the ability to extend the basic mathematical idea into a more general mathematical frame in a way accessible to children, these cases fulfil perfectly the criteria. Thus, they support the ambitious pretension of regarding mathematical lectures as a silver bullet for the “Kinderuni”. These lectures have been documented, analysed and evaluated in a systematic way in the thesis of Kohlhasse.

## Additional Benefits

The search for suitable topics, the formulation of key ideas and methods without employing technical mathematical notions or results unfamiliar to children, together with the presentation, requires a lot of skill and experience. Besides the direct benefit to the children, the development of lectures for children provides an ideal chance for teacher-students to



test their teaching abilities and to acquire experience. At the University of Cologne, we have involved interested students in such processes, either through seminars especially devoted to subjects suitable for such purposes, or through direct participation in the design and presentation of lectures or systematic evaluation in form of theses. Through cooperation with the Moscow Pedagogical State University, in the shape of joint seminars for German and Russian students, international experience has been made available. In addition, new approaches have been initiated, such as a theatre play for children illustrating mathematical topics. This was developed as an outcome of the seminar 2013. Starting in 2010, we introduced a new format: lectures in mathematics held by children who previously attended the “Kinderuni” themselves. This new approach has been welcomed by the audience in particular, since children as the “junior lecturers” express the content in a natural way accessible to kids. In addition, it is a great experience for them, too, and a remarkable motivation for the youngsters in the audience.

## Acknowledgements

The lectures since 2010 have been prepared in co-operation with the students Janna Barz, Hannah Kochanek and Sarah Kohlhase, who deserve special thanks for their great enthusiasm and support. For all of us, it has been a pleasure to work with the “kid teams”, Julia and Eva Isakeit and Viktor Teutsch in 2010, Henri Cremer, Julius König and Maxim Torgovitski in 2011, Johanna Voorwold, Eva and Marika Spiertz in 2012, Lukas Peter, Timon Sültenfuss and Maximo La Vergata in 2013 and, just recently, Lilian Hoffmann, Paul Zinke and Mert Canakkoyun in 2014.

## References

- Anna-Maria Dückers (2010): Die sieben Symmetriegruppen von Friesen – ein Projekt mit Kindern in der Kinderuniversität, Thesis University of Cologne
- Ulrich Janßen, Ulla Steuernagel (2003): Die Kinder-Uni. Forscher erklären die Rätsel der Welt. Stuttgart/München DVA
- Sarah Kohlhase (2014): Die Kölner Kinderuniversität in Mathematik – Dokumentation, Analyse und Ausblick, Thesis University of Cologne
- Tassilo Küpper, Natalia Puresheva (2013): Modelling in Science – a German–Russian Seminar
- Thomas Schmidt (2011): Mathematische Aspekte des Spirographen und Anwendungsmöglichkeiten im Mathematikunterricht, Thesis University of Cologne





*"Bus of the Sun" of the KölnerKinderUniversität*

# LECTURE V: MODEL IN CONCRETE: THE MCMASTER CHILDREN AND YOUTH UNIVERSITY IN CANADA – BUILDING BLOCKS TO ENGAGEMENT

*Sandeep Raha, Ph.D., Associate Professor, Department of Pediatrics, McMaster University, Hamilton, Canada*  
*Dr. Katrin Scheinermann, University Hospital Münster*

Globally, efforts directed at the education of children have taken many shapes and involve a very broad spectrum of organisations. While formal educational systems constitute a major share of this effort, it has become increasingly clear that engagement in educational systems, outside the existing school systems, helps to develop a child's interest in their own learning environment. This has led to the development of organisations which seek to engage and excite children with various subject matters and experiences. One of the emerging themes in these efforts is the importance of experiential learning. The importance of providing such experiences to young children clearly has the advantage of creating positive attitudes towards education at an early age. With this in mind, children's universities targeting students in the age ranges of 7 to 14 years of age provide an opportunity for young people to be exposed to a variety of topics currently being researched by experts in these particular subject areas. These experts, university professors and students, have devoted considerable time to understanding these topics and are uniquely qualified to pass this information along to young people in an age-appropriate manner. Furthermore, such forums provide young people the opportunity of coming to the university campus and exploring an educational experience quite different from that to which they are routinely exposed.

The concept of children's universities, originally developed in Tübingen, has spread throughout much of Europe. In 2011, we introduced this experience to Canadian children and called our programme McMaster Children and Youth University (MCYU). There were a number of logistical considerations in implementing these lectures without significant university support. We had to acquire space that would allow the delivery of interactive lectures with large seating capacity while providing accessibility for handicapped individuals. Since this programme is still in its infancy we are experiencing a number of other challenges such as the recruitment of lecturers as well as volunteers to provide organisational support to the programme. The academic environment in Canada does not provide appropriate recognition for lecturing in forums such as MCYU. Therefore academics are hesitant to expend the effort necessary to prepare a lecture for this young age group. Finally, promotion of the programme was difficult due to the lack of university support and the cost associated with

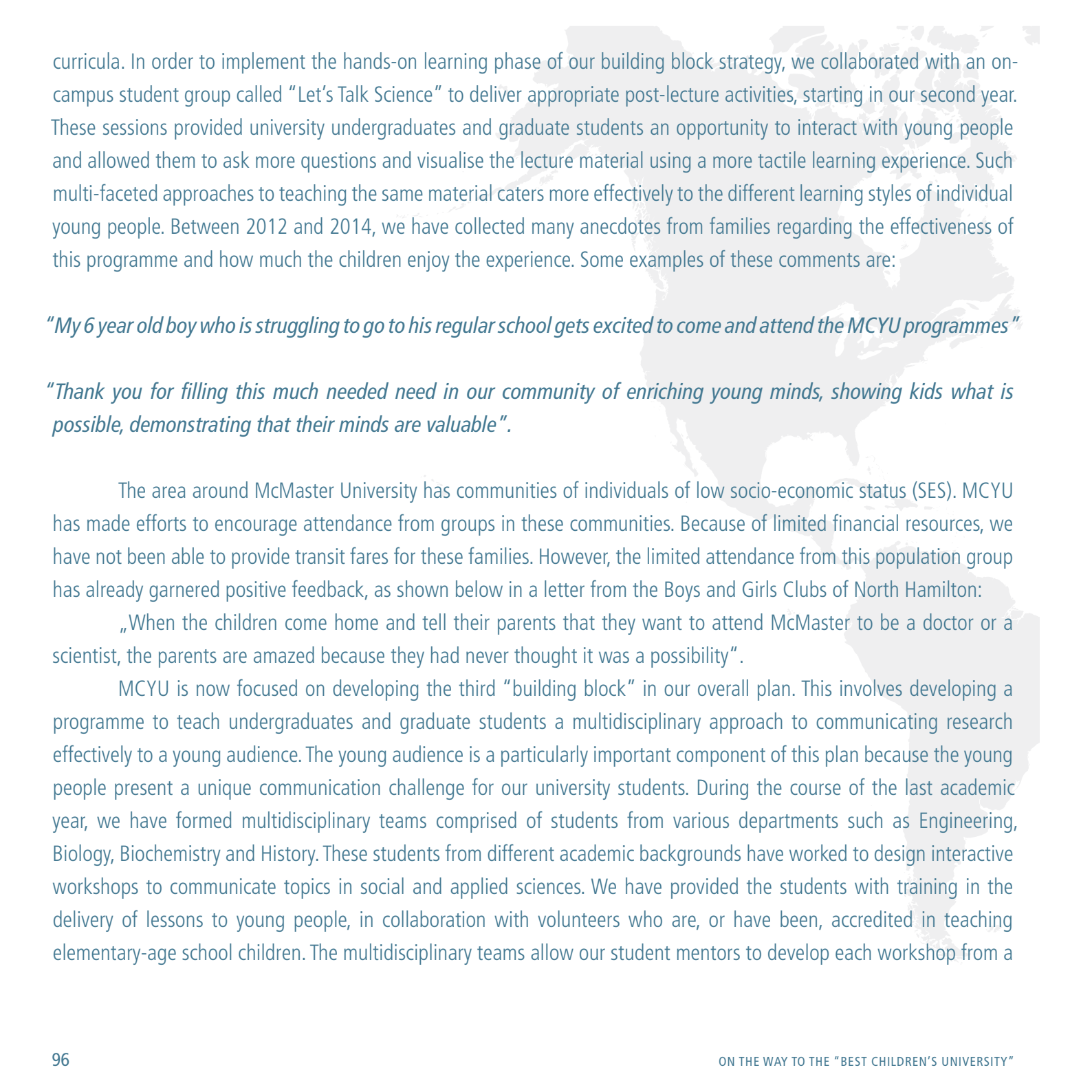
advertising in the media. While a number of individuals thought this was an important programme for the community, it was not clear that its value for promoting the university to a sceptical community was recognised.

One of the primary modifications to our programme, as compared to the model currently implemented in Europe, is that we encouraged both parents and children to attend the programme. This family-based attendance was originally designed to mitigate legal considerations related to the safety of the children. According to Canadian law, public gatherings of children (under the age of 12) require the presence of a specific ratio of adults for safety reasons. However, during the past 3 years, we have found that this family-based education forum has been highly effective and the parents have complimented us on this design. The main claim is that attending the lecture with their children allows the family to continue discussing the topic long after leaving the lecture venue.

Over the past three years, there has been a very broad selection of lectures in our programme. The titles range from “Robotic surgery” to “How does the brain work” to “Is there life on other planets”, “What does a university really do”, and “Aboriginal contributions to Canada”. In most cases, the audience has been extremely engaged and the children are always eager to ask questions and state their opinions during the lectures as well as in discussions with the speakers following the sessions. Following each lecture, MCYU utilises a web-based survey to garner opinions regarding the quality of the lecture as well as suggestions for improvements and future topics. In these surveys, we find that topics relating to health and medicine, engineering and video games and computer science are amongst the most sought after. Interestingly, history, archaeology and geography are also quite popular with the children.

During the last 3 years, we have averaged almost 300 attendees per session. While these are not always the same individuals, almost 25% of the attendees have attended 80% of the lectures. This 80% attendance requirement is what is required to receive a MCYU graduation diploma. We are also quite impressed by the wide geographical distribution of our attendees. Many of them come from a distance of 100 km to attend our once-a-month lectures.

After our first successful year delivering on-campus lectures to the community, we found that the public was hungry for more such experiences delivered by our experts. Therefore we decided to expand our programme using a “building block strategy”. The first building block consisted of stabilising the on-campus lectures. The second “building block” would be to develop hands-on learning experiences for young people, associated with each lecture session. The third “building block” would be to develop an innovative training programme for undergraduates and graduate students so that we could teach the “art” and science of research communication. This is a skill-set that is demanded by most North American funding agencies as well as private industry and is also an area of training that is lacking in most university



curricula. In order to implement the hands-on learning phase of our building block strategy, we collaborated with an on-campus student group called “Let’s Talk Science” to deliver appropriate post-lecture activities, starting in our second year. These sessions provided university undergraduates and graduate students an opportunity to interact with young people and allowed them to ask more questions and visualise the lecture material using a more tactile learning experience. Such multi-faceted approaches to teaching the same material caters more effectively to the different learning styles of individual young people. Between 2012 and 2014, we have collected many anecdotes from families regarding the effectiveness of this programme and how much the children enjoy the experience. Some examples of these comments are:

*“My 6 year old boy who is struggling to go to his regular school gets excited to come and attend the MCYU programmes”*

*“Thank you for filling this much needed need in our community of enriching young minds, showing kids what is possible, demonstrating that their minds are valuable”.*

The area around McMaster University has communities of individuals of low socio-economic status (SES). MCYU has made efforts to encourage attendance from groups in these communities. Because of limited financial resources, we have not been able to provide transit fares for these families. However, the limited attendance from this population group has already garnered positive feedback, as shown below in a letter from the Boys and Girls Clubs of North Hamilton:

*„When the children come home and tell their parents that they want to attend McMaster to be a doctor or a scientist, the parents are amazed because they had never thought it was a possibility”.*

MCYU is now focused on developing the third “building block” in our overall plan. This involves developing a programme to teach undergraduates and graduate students a multidisciplinary approach to communicating research effectively to a young audience. The young audience is a particularly important component of this plan because the young people present a unique communication challenge for our university students. During the course of the last academic year, we have formed multidisciplinary teams comprised of students from various departments such as Engineering, Biology, Biochemistry and History. These students from different academic backgrounds have worked to design interactive workshops to communicate topics in social and applied sciences. We have provided the students with training in the delivery of lessons to young people, in collaboration with volunteers who are, or have been, accredited in teaching elementary-age school children. The multidisciplinary teams allow our student mentors to develop each workshop from a



different perspective and also permit the audience of young people to appreciate that research questions require expertise in a variety of subject areas in order to solve them.

Operationally, the student mentors will provide our programme with additional outreach capacity. This is important in the absence of paid programme developers. However, the student mentors also develop a unique skill-set in communicating complex research subjects to lay audiences clearly. This is a highly relevant skill that is valuable for obtaining employment in the private and public sector. MCYU feels that this aspect of the overall programme, the training of university students, makes it significantly different from many of the other outreach programmes in North America. While there are a number of outreach organisations in Canada, such as Let's Talk Science, Girls in Engineering, Mad Science, as well as university-based camps specialising in engaging young people in science, to our knowledge there are none that integrate the post-secondary education experience as a whole, using the university setting as well as faculty and students to demonstrate to young people that they are not only knowledge users, but they can also be knowledge creators. Furthermore, we use this forum to train both graduate and undergraduate students, a primary mandate of the university. Taken together, the MCYU programme is about providing opportunities:

1. for families to learn together
2. for young people to explore various topics with experts in a university setting and discover how they can be knowledge producers
3. for university students to discover a valuable skill-set in research communication

One of the primary challenges that currently limits the growth of the MCYU programme is adequate funding. While the Office of the President, the Faculty of Health Sciences, the Faculty of Science and the McMaster have provided initial funding for our programme, we require a significantly greater amount of funds to further develop and sustain this programme. One of the primary objectives is to keep the costs to the public to a minimum. Currently, all sessions are free to the public and this is important if we are to attract attendance by low SES communities. We are therefore developing a number of funding strategies, including examining strategies to seek sponsorship from benevolent and corporate donors, fees for service opportunities as well as national and international funding agencies. We will also work with the university to develop stable sources of internal funding in order to allow for the establishment of one to two senior programme coordinators.

## Acknowledgements

We would like to acknowledge the financial assistance from the department of Pediatrics, office Dr. Susan Denburg (Faculty of Health Science); office of Dr. Patrick Dean (the President); office of Dr. Gianni Parise (Faculty of Science); McMaster Alumni Association. We would also like to thank all those who provided valuable guidance and worked tirelessly to deliver the programme over the last three years; Ms Janice Penny-Gibb, Ms. Brianne Robertson, Ms. Rabia Mirza, Ms. Cheryl Crocker. Thanks go out to all the faculty lecturers and student volunteers for their commitment. Finally we would like to thank all the parents and young people for their regular attendance and encouragement in developing and delivering the MCYU programme.

## LECTURE VI: THE FIRST DECADE – THE HISTORY OF CHILDREN’S UNIVERSITIES AND THEIR CURRENT DEVELOPMENTS

*Chris Gary, Vienna University Children’s Office, EUCU.NET General Secretary*

*Karoline Iber, Vienna University Children’s Office, EUCU.NET President*

In times of teaching and learning with technologies, of a continuing financial crisis and the related struggle for limited resources in science and academic research, universities and academics are more and more called upon to present and justify their contemporary relevance. Universities are faced with a discussion about their authority between the poles of a modern knowledge society and the information society. Moreover, there are increasing expectations on universities in the face of the grand challenges – and to contribute to the benefit of society.

Parallel to the highly dynamic last decade of developments in education, the term „children’s university“ became a widespread synonym for science awareness and outreach programmes at universities – or within other settings that have a strong link to academia. The evolution of these programmes advanced hand in hand with a general claim for efficiency in academia and a call for more graduates from the classical STEM fields, as soon as the increasing undersupply was identified on the labour market.

So how are science communication for and with children and the development of higher education institutions linked to each other, and how can there be a mutual enrichment for all spheres? Are children’s universities the appropriate model to give children a voice in science and research? Will this establish new forms of dialogic environments which have an impact on the involved actors?

Typically, children's university programmes include science-related lectures, workshops, hands-on tutorials or similar activities which take place as summer programmes, after-school activities or at weekends – which are prepared by academics and involve students in some cases.

These activities are specifically prepared to meet the needs and demands of children normally aged between 7 and 14 years and – ideally – to match their commonplace curiosity with professional scientific interest. As a basic principle and irrespective of other particular inherent objectives, children's universities are aiming to raise interest in science and research from an early age, to provide a first glimpse into the academic world and to possibly spark interest for later careers in science. In order to support this, the scientific subjects tend to make reference to the living world of children and their current experiences with everyday phenomena – this is what many children's university concepts have in common.

## Milestones

The distinctions between children's universities and other occasional science engagement and outreach programmes are to a certain degree academic themselves. There is no standard model of a children's university, as children's universities may include and combine elements of afternoon or weekend lectures (including workshops, tutorials etc.), summer schools and summer programmes, science camps and excursions, campus visits, open labs, visits in schools, science fairs and festivals, media projects and online tutorials and many more. They all share their aspiration to go beyond the boundaries of the traditional mission of universities and research institutions that turn towards a wider audience in the course of science in society activities. The somehow innovative and advanced aspect of children's universities is rooted in the exemplary effect in the university ecosystem. Within a relatively short period of time and encouraged by very successful lighthouse initiatives, a larger number of universities and other science institutions implemented for the very first time programmes for a previously unusual audience: children.

In a recent survey, more than 350 comparable children's university initiatives at universities and other science organisations have been identified by the European Network of children's universities (EUCU.NET) in European countries and beyond. By using similar labels, they form a massive and recognisable approach – which was even more stimulated and accelerated by a public media debate, triggered by a wide coverage of first initiatives which were implemented under this label around 2003. Meanwhile, the University of Tübingen was awarded the Descartes Prize for Excellence in science communication by the European Commission (2005) for their children's university. At a later stage, the European

Commission stated that “children’s universities represent the most radical approach to open universities towards the general public”.

## **More than just lectures**

Can children’s universities accomplish the expectations of more inclusive higher education, research institutions and educational policy developments? Do encounters at eye level and personal engagement lead to a change of mind-sets – either of the young participants or within academia? The success of children’s universities and the intended impact of these programmes remain to be proved, irrespective of the fact that children’s universities all over the world can put more than 500.000 attendances per year into the balance.

Actually, not much comparable data is available from or about children’s universities to clearly answer these questions about the “impact” of this approach. This is notably true as the definition of impact very much depends on the local context as well as on the aims and objectives of a project. In many cases, project data and evaluation results are missing or vague. In light of the diversity of the particular children’s university approaches, it will still be difficult to estimate the effects of such interventions in a comparable manner, especially in the long view.

Children’s university may appear as a simple concept – arranging activities for children at a university – but even though the overall effects are not apparent, there is one outstanding characteristic of children’s universities which is undoubted: they enable a direct personal encounter with academics in places which were initially not intended for children – neither by definition, nor tradition or mission. And there are several artefacts and anecdotes which suggest that this direct encounter with children as dialogue groups in an unusual environment has a wider effect which goes beyond a particular lecture hall.

## **Institutions and society – the potential of listening to children**

Soon after the first children’s universities were launched, massive media attention was attracted by prominent lighthouse initiatives. Presumably, this may be perceived as a counter-reaction to the first results of the PISA-study on educational achievements, which were occasionally disillusioning for some countries – and still heat up the education debate in many European countries. Coincidentally, the question was raised in the media if universities would be the better schools – if they manage to arouse interest in science and technology in an obviously pleasant way, whereas in formal education, schools got stuck in controversies about educational reforms over years.

This comparison may have been far-fetched – as children’s universities are not part of the formal education system by definition. But as initiatives which widely attract attention, children’s universities increasingly fit into strategies for universities to present themselves in public as innovative and socially responsive institutions that are relevant for the general public. Obviously, this was very welcomed at a time when they had their own bad press about (likewise) inefficiency or too much efficiency orientation in higher education, limited access to universities and the Bologna reform in general.

This is not necessarily a sustainable approach for initiating innovation and change in education, but the aforementioned debate encouraged higher education establishments to implement similar programmes, and thereby it contributed to forming a critical mass of outreach activities within a short period of time. In turn, an increasing number of activities – and the positive response to them – even encouraged some authorities at various levels to implement funding schemes which provide support for such initiatives. Provocatively said, because of the simple fact that the public debate (notably including the parents) liked the idea of “cute little Einsteins at universities”.

Media attention came along with a rapidly growing demand on the side of parents and families who were keen on enrolling their children in children’s universities in an achievement-oriented educational climate which is distinguished by limited access and rising costs – and it was especially true for educational climbers as well as for an education elite that children’s universities were frequently deemed as talent factories for highly capable pupils, which are worth striving for and an opportunity to be missed by no means (notwithstanding that this in fact is not at all an aim of children’s universities).

This is a simplified and slightly exaggerated description of the initial phase of the children’s university approach, which was definitely strongly influenced by media attention. But it seems to be the case that this was a driving factor during the first years, whereas after a while universities started to have a second look at how this successful model can be aligned with existing or modified strategies, how quality development can be achieved within children’s universities – including an impact on academic teaching – and how this may lead to institutional development. With some time delay, higher education establishments seem to have realised the full potential which lies in this approach. Enhanced institutionalisation processes become visible when universities now task their well-established departments like external communication or study administration – different from earlier years, when such initiatives were often initiated by committed individuals.

Consequently, the outcomes of listening to children and entering into an active dialogue may even become effective time-delayed, and institutional learning continues as a direct consequence of an established dialogue with



children: there is a growing number of participatory forms of governance of children's university projects, where children are included in diverse advisory panels or committees, thereby including children's voices in a strategic approach.

Ultimately, this illustrates well the impact and the capacity which the children's university approach can provide for science institutions when they make a transition from one way information within their science in society activities towards a sustainable implementation of an active dialogue with children that can be relevant for the entire institution: as responsible citizens, as potential students and as future scientists who will have to cope with the grand challenges – which will not be solved within one generation.

*“The University of Vienna will celebrate its venerable 650th anniversary very soon – and the five years of existence of Vienna University's Children's Office is not long in comparison. However, you may wonder why it lasted 645 years before the university realised that indeed children are a relevant target group.”*

(Georg Winckler, former rector of the University of Vienna, in his laudation at the 5th anniversary of Vienna University Children's Office)

## **The limits of children's voices**

In the above sense, children's universities can enable universities to become aware of needs and perceptions of potential future students, as well as to reconsider the role of a university within the communities around them. Consequently, children's universities provide the opportunity to get in touch with the academic world at a very young age – to some of them for the very first time, including their parents and families.

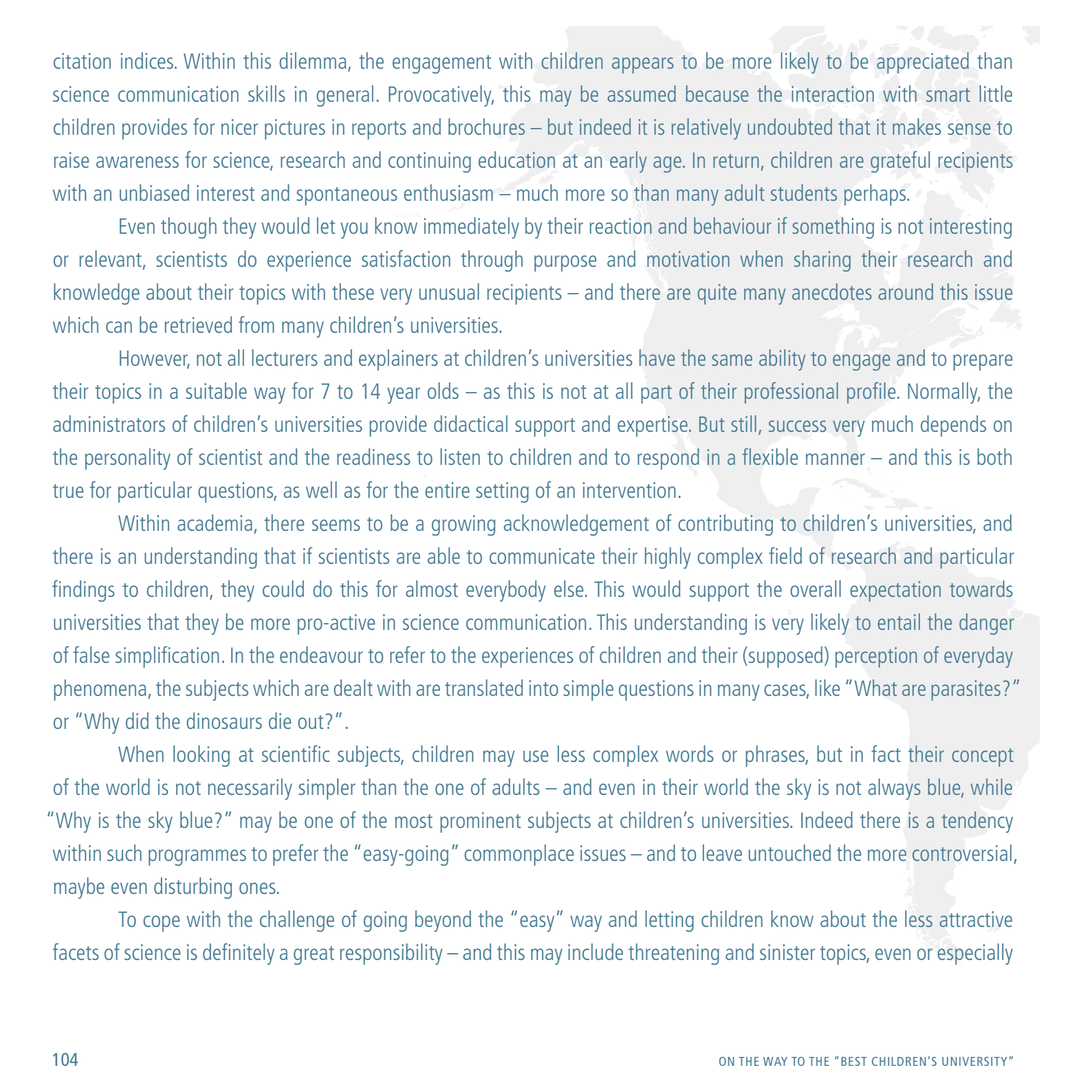
However, there is an issue with social inclusion, and – irrespective of a vast load of positive experiences which is reported about children's universities by participants and organisers – by far not everything is just sunshine and roses at children's universities. Firstly, as already mentioned, cumulative data is missing about children's universities – but there is fragmented evaluation and first-hand impressions which uncovers that there is still a substantial bias in terms of social origin and social-economic background of participants: those who are more likely to go on to higher education and those who have sufficient information about educational opportunities are still over-represented at children's universities – much more than children from educationally disadvantaged social milieus, even though this is a central aim of many related programmes and sometimes required by universities under the pressure of demographic changes in many European

countries. As a matter of fact, not all voices of children can be heard in the children's university model. In reaction to this, organisers started to implement supplementary action in order to support these populations that would otherwise remain excluded – and this may well have a long-term impact on the consideration of non-traditional students at universities in general.

Secondly, there is a tendency inherent to children's universities to imitate a very traditional understanding of a university and to demonstrate interactions between students and lecturers "at eye level", which may not be realistic outside the children's university model. An idealised mimicry of science, arts and humanities at children's universities entails the danger that the perception of the children will not meet the educational reality in their future study life. Important ethical questions are raised by the educational stimuli of such programmes. Ethical questions do indeed become relevant if "becoming a scientist" is communicated as desirable – and simplified as achievable for all who are just interested enough in a subject. By all statistics, this is not true; not everyone can achieve positions in academic research – even if they have the ability and motivation to perform. Science as a social system is not unbiased and this cannot be ignored in the basic message. Moreover, there is an overall tendency to simplify the core message and reduce it to "science is fun" – which is definitely not true in all respects. This may raise false expectations which are likely to reproduce and sustain traditional thinking about universities and higher education even more strongly. In the end, there is a serious need to continuously reconsider the results of the direct engagement with children within science establishments, both on a programmatic and strategic level – as well as with a view to the quality of implementation within an institutional setting.

## Who is listening?

It is not the institutions but the individual actors who directly engage in this dialogue and personal encounters with children, for which the institutions and their representatives provide the framework. The role of the academic researchers is to prepare the scientific programme within a children's university with the support of programme coordinators. The idea is to invite scientists to reflect on their complex and sometimes out-of-touch research in a way that aims to meet the demands of curious children – and it is a very challenging endeavour to prepare this in a catching and profound way. Children's university can be suitable to enable these encounters between academics and children, which would not be possible in such large numbers elsewhere. Nowadays, scientists are torn between a demand to prove and communicate the success and relevance of their research within a wider society. But in return, the ability to do so is not yet much acknowledged within academia as a key competence – compared to publication activity, research grants received or



citation indices. Within this dilemma, the engagement with children appears to be more likely to be appreciated than science communication skills in general. Provocatively, this may be assumed because the interaction with smart little children provides for nicer pictures in reports and brochures – but indeed it is relatively undoubted that it makes sense to raise awareness for science, research and continuing education at an early age. In return, children are grateful recipients with an unbiased interest and spontaneous enthusiasm – much more so than many adult students perhaps.

Even though they would let you know immediately by their reaction and behaviour if something is not interesting or relevant, scientists do experience satisfaction through purpose and motivation when sharing their research and knowledge about their topics with these very unusual recipients – and there are quite many anecdotes around this issue which can be retrieved from many children’s universities.

However, not all lecturers and explainers at children’s universities have the same ability to engage and to prepare their topics in a suitable way for 7 to 14 year olds – as this is not at all part of their professional profile. Normally, the administrators of children’s universities provide didactical support and expertise. But still, success very much depends on the personality of scientist and the readiness to listen to children and to respond in a flexible manner – and this is both true for particular questions, as well as for the entire setting of an intervention.

Within academia, there seems to be a growing acknowledgement of contributing to children’s universities, and there is an understanding that if scientists are able to communicate their highly complex field of research and particular findings to children, they could do this for almost everybody else. This would support the overall expectation towards universities that they be more pro-active in science communication. This understanding is very likely to entail the danger of false simplification. In the endeavour to refer to the experiences of children and their (supposed) perception of everyday phenomena, the subjects which are dealt with are translated into simple questions in many cases, like “What are parasites?” or “Why did the dinosaurs die out?”.

When looking at scientific subjects, children may use less complex words or phrases, but in fact their concept of the world is not necessarily simpler than the one of adults – and even in their world the sky is not always blue, while “Why is the sky blue?” may be one of the most prominent subjects at children’s universities. Indeed there is a tendency within such programmes to prefer the “easy-going” commonplace issues – and to leave untouched the more controversial, maybe even disturbing ones.

To cope with the challenge of going beyond the “easy” way and letting children know about the less attractive facets of science is definitely a great responsibility – and this may include threatening and sinister topics, even or especially

the “unknowing” or controversies in science. If we stick to the “fun parts”, we ignore the fact that science and research itself may be against society and may hinder equitable and sustainable development, and not just be to their favour. This also includes academic malpractice and the fact that “scientists are not only the smart nice folks in white coats, but sometimes really bad guys”.

If we take children seriously as a dialogue group for science organisations and universities and if we want to encourage more such organisations to incorporate this in their missions and strategies, there is a need to provide a more realistic picture about the scientific system rather than to focus on the “fun parts” of science. And this must also be reflected at the level of those who deliver the programme as scientists and researchers.

If children are taken seriously in a personal encounter and if they are offered a holistic and unbiased view, and if – in turn – scientist use this opportunity to let them get an impression of their integrity and their authority, this may even lead to more participatory forms of research. Some illustrative examples are available from children’s universities of how feedback and contributions from children had a real impact on how scientists perceive their own field of research, and even on actual research practice – for example from a Polish physicist who is highly esteemed in the automotive and aviation industry. With shining eyes he told the story of how the workshops he is doing with children in his acoustic lab, where they can freely experiment with noise-insulating elements, had a real impact on his own scientific problem solving on noise reduction.

This is an ideal example that the ability to communicate science very much depends on the ability to listen to children and to take them serious, but there are many more first-hand impressions of how the engagement with children motivated academics to take a fresh look at their research or their role and position as a researcher – and how inspiring this was. The message is clear: If more encounters of this kind are to be possible and if the benefit from such mutual inspiration is to be available within universities and other research organisations, it needs a clear commitment of decision makers and key players to provide suitable framework conditions. And if there are to be more showcases of participatory knowledge production, the organisers of well-established models of children’s universities are very obliged to accept the challenge of re-thinking their acknowledged models and taking them to the next level of (quality) development – towards even more inclusive and engaging interventions, which leave room and flexibility for collaborative activities and shared understanding. At the same time, they are requested to develop supportive measures which specifically address those who are less likely to participate in a children’s university programme.

This may lead away from “bing-bang” children’s universities and other science events towards smaller-scale

activities, and possibly from on-off interventions and non-recurring events towards more continuous programmes which are embedded in a wider thematic context. This may also result in a smaller number of attendances, a decline in media attraction and also have an impact on the required resources. But the objective is obvious: to enable a more intensive encounter with children in the scientific sphere and to make the diverse voices of children heard.

## **Appendix: Current numbers and figures**

In order to be able to reflect on the institutional and the practical potential of children's universities and to underpin the aforementioned thoughts about them, EUCU.NET conducted a survey which shall contribute to the debate with findings from the field. This survey was carried out between July 2013 until January 2014 and has revealed impressive facts and figures about children's universities.

Based on initially existing contacts plus an additional search, which constituted the first part of the inventory, a total of 356 children's universities were identified in 40 countries. Among them, an online questionnaire was distributed (second part of the inventory). The response rate was at 46%.

The 356 invited projects were located in 40 countries – 31 European and 9 non-European ones. More than half of the projects (195 projects – approx. 55 %) were situated in German-speaking countries, the vast majority of them (167 projects) in Germany itself. This is very much influenced by the emerging of the children's university approach in Germany, which subsequently triggered large numbers of similar projects. In the meantime, children's universities are also represented in other countries in larger number – but these early developments are still unfolding. Moreover, the level of internationality has notably increased: in 2013, projects were situated in 40 different countries, compared to a previous inventory in 2009 which revealed children's universities in only 25 countries. Additionally, the predominance of German approaches has decreased: in 2013, approx. 47 % of identified children's universities were located in Germany, whereas this figure was still at 68% in the 2009 survey.

The "boom years" of children's universities in the public debate appear to have been between 2003 and 2008. However, the peak is not over yet; the recent survey revealed that the implementation of new children's universities still shows a continuous uptrend: 34% of all children's universities in the sample were initiated after 2010.

Despite an increased diversification of the various models of children's universities, which goes hand in hand with their ongoing development and continuous spreading, there is still a strong commitment to children's universities as an academic approach: more than 75% of children's universities in the survey sample are coordinated by universities or in



close cooperation with universities. Other coordinators of children's universities typically are federations, associations, non-governmental or civil society organisations or municipalities. The predominant proportion of universities in the survey also indicates that universities in various European countries tend to consider science communication for children and young people as something important when initiating children's university-type activities of some kind.

Moreover, cooperation is an important issue: almost 50% of all children's universities in the sample are cooperating with partner organisations in the development, administration or delivery of their children's university programmes. In light of the academic resources and academic skills which are required for successfully carrying out a children's university, it is not surprising that universities are less likely to cooperate when children's universities are concerned compared to other (non-HE) types of coordinating organisations like municipalities or NGOs. However, the strong commitment shown by non-HE establishments to cooperate with universities proves that children's universities are deemed an academic approach and that academic "standard" is brought in as a quality criterion by ways of cooperation if the organisers themselves are non-academic institutions.

All in all, the overarching aims in the implementation of children's universities which were mentioned in the survey are science communication, broadening participation and awareness-raising as well as public engagement of universities in general. All of these perfectly match with what is called the "third mission" of universities, i.e. the obligation to communicate the roles, the potential and the achievements of academic research to a wider public and to engage in an active dialogue with the communities around a particular university about these issues.

These days universities increasingly define as a central aim of their "third mission" to engage with potential future students at the earliest age possible – and children's universities very well correspond with this objective: 7 to 14 years is the predominant age of the target population and more than 70% of the children's universities cover this age group. However, there are still some programmes which start at even earlier ages and others which are rather aiming to close the upper age gap until the actual age of attending university studies between 14 and approximately 18 years of age.

As mentioned earlier, the nature and the characteristics of children's universities may vary according to the particular history of a programme, as well as its objectives and organisational framework conditions. In consequence, children's universities may include a diverse range of activities like afternoon or weekend lectures and workshops, summer schools/programmes, science camps, campus visits, visits in schools and much more. But what a large proportion of all children's universities has in common is that they are capable of serving as a learning and training ground for university students: 78% of all children's universities do involve students in the administration (15%) or the delivery of children's

university programmes, e.g. as explainers (42%) or in other roles (21%). This means that when students have a role in the programme, they are more likely to be involved in direct encounters and science communication settings (e.g. preparing and holding a workshop or tutorials in a lab), than to work in the “back-office” on preparation and administration tasks. (Notwithstanding that also the latter form of involvement can lead to valuable insights and experiences.) “Other roles” of students were frequently mentioned as either including aspects of both administration and delivery, or for example having a more supportive function in the delivery and the teaching (as technical assistants, sound or video team, being involved in the promotion of a programme and/or the information and counselling of parents and children).

All in all, this represents a massive potential of outreach and public engagement of the academic sector – especially as also those organisers of children’s universities which are not an establishment of higher education themselves, do say to a very large share (67% of all non-HE organisers in the survey) that they include university students in the programmes.

Depending on the particular setting of a children’s university and its organisational framework, the support of students and other helpers may be a good thing or inevitably required anyway, as children’s universities have reached a considerable average size in the meantime: on average, a children’s university in the sample serves approx. 1,500 children as participants per year and involves approx. 40 academics who contribute to the programme. However, there is quite a spreading in these figures and again, this particularly depends on the history, the objectives and the organisational setting of a children’s university initiative: figures in the sample show that the number of participants ranges from 30 to 20,000 in a year and fall back on one to 500 academics who contribute to the programme as lecturers, tutors and the like. The largest proportions of children’s universities do serve between 101 and 500 children (38% of the children’s universities) or between 501 and 1,000 children (24%). At the same time, the majority of children’s universities works with less than 10 lecturers (48% of the children’s universities) or with 11 to 50 lecturers (39%).

In cumulative figures, they do serve a total of approx. 190,000 participating children per year and involve approx. 5,000 academics, which is an impressive number. However, if these numbers are extrapolated for all children’s universities that we know of, this sums up to a reasonable total of over 500,000 children per year and up to 15,000 researchers who contribute to the programmes in all countries where children’s universities exist.

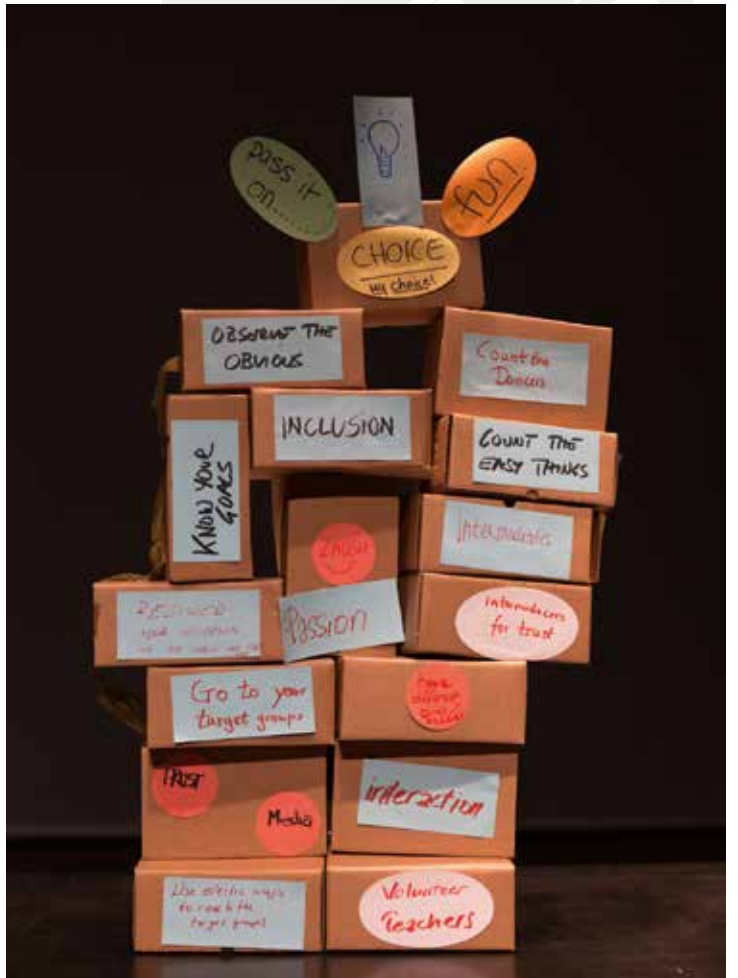
## How do we continue?

All in all, these figures clearly prove that since the “boom years” during the first decade, the model of children’s universities as science engagement and awareness-raising initiatives has well reached a critical mass in the meantime

and definitely goes beyond mere isolated pilot phenomena – children’s universities do form a structural approach within academia and they may lead to a systematic change. In this regard, children’s universities can be incubators of change in the university ecosystem. Despite the ongoing debate whether the “bing-bang” children’s universities or rather more personalised offers will be considered as more successful in reaching the particular objectives of children’s universities, both will need to prove their capability through facts in the future. In the survey, 71% of all children’s universities responded that they do conduct occasional or continuous evaluations of their programmes. However, there is quite a spread observable between types of programmes and countries – for example, 41% of all children’s universities in Germany have reported that they do not apply any evaluation procedures at all.

In consequence, EUCU.NET will continue to encourage organisers of children’s universities to collect more data about their programmes and to contribute to a synoptic analysis of the impact of the children’s university approach in Europe and beyond. Compiling evaluation results, collecting research tools and procedures and making both evaluable for a community of committed researchers and practitioners will be our central concern for the coming years. This will prove the sustainable effects and the efficiency of children’s universities. They will definitely go beyond just being fashionable marketing instruments for universities.









*Bricks for our best children's university – Impressions*



## PARTICIPATING SCIENTISTS



Educator **PETER BRAMMER** has been the development and project manager of the Children's University at Georg-August-University Göttingen since 2003. Studied history, politics, sport and education in Lüneburg, Köln and Göttingen. Taught at different schools, served as principal of George-Christoph-Lichterberg-Gesamtschule-IGS in Göttingen from 1975 until 2002. Deutscher Schulpreis 2011, lecturer at the University of Göttingen.



**PROF. BARBARA BRÜNING** was born in 1951 and studied educational science, philosophy and Slavic languages. She is a professor at the University of Hamburg and professeur associé at the University of Luxemburg. Her research work focuses on ethics-teaching in Europe, exploring the world of philosophy with children and the didactics of philosophy. Brüning also works in further professional training for teachers and is the author of several key works on the subject of teaching ethics and philosophy, among them a book about doing philosophy with children at pre-school age, as well as works on teaching ethics in primary school.



**ASTRID COSTARD** has been the general manager of Cologne Children's University since August 2014. She studied Protestant theology and educational science at the universities of Bonn, Hamburg and Cologne and worked on the education of highly talented youth and study programmes for senior citizens. At the Centre for Ageing Studies of the University of Cologne, she conducted several studies on ageing and was engaged in life-span education.



**CHRISTIAN GARY** is a trained mechanical engineer, studied sociology at the University of Vienna and holds a diploma in education management. After some years in vocational training research, today he is responsible for project development, international relations and evaluation issues in his position at the Vienna University Children's Office. He has initiated and coordinated several projects in the area of Science in Society under FP6 and FP7. He is also general secretary of the European Children's University Network.



**KAROLINE IBER** is a trained specialist teacher for people with disabilities. After her initial training, she studied educational sciences and group dynamics at the Universities of Vienna and Klagenfurt. She worked as a group facilitator and lecturer at the University of Vienna before she became responsible for innovation projects as an advisor to the board of rectors. Among many other initiatives, she has established the Children's Office, which became an independent non-profit organization in 2006. Since that time, Iber is the managing director of Vienna University Children's Office, which was established to support the diversity policy and public engagement of the university. At the international level, Iber is president of the European Children's Universities Network.



**NGONDI A. KAMATUKA**, Ph.D., School of Education, University of Kansas, USA. Dr. Kamatuka is the director of the Center for Educational Opportunity Programs in the Achievement and Assessment Institute. He has served as academic services coordinator for the Upward Bound programme at the University of Kansas and as interim director for the Institute for Educational Research and Public Service. Kamatuka holds a Master's and doctoral degree in higher education from KU and a Bachelor's degree in education from Tabor College. He has served as president of the Mid-America Association of Educational Opportunity Program Personnel (MAEOPP), and has also served as the chairman of the Board of Directors for the Council for Opportunity in Education. Currently, he is serving as advisor to a Science in Society Catalyst Grant funded by the University of Liverpool European Commission. The grant provides for projects at the Comenius University in Bratislava, Slovakia, the Children's University and the ZOOM Children's Museum in Vienna, and the University of Tübingen.



**DR. JOSEF KÖNIG** was born in 1948 and studied applied economics, Germanic languages and philosophy, gaining his doctorate in literary studies in 1982. He was Press Officer for Ruhr University Bochum from 1990 until 2013. In 1995, he founded the “Science Information Service” (Informationsdienst Wissenschaft – idw) with colleagues from Bayreuth and Clausthal. He remains closely linked to this institution in several functions to this day. In 1998, he founded the “AG Evaluation Hochschul-PR” (University Evaluation-PR Company), now IQ-HKom (Initiative for Quality in University Communication) together with a colleague.

In 2001/02, he was a member of the Bertelsmann-Trust Experts Panel for their programme “Training and further education of economic journalists”. In 2001, he was invited by the Advisory Board of the University of Zurich to join the Peer Review for the Evaluation of their Communications Department. König has received many awards for his work, among them the “PR Fuchs” from the Federal Association of University Communication in 2008. Most recently he was voted “Research-Speaker of the Year 2009”. At present he is team leader of the idw.



**SUSANNE KRETSCHMER**, born in 1972, is a certified cultural manager and completed her (German) State Examinations in English and French. She gained her doctorate in educational science at the University of Bonn with a dissertation on “Science and Publicity, using the Children’s University as an example. Theoretical prerequisites and empirical studies”. Before taking up her profession as a research fellow and lecturer, she worked as a consultant for a charitable foundation supporting pupils and students. She also worked in the publicity department of the Fraunhofer Institute and the GIZ (Association for International Co-

operation) as well as for a PR agency.



**PROF. DR. DR. H.C. TASSILO KÜPPER** was appointed Professor of Mathematics at Cologne University in 1990. He had previously held professorships in Freiburg, Dortmund and Hannover. In 1981/82, he attended US universities in Madison, Tucson, Pasadena and Stanford as Heisenberg Scholar. He is honorary professor in Changchun, Peking and Moscow. During his time as the university’s vice chancellor (2001–2005), he initiated the Cologne Children’s University.



**URSULA PIETSCH-LINDT** is research fellow at the University of Cologne's Department for the Coordination of Science and the Public. Pietsch-Lindt was trained as a book seller, editor and teacher (English/Catholic Religion), studied at the Karl-Franzens-University Graz and at the University of Cologne. She holds a Master's degree in education, psychology, German studies and musicology and previously worked as a teacher at the primary level, secondary level and at City of Cologne Day and Night College. She also has experience in PR work in publishing and as an editor. After 12 years of programme development for the Cologne Children's and Junior University, Pietsch-Lindt is still enthusiastic about science communication and youth development.



**DR. SANDEEP RAHA** is a biomedical scientist whose research focuses on understanding the effects of diet and drugs on placental function and fetal programming. Dr. Raha completed his Ph.D. at the University of Toronto and carried out his post-doctoral training at the Hospital for Sick Children. He spent 3 years in the biotechnology sector before returning to academia at McMaster University in Hamilton, Ontario. In addition to his biomedical research focus, Dr. Raha is also interested in how early educational engagement impacts later life health status. He is also involved in speaking to high school and university students about strategies in career development. In 2011, he co-founded the McMaster Children's and Youth University. In 2013, Dr. Raha received the Canadian Institutes for Health Research Synapse Mentorship award for an individual researcher. This national award recognises individuals for excellence in science outreach activities.



**TORBEN INGERSLEV ROUG** is head of the outreach programme at the Faculty of Science at the University of Copenhagen. The Faculty as well as the outreach programme covers the natural sciences as well as the life sciences. The main focus of the outreach activities is towards public and private schools, and especially children from 12 to 16 years of age. Every year, the Faculty visits around 9,500 school children as guest lecturers in the sciences, conducting a 90 minutes session. At the same time, approximately the same number of pupils travel to the Faculty campus to take part in the activities offered in the science laboratories.



**JOLANTA RÓŻOWSKA** is president of the Foundation Board of Malopolski University for Children in Poland. As an algologist at the Polish Academy of Science, she persuaded her university and academy colleagues to form an Advisory Board for the children's university. The foundation established the first Polish children's university organised in a non-academic city in 2008. Since then, the Malopolski University for Children gained popularity and a good reputation across the country. The Malopolski team has established good relations with both local government and academic institutions. The Foundation is also very active at

the international level: it organised of the first founding meeting of EUCU.NET in Krakow in 2010, participated in several EUCU.NET and SisCatalyst conferences and is an active member of European networking as a partner for European Commission projects.



**PROF. HANS-JOACHIM ROTH**, born in 1959, holds a degree in educational science, German studies, Scandinavian studies and philosophy from the University of Bonn. In 1986, he did his First State Examination in German and pedagogy. In 1986 he attained his doctoral degree and in 2000 his postdoctoral lecture qualification (Habilitation). Between 1999 and 2003, he served as an assistant professor at Hamburg University. In 2003, he was appointed Professor of International and Intercultural Comparative Educational Science at the Department of Educational Science of Hamburg University. Between 2000 and 2005, he

served as the chairperson of the Commission for Intercultural Education at the Office for International and Intercultural Comparative Educational Science (SIIVE) at the German Society for Educational Science (DGfE). In 2006, he was appointed Professor of Educational Science with a special focus on intercultural pedagogy. Between 2007 and 2010, he was Dean of Studies at the University of Cologne's Faculty of Human Sciences. Since 2011, he has been the academic director of the university's Centre for Teacher Training.





**DR. KATRIN SCHEINMANN:** University Clinic Münster, Department of Children and Paediatrics / Paediatric Haematology. Scheinmann did her undergraduate and graduate studies in human medicine at the University of Würzburg. She then trained to become specialist in paediatrics in Switzerland and in paediatric haematology in Canada. Today, Dr. Scheinmann is an associate professor at McMaster University in Hamilton. At Mc Master, she co-founded Canada's first children's university.



**PIA SCHREIBER** did her diploma in specialist journalism (focus on technology and sciences) at the University of Applied Sciences in Bremen in 2007. After her diploma she began to focus on science communication: for four years, she worked as a research fellow at Bremen University of Applied Sciences and participated in a research project on methods in science communication. Meanwhile, she started writing her PhD on the sustainability of science communication for children in children's universities. Currently she is working and lecturing in the Journalism Department at Jade University of Applied Sciences in Wilhelmshaven, where she also organises practical projects on science communication for children with her students.





# IMPRINT

Cologne, 2015

## **Publisher**

University of Cologne,  
Prof. Dr. Axel Freimuth, Rector of the University of Cologne,  
Coordination Center  
Areas of operation: Children's & Junior University  
Arbeitsbereich Kinder- und Junioruniversität

## **Editorial Staff**

Astrid Costard  
Anne Löhr  
Ursula Pietsch-Lindt

## **Photography**

Arnold Stadtler  
Sigurd Lindt  
Ulrike Kersting  
Project „Bus of the sun“

## **Design Concept**

Ulrike Kersting, Jan Swoboda  
Marketing Department, University of Cologne

## **Print**

in-house-printing, University of Cologne

REPORT 2015

Co-operation partner:

**eucunet**  
European Children's Universities Network



**Sis** CATALYST

Kindly supported by

**KölnAlumni – Freunde und Förderer  
der Universität zu Köln e.V.**

Premium-Partner



INTERNATIONAL SYMPOSIUM

[www.kinderuni.uni-koeln.de](http://www.kinderuni.uni-koeln.de)