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Symposium VIII  
13-14 February 2020  
Tokyo Campus, University of Tsukuba  
Japan

Digital Competencies for  
Industry 4.0  
Vietnamese case: issues and  
challenges

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Faculty of Teacher Education  
Vietnam National University



# Plan



- Introduction
- Issues
- Challenges
- New teacher education approach
- Competency approach in the new general curriculum
- Student digital competencies



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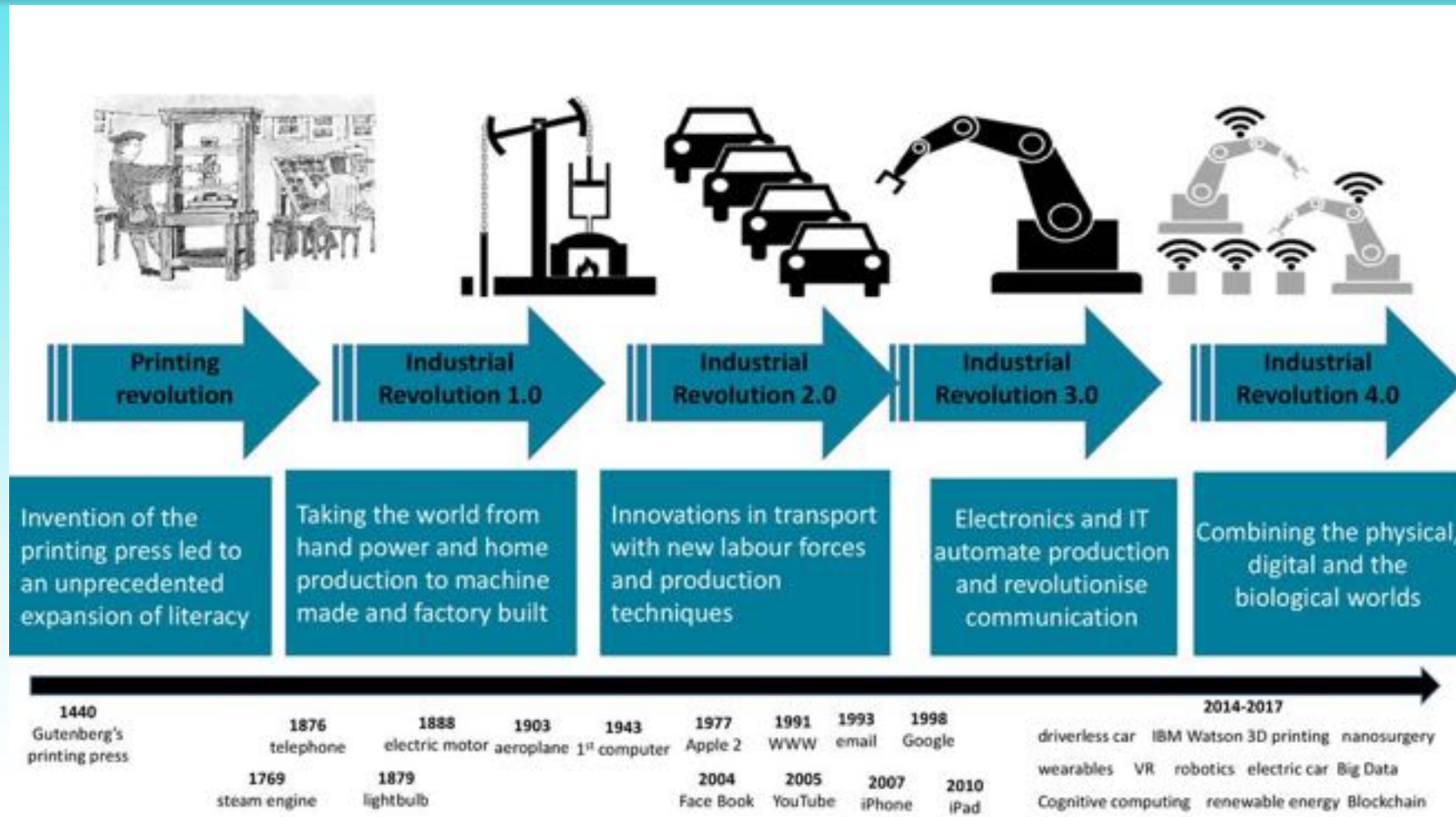


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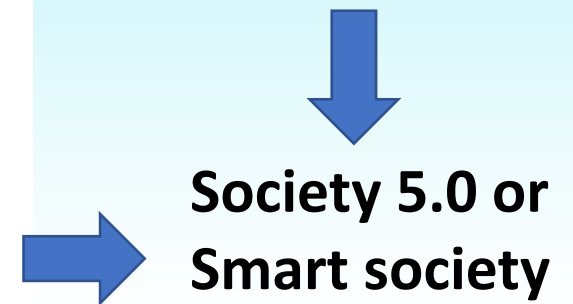
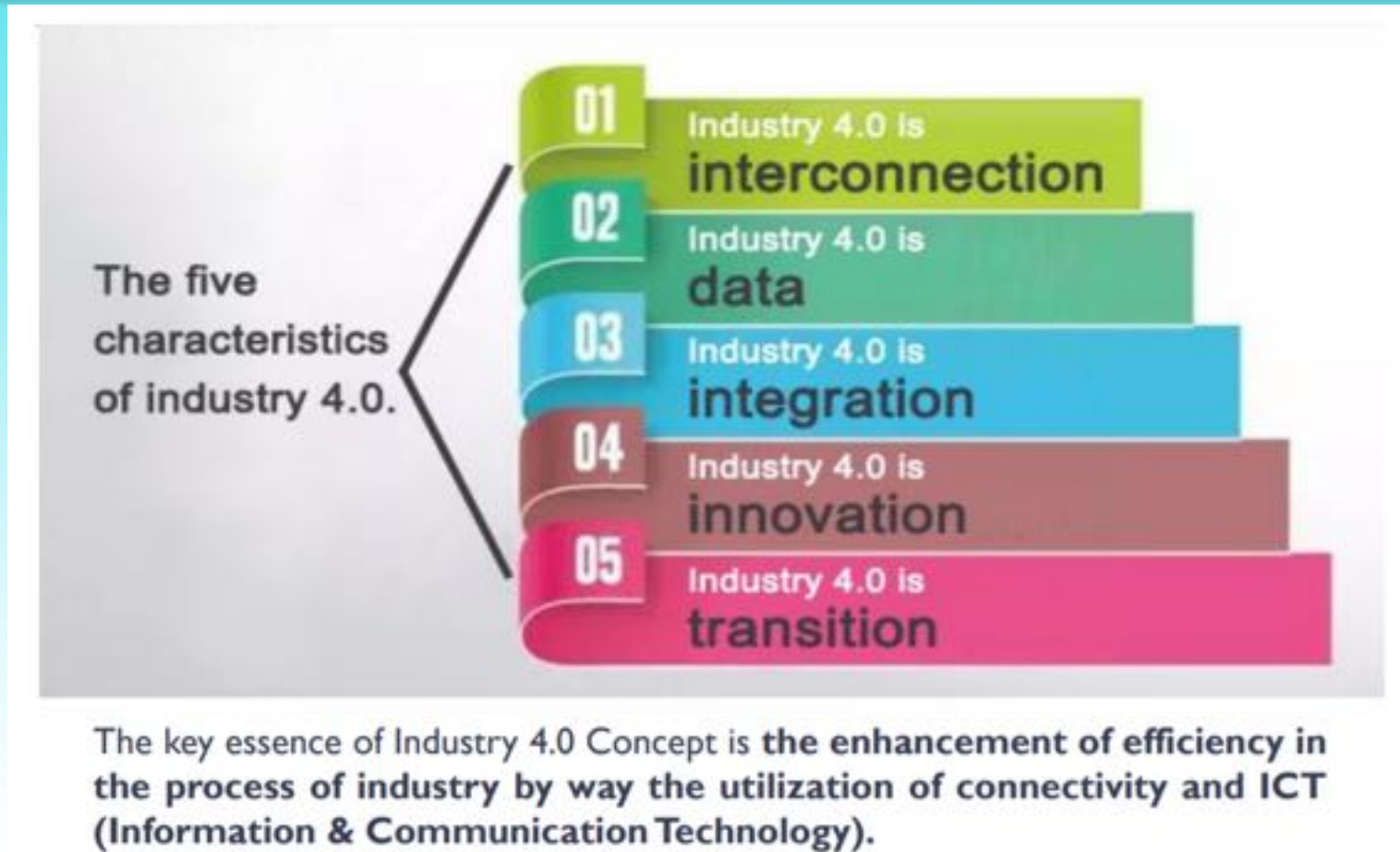
# IR. 4.0 timeframe



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# Principles of Industry 4.0



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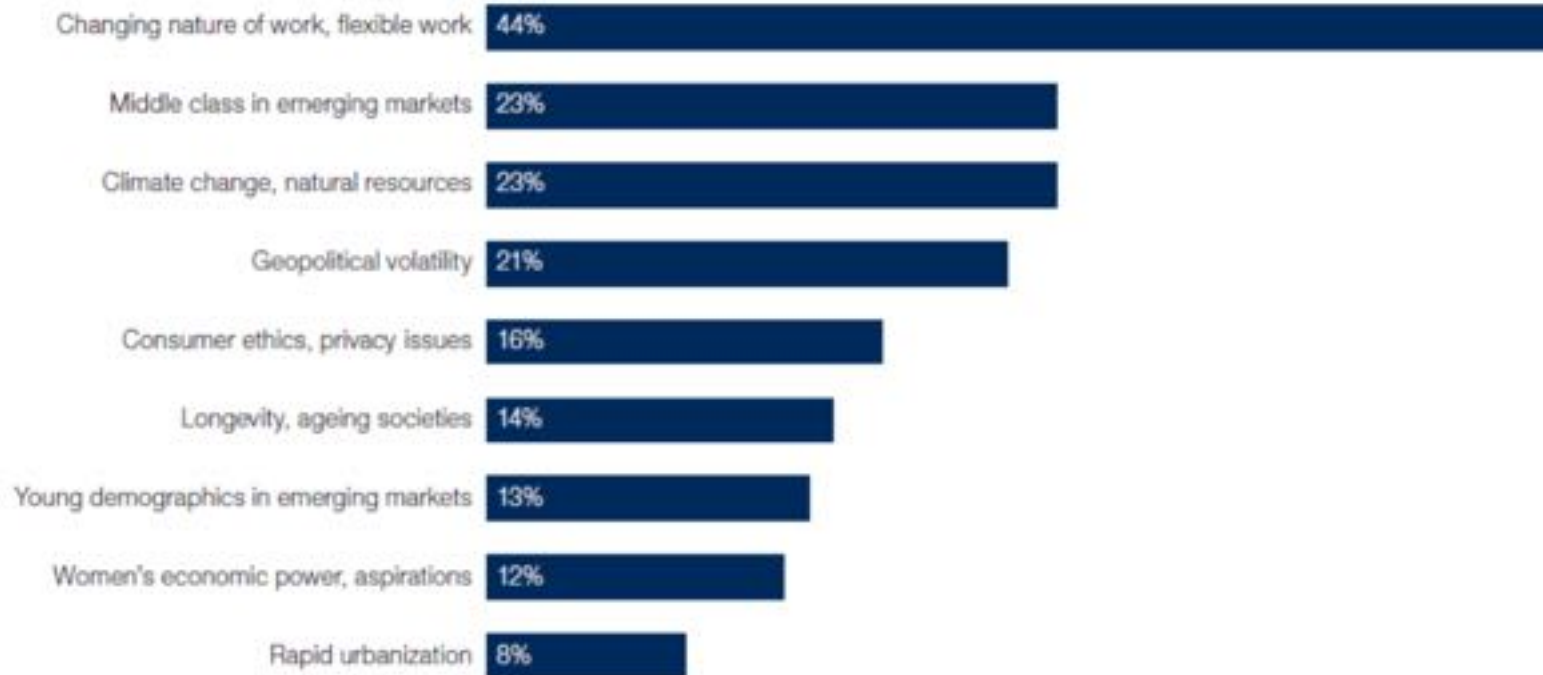


# The future of Jobs



Share of respondents rating driver as top trend, %

## DEMOGRAPHIC AND SOCIO-ECONOMIC



Source: Future of Jobs Survey, World Economic Forum.



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# The future of Jobs Skills Requirement



Abilities	Basic Skills	Cross-functional Skills	
<b>Cognitive Abilities</b> <ul style="list-style-type: none"> <li>» Cognitive Flexibility</li> <li>» Creativity</li> <li>» Logical Reasoning</li> <li>» Problem Sensitivity</li> <li>» Mathematical Reasoning</li> <li>» Visualization</li> </ul>	<b>Content Skills</b> <ul style="list-style-type: none"> <li>» Active Learning</li> <li>» Oral Expression</li> <li>» Reading Comprehension</li> <li>» Written Expression</li> <li>» ICT Literacy</li> </ul>	<b>Social Skills</b> <ul style="list-style-type: none"> <li>» Coordinating with Others</li> <li>» Emotional Intelligence</li> <li>» Negotiation</li> <li>» Persuasion</li> <li>» Service Orientation</li> <li>» Training and Teaching Others</li> </ul>	<b>Resource Management Skills</b> <ul style="list-style-type: none"> <li>» Management of Financial Resources</li> <li>» Management of Material Resources</li> <li>» People Management</li> <li>» Time Management</li> </ul>
<b>Physical Abilities</b> <ul style="list-style-type: none"> <li>» Physical Strength</li> <li>» Manual Dexterity and Precision</li> </ul>	<b>Process Skills</b> <ul style="list-style-type: none"> <li>» Active Listening</li> <li>» Critical Thinking</li> <li>» Monitoring Self and Others</li> </ul>	<b>Systems Skills</b> <ul style="list-style-type: none"> <li>» Judgement and Decision-making</li> <li>» Systems Analysis</li> </ul>	<b>Technical Skills</b> <ul style="list-style-type: none"> <li>» Equipment Maintenance and Repair</li> <li>» Equipment Operation and Control</li> <li>» Programming</li> <li>» Quality Control</li> <li>» Technology and User Experience Design</li> <li>» Troubleshooting</li> </ul>
		<b>Complex Problem Solving Skills</b> <ul style="list-style-type: none"> <li>» Complex Problem Solving</li> </ul>	

Source: World Economic Forum, based on O\*NET Content Model.



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# Nowadays student



## THE STUDENT HAS CHANGED

Always mobile, always moving – Grew up on Social Networks

90% of students think on-line is as good or better

Non-traditional 75% of undergrads are > 25 years old

Source: Online Learning Consortium



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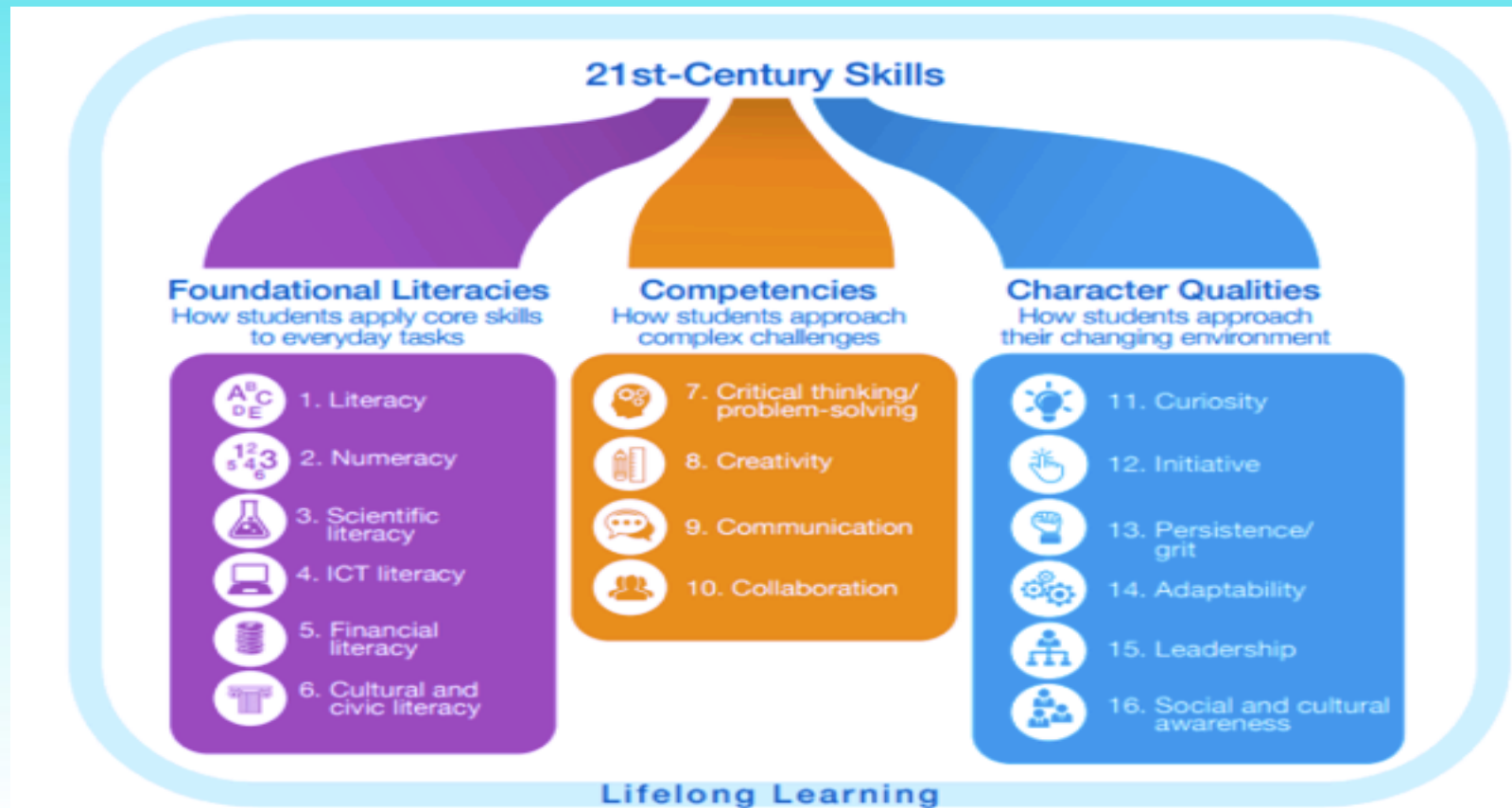


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# Student competencies



Note: ICT stands for information and communications technology.



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# New vision for Education



The New Vision for Education project examines the role that technology can potentially play to improve education for the future. In phase II, we investigated innovative ways to help students develop competencies\* and character qualities\*\* broadly defined as social emotional skills, which are critical components of 21st century skill framework but not a core focus in today's curriculum.



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# SMART Education for Society 5.0



- The revolution is not about introducing more tech into schools. It's about creating access and scalable models to transform Education towards a ubiquitous system .
- Smart Education” Approach should be simplified for teachers, parents and education managers; integrative for community collaborations.
- In the current 4.0 Revolution, Smart Education is constantly happening outside of the School Systems. So how do we maximize opportunities?
  - Lower Costs to Sustain Smart Education
  - Leveraging Resources to Co-Create Qualified Instructions
  - **REMOVE COMPETITIVENESS** and **INSPIRE BENEFICIAL COLLABORATIONS** for sustainable and regenerative development.



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# Long-term strategies for Education in Vietnam



Reform of Education system: curriculum  
Teacher Education

Enhance life-long learning

Cross-industry and public-private collaboration

Core national standard on teacher and  
student competencies



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# Pedagogy in IR. 4.0



TEACHER-LED  
**CLASSROOMS**



PROJECT-BASED  
**LEARNING**

**TRADITIONAL**  
CLASSROOMS



**FLIPPED**  
CLASSROOMS

**INDEPENDENT**  
LEARNING



**COLLABORATIVE**  
LEARNING

**INDIVIDUALIZED**  
LEARNING



**PERSONALIZED**  
LEARNING



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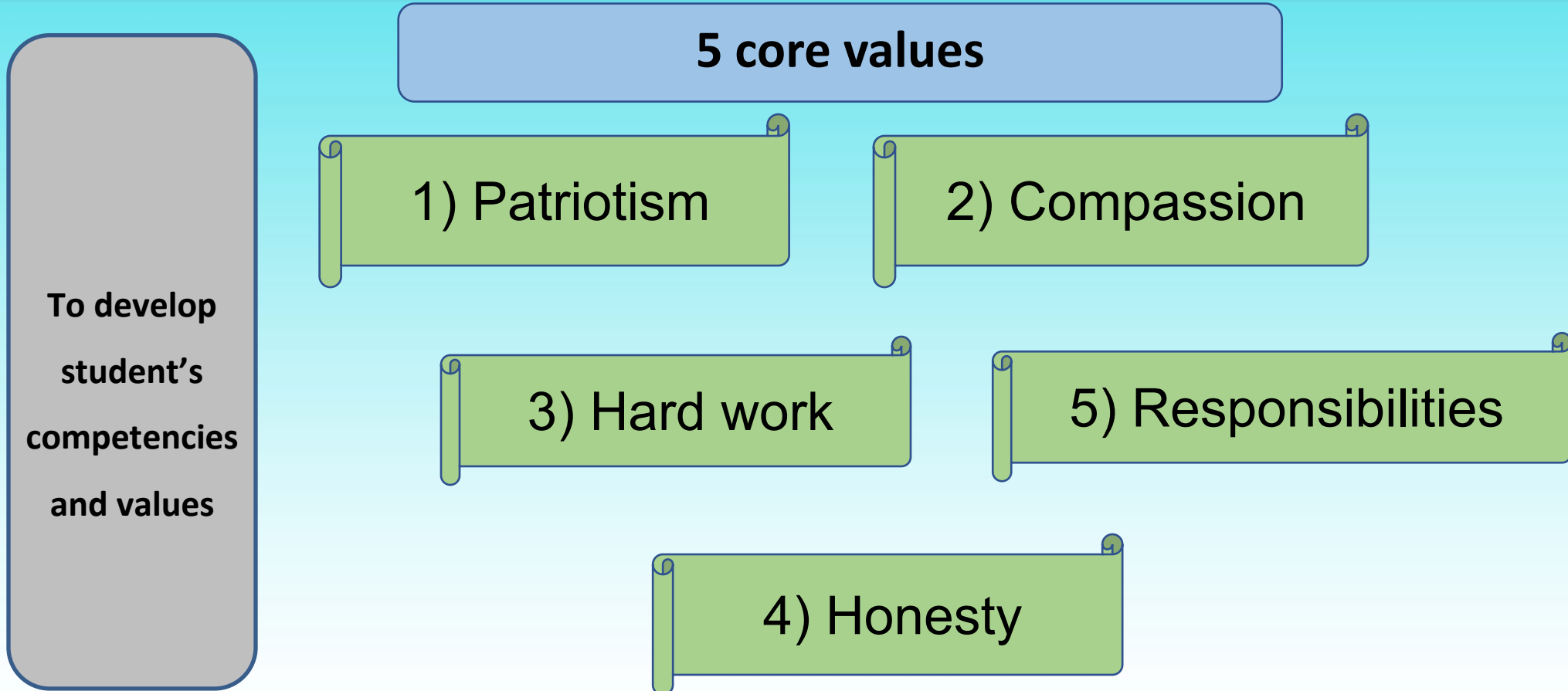


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# Characteristics of the Vietnam new curriculum (from 2020-2021 academic year)



# Characteristics of the Vietnam new curriculum (from 2020-2021 academic year)



To develop  
student's  
competencies  
and values

10 core competencies		Special competencies (for gifted students)
Common competencies	Specifics competencies	
1) Self autonomous 2) Collaboration and communication 3) Problem solving and creativities	1) Language 2) Computation 3) Understanding on Nature and Society 4) Technology 5) Informatic 6) Esthetic 7) Health	



## Competency based curriculum



To develop student's  
competencies and  
values

A

• Differentiated learning

B

• Integrated teaching

C

• Teaching by activities



# Technologies in Education



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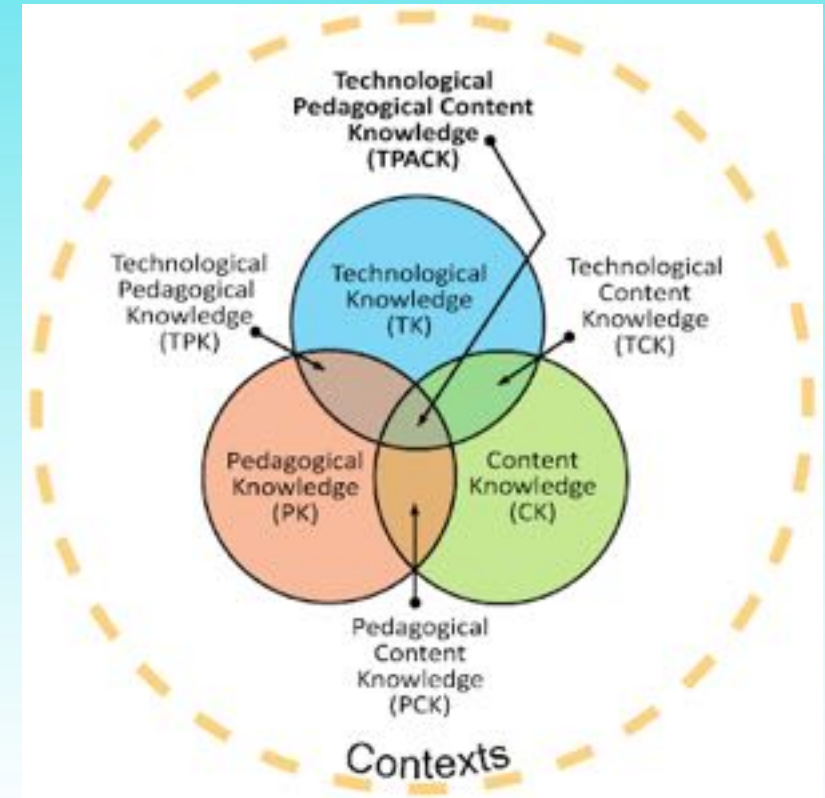
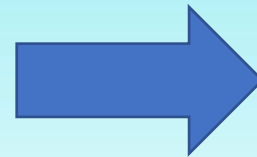
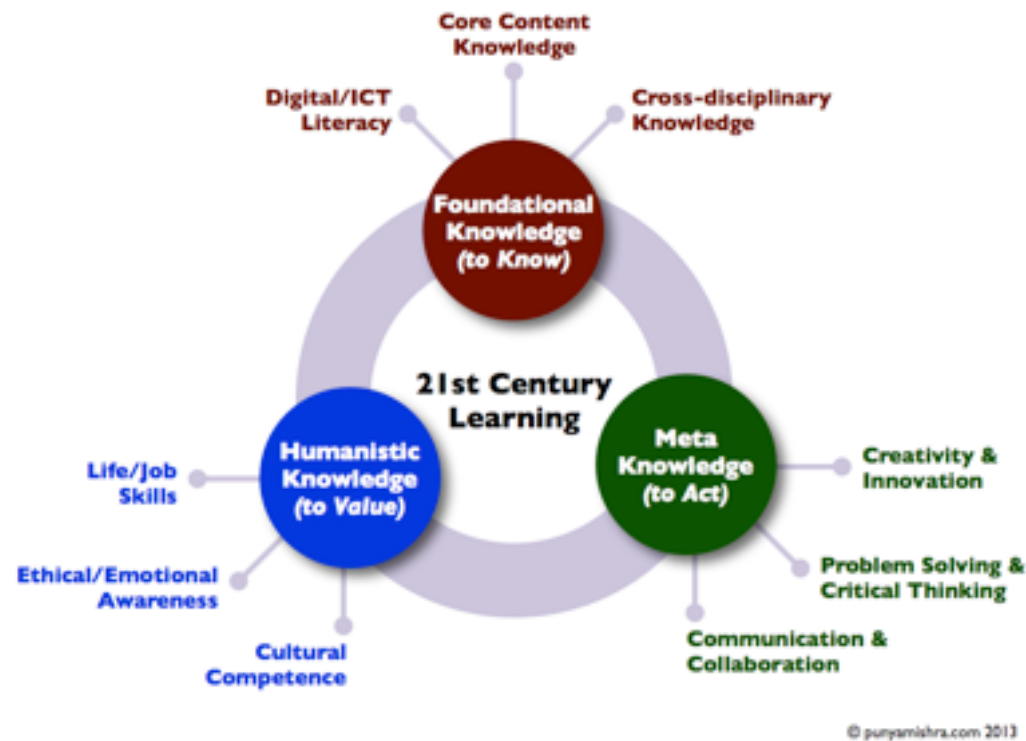
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# TPK model in Vietnam teacher education institution



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# Student digital competencies in new curriculum



Questions	Explanation
1. What are the changes in the curriculum objectives?	<p><b>1. General objectives of the all 3 educational levels</b></p> <ul style="list-style-type: none"><li>- Contribute to the formation and development of all five core qualities, three general competences, and seven professional competences, in particular the informatics competence identified in the General Curriculum.</li><li>- Assists in the formation and development of all students in informatics competence including <b>5 groups of competency components</b>:<ul style="list-style-type: none"><li>- <i>Competence a: Use and management of tools, means, automation systems of IT and ICT.</i></li><li>- <i>Competence b: Knowledge and behavior in accordance with ethical, cultural and legal standards in the information society and knowledge economy.</i></li><li>- <i>Competence c: Detect and solve problems with the support of digital technology.</i></li><li>- <i>Competence d: Learning, self-learning with the support of IT and ICT systems.</i></li><li>- <i>Competence e: Communication, integration, cooperation in accordance with the era of knowledge economy.</i></li></ul></li></ul> <p>Informatic Subject equips students with a common computer knowledge system consisting of three integrated strands:</p> <ul style="list-style-type: none"><li>- Computer Science (CS)</li><li>- Information and Communication Technology (ICT)</li><li>- Digital Literacy (DL)</li></ul>



# Student digital competencies in new curriculum



Primary education level	LSE level	USE level
<p>Topic C. Store, search and exchange information</p> <ul style="list-style-type: none"> <li>• Arrange to make it easy to find</li> <li>• Search for information in problem solving</li> </ul> <p>Topic F. Problem solving with the help of a computer.</p> <ul style="list-style-type: none"> <li>• Do the work according to the steps</li> <li>• Your tasks and computer help</li> <li>• Get familiar with the visual programming environment</li> <li>• Play and explore in <u>an</u> visual programming environment</li> </ul>	<p>Topic C. Store, search and exchange information</p> <ul style="list-style-type: none"> <li>• Social networking and some popular information exchange channels on the Internet</li> <li>• Characteristics of information in the digital environment</li> <li>• Information with problem solving</li> <li>• Evaluate the quality of information in problem solving</li> </ul> <p>Topic D. Ethics, law and culture in digital environments</p> <ul style="list-style-type: none"> <li>• Preventing some harm</li> </ul>	<p>Topic A. Computer and knowledge society</p> <ul style="list-style-type: none"> <li>• Introduction to Artificial Intelligence</li> <li>• Digital devices world</li> <li>• ICT Practice connecting digital devices</li> </ul> <p>Topic B. Computer Network and Internet</p> <ul style="list-style-type: none"> <li>• Network connections</li> <li>• (CS) Get familiar with computer network design</li> </ul> <p>Topic D. Ethics, law and culture in digital environments</p> <ul style="list-style-type: none"> <li>• Obligation of legal compliance in the digital environment</li> <li>• Cultural behavior and online safety</li> </ul>



# Student digital competencies in new curriculum



	<p>Topic D. Ethics, law and culture in digital environments</p> <ul style="list-style-type: none"> <li>• Use appropriate personal information in the digital environment</li> <li>• Software copyright</li> <li>• Information Copyright</li> </ul>	<p>when joining the Internet</p> <ul style="list-style-type: none"> <li>• Cultural behavior through digital media</li> <li>• Ethics and culture in the use of digital technology</li> <li>• Some legal issues about using Internet services</li> </ul> <p>Topic E. Applied computing</p> <ul style="list-style-type: none"> <li>• Mind map and thinking diagram software</li> </ul> <p>Topic F. Problem solving with the help of a computer</p> <ul style="list-style-type: none"> <li>• Visual programming</li> </ul> <p>Topic G. Career with Informatics</p> <ul style="list-style-type: none"> <li>• Informatics and occupations</li> <li>• Informatics and career orientation</li> </ul>	<ul style="list-style-type: none"> <li>• Keep humanity in the virtual world</li> </ul> <p>Topic E. Applied computing</p> <ul style="list-style-type: none"> <li>• (ICT) Graphic Design Software</li> <li>• (ICT) Photo and video editing software</li> <li>• (ICT) Practice creating simple website</li> </ul> <p>Topic F. Problem solving with the help of a computer</p> <ul style="list-style-type: none"> <li>• Create a website</li> <li>• (CS) Introduction to Machine Learning and Data Science</li> <li>• (CS) Simulation in problem solving</li> </ul> <p>Topic G. Career with Informatics</p> <ul style="list-style-type: none"> <li>• Introduce job categories of design and programming</li> <li>• Introduction job categories of data management and processing</li> <li>• Introduce job categories of service and management</li> <li>• Introduce the occupations of applied computing and the fields of information technology</li> </ul>
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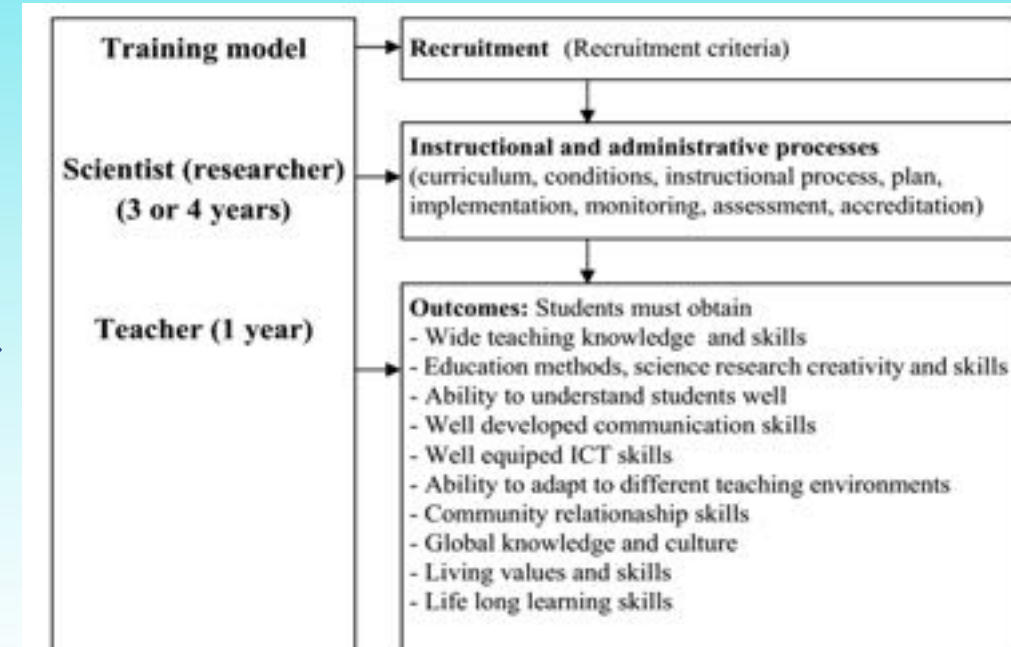


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# Teacher education curriculum in UEd-VNU



Teacher education in	M1	M2	M3		M4		M5		M6	Total credits
			Compulsory	Electives	Compulsory	Electives	Compulsory	Electives		
Mathematics	29	6	12	6	43	0	20	10	10	136
Physics	28	6	12	6	30	6	22	15	10	135
Chemistry	28	6	12	6	52	5	6	12	10	137
Biology	28	6	12	6	31	6	28	9	10	136
Literature	27	6	12	6	15	12	40	7	10	135
History	27	6	12	6	34	10	14	16	10	135



Thanks for your attention



감사합니다 Natick  
Grazie Danke Ευχαριστίες Dalu  
Thank You Köszönöm  
Спасибо Dank Gracias  
谢谢 Merci Seé  
ありがとう



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