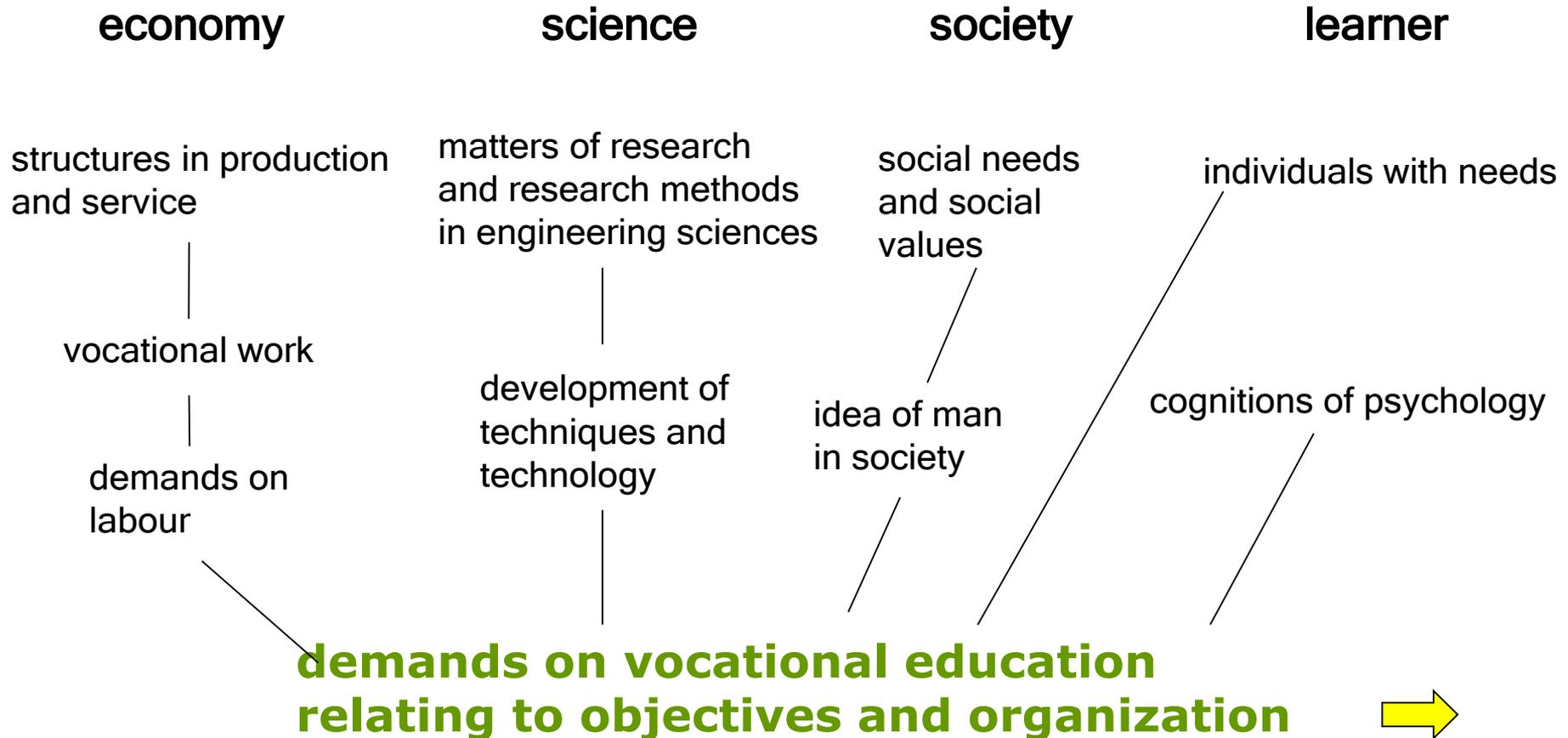


Research – Production – Education
VocEd-M5

Production and Education

Dresden, September 2022

Influence factors of vocational education



对职业教育产生影响的各种因素

职业

教师该职业是
社会生产和
服务结构中的
重要组成部分

工程科学

工程科学的发展
及其对技术、工艺
的影响

社会和教育政策

社会规范和
道德价值标准
→ 社会化过程
学校法、学校规章制度、
教学大纲、教学计划

教育学

教学法原理
教学方法的发展更新
媒体教学技术的变革

Socialization in professional and social life
 职业和社会生活中的社会化

Requirements on employees in
structures of production and service
 生产和服务过程中工作性质对工人的要求

Determine the content 确定以下内容

„Berufliche Handlungskompetenz“

确定以下内容

„Majority“
 „Mündigkeit“

"Employability"
 "Flexibility"
 "Learning"

Out of it be derived
 由此得出

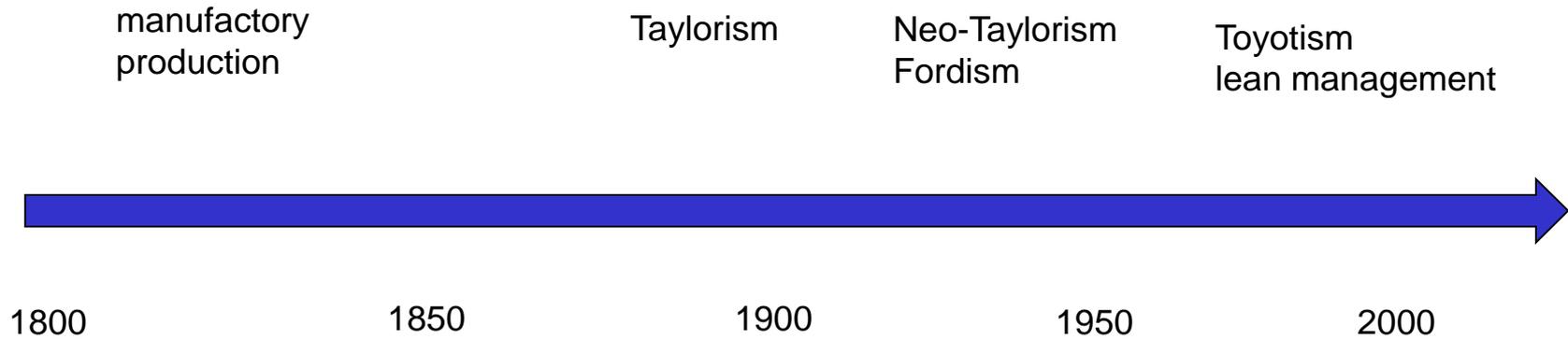
- philosophical positions
- educational psychological regularities
- sociological insights
- ...

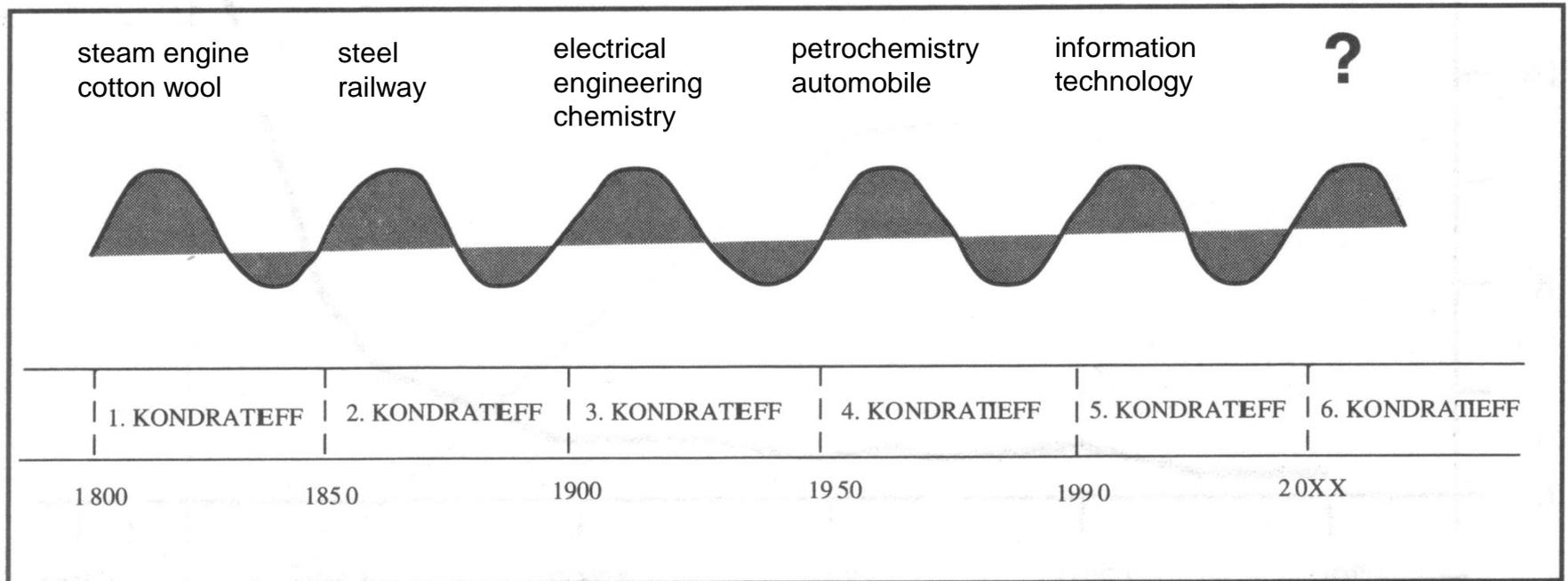
„Act-Theory“

**Didactic
Intentions**
 教学意图

Methodical Procedure 方法

Development of production structures





The long waves in the economy and its basic innovations (Nefiodow 1999, p.3)



Frederick Winslow Taylor
(1856 – 1915)

"Taylor dissected the work as a pathologist, disassembled them in motion, into smaller and smaller units, measured in time and space, newly added them together, separated them in correct and incorrect working methods, and gave them eventually its direction: higher production, lower costs, higher profit, higher pay."

(Dettmer, M.: The modern factory.) In: Der Spiegel 26/1999)

Core programme-led transformation of industrial production and work processes according to Taylor

- Analysis of the existing worker process through time with the stopwatch
- Decomposition thereof in individual handle items
- New combination of the action elements in terms of the optimization of the work process
(avoiding idle times and unnecessary steps, etc.)

(cf. Taylor, f.w.: The principles of scientific management.) (Weinheim & Basel 1977)

Basic principle: Separation of mental and manual work

Labour office

- Reorganization of the micro and macro structures of the production process on the basis of work and time
- imputed preparation of the current production
- Conflict solution

Manual work

- Orientation at work regulations
- Increasing efficiency through routine development
- Motivation by differential wage principle

Master of function

- Technical inspection and ongoing organization of production
- Training of the workforce

"We would not use the advantages of the system, if almost on all machinery would work **lower paid working people instead of trained skilled workers**"

(Taylor 1919)



Aspect	Manufactory Production	Taylorism
Level of automation	low	increasing
Complexity of the tasks	high	very low
Level of freedom in action	high	very low
Character of the work	qualified craft activity	simple tasks
Customer orientation	high	low
Efficiency	low	high
Qualification of worker	high	low

Toyotism – Lean management

"The problem is the thoughtless link of the worker to the machine,
because he watches the work meaningless."

"In Japan, the goal is to utilize the people, not like you the machines."

(K. Sekine, co-inventor of the Toyota production system)



Essence of toyotistic mode of production:

- no democratic attempt to the humanization of work
- Team work with individual responsibility for work organisation, work plan, quality control, multi-purpose work
- Level of work-sharing goes back, work becomes more complex
- Possibility of band stop for each worker
- Product improvement in the interaction between workers and engineer
- Design tasks for individual components are given the suppliers responsibility
- Delivery of the parts "just in time"

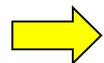
Consequences:

- Flattening of hierarchies in the company
- flexible production with short development times
- smaller amount of personnel
- lower capital investment
- low stock
- Qualification and motivation of individuals gaining significantly

Requirements on the workers/impact on vocational education and training	Lean management	Scientific management (Taylorism)
Holistic approach of thinking and acting	↑	↓
Problemlösevermögen	↑	↓
Social skills	↑	↓
Responsible for production	↑	↓
Self-organization of work	↑	↓
Learning opportunities in the workplace	↑	↓
Equivalence of professional qualifications	Trend of allocation of tasks according to performance ability	Work items for professional qualifications (service outline)
Meeting new needs	Flexibility of staff	Flexibility of management and technology

- Process-chain-oriented company organization instead of functional hierarchies
- Customer-orientation instead of product-orientation
- Responsibility for the project/venture and budget instead of hierarchically structured task management
- Working in teams or groups instead of working alone
- Complete operations instead of individual/single acts
- Self-regulation instead of standardized input/guidelines
- Involvement instead of heteronomy
- Continuous improvement instead of hope for innovation.

(cp. Frieling (1993): Das lernende Unternehmen, p.32)

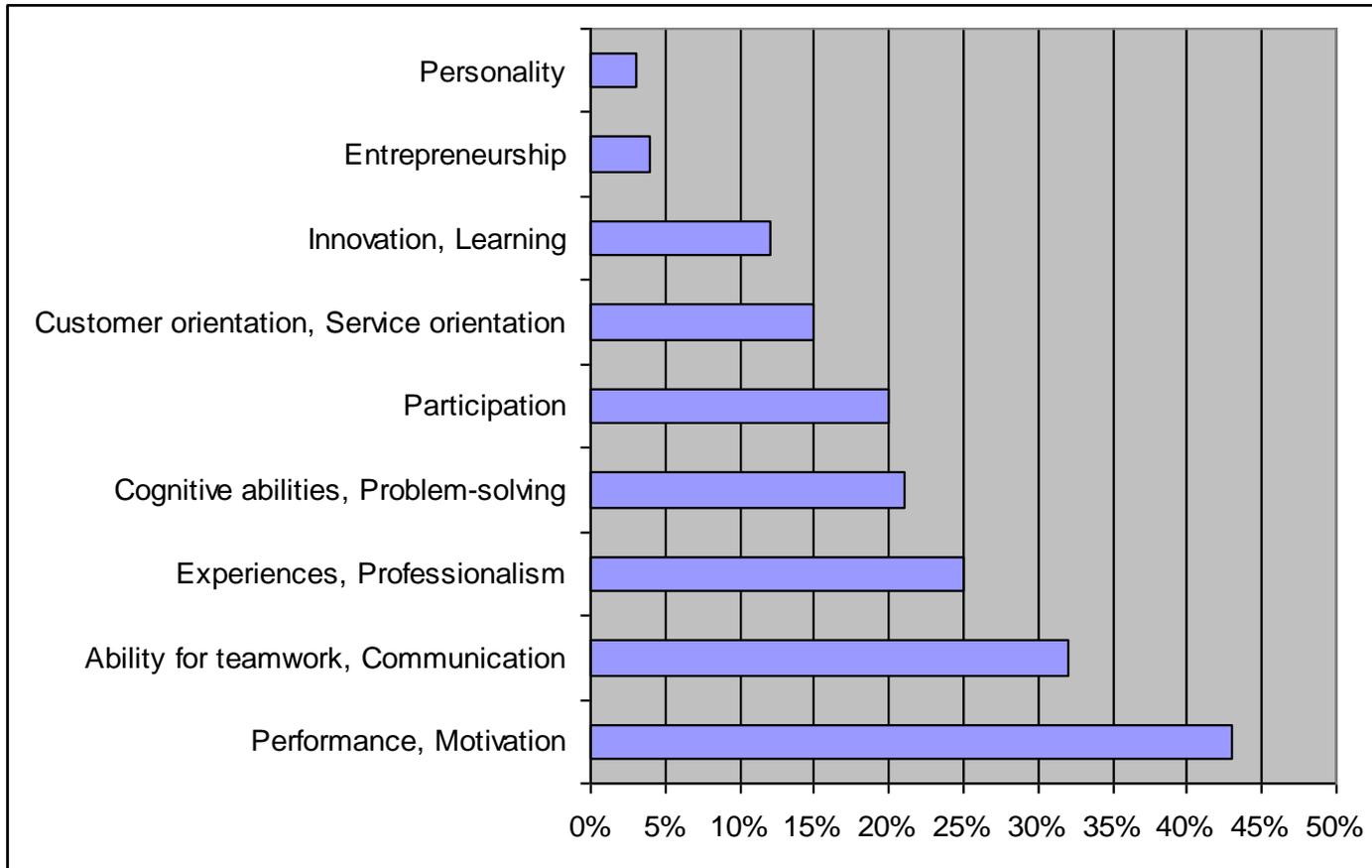


现代化生产结构的特征

- 以过程为导向的组织取代了功能等级制
- 以客户需求为导向取代了以产品为导向
- 项目和预算负责制取代了等级结构性的任务管理方式
- 团队或小组工作取代了单个个体作业
- 完整的行为取代了单一的工作
- 自我控制和管理取代了接受标准化指令
- 参与取代了依赖
- 持续性改善和优化取代了等待改革和创新

(cp. Frieling, Ekkehart: Das lernende
Unternehmen.- Hochheim 1993 , S. 32)

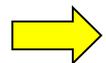
Required Qualifications of Staff to be recruited



Source: Federal Institute for Vocational Training in Germany, 2001

KERN/SCHUMANN: qualifications which are independent of the work processes

- the ability to quickly adapt to new working conditions
→ **“flexibility”**
- the ability of abstract, hypothetical and causal thinking
→ **“technical intelligence”**
- the ability to perceive changes in a complex signal system
→ **“perception”**
- the ability to empathize with complex technical systems
→ **“technical sensibility”**
- the ability to conscientious, reliable and independent work habits →
“responsibility”



KERN/SCHUMANN: 与过程不直接相关的能力

- 能快速地适应新的工作条件
→ “灵活性”
- 能进行抽象思维、假设性思维和因果思维
→ “理解力”
- 能发觉复杂的符号系统中的变化 → “感知力”
- 能领会复杂的技术系统
→ “技术灵敏性”
- 能认真、可靠并独立地完成工作
→ “责任感”

mental abilities which enable the transfer of existing experience to new situations, for example, logical thinking, analytical thinking and constructive thinking

→ Basic qualifications

abilities that enable quick access to knowledge stored somewhere else, i. e. abilities for gaining, understanding and processing information

→ Horizontal qualifications

knowledge abilities and skills which occur as requirements in many workplaces within a field of occupation or field of professional activity (e.g. knowledge of measurement technology or of occupational safety)

→ General elements

abilities to compensate generation-specific educational differences through individual learning.

→ Vintage factors

- Working with projects
- Working with Case Studies (Harvard-Case-Method)
- Business Game
- Role Playing

Thank you for your attention!

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