ALGORITHMIC LITERACY OF POLISH STUDENTS IN SOCIAL SCIENCES AND HUMANITIES

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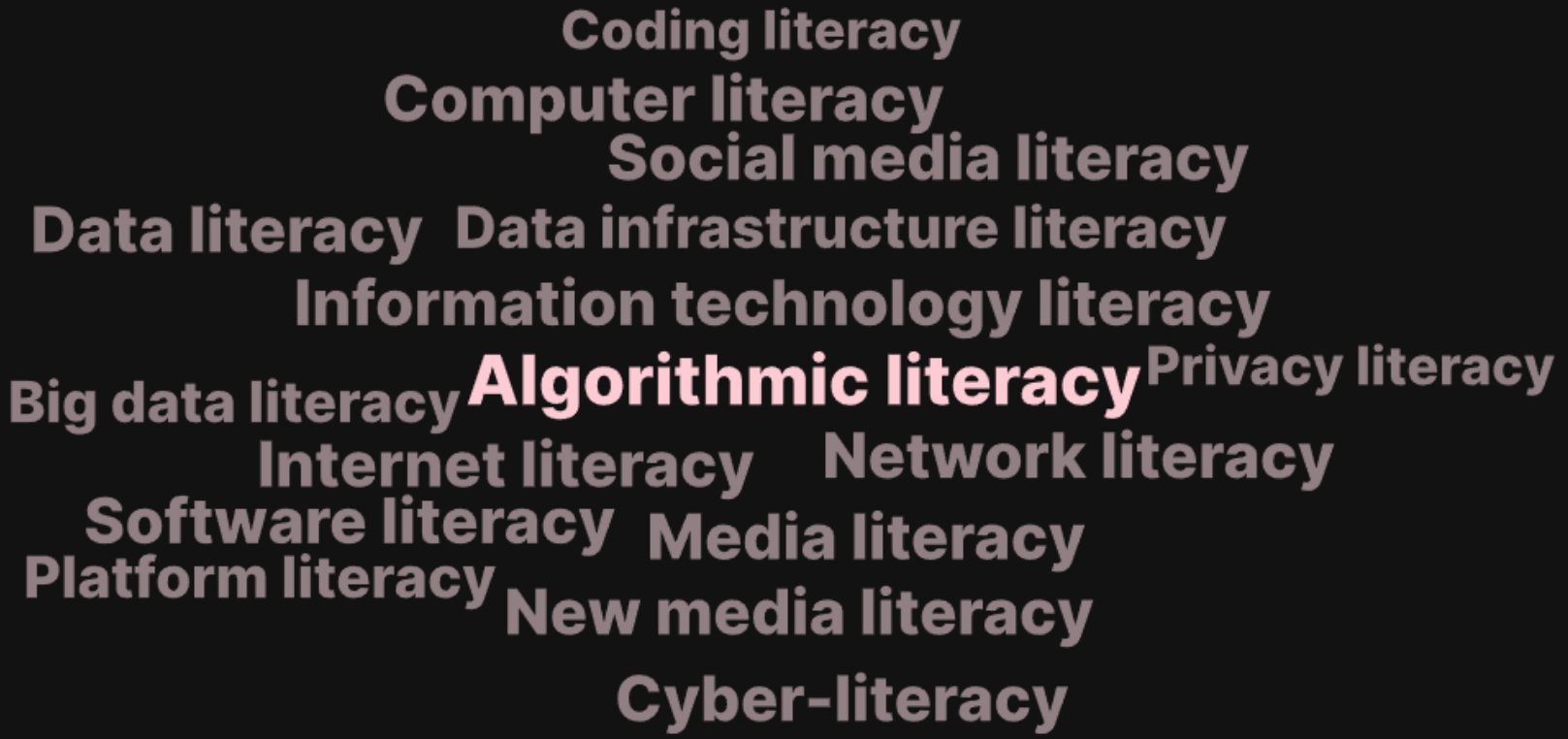
WHAT IS ALGORITHMIC LITERACY?


Coding literacy
Computer literacy
Social media literacy
Data literacy
Data infrastructure literacy
Information technology literacy
Big data literacy
Algorithmic literacy
Privacy literacy
Internet literacy
Network literacy
Software literacy
Media literacy
Platform literacy
New media literacy
Cyber-literacy

WHAT IS ALGORITHMIC LITERACY?

KNOWLEDGE

about the functioning of the algorithms

AWARENESS

of consequences caused by algorithmic operations

ABILITY

to critically evaluate technologies based on algorithms

02

MEASURING AL:

Algorithm Literacy Scale for Internet Users

ALGORITHM LITERACY SCALE FOR INTERNET USERS (DOGRUEL, 2022)

ALGORITHM KNOWLEDGE SCALE

2 ITEMS

11 TRUE/FALSE OPTIONS

ALGORITHM AWARENESS SCALE

2 ITEMS

11 TRUE/FALSE OPTIONS

03

RESEARCH OBJECTIVES AND METHODOLOGY

OBJECTIVES

- Preliminary assessment of algorithmic literacy among Polish students of selected faculties
- Testing the Algorithmic Literacy Scale in the Polish context
- Critical analysis of the scale

METHODOLOGY

1. **QUANTITATIVE Algorithm Literacy Scale for Internet Users**
2. **QUALITATIVE Open ended items:**

Question 1	Was any of the questions unclear?
Question 2	Are you unsure about the correct answer to any of the questions?
Question 3	Was the knowledge acquired during your studies useful in answering the above questions?
Question 4	Are there any subjects in the study program that cover topics related to algorithms (in a technical and/or socio-cultural context)? What are the specific topics they cover?

SAMPLE:
STUDENTS OF SELECTED FACULTES

(*n* = 47)

Architecture of Information Spaces

University of Warsaw
(*n* = 12)

Information in the Digital Environment

speciality: Information Management

University of Łódź
(*n* = 18)

Sociology

speciality: Individual and Contemporary Culture

University of Łódź
(*n* = 17)

HYPOTHESES

- There are differences in levels of algorithmic literacy between students of other faculties
- There is lack of clarity of some items in the questionnaire

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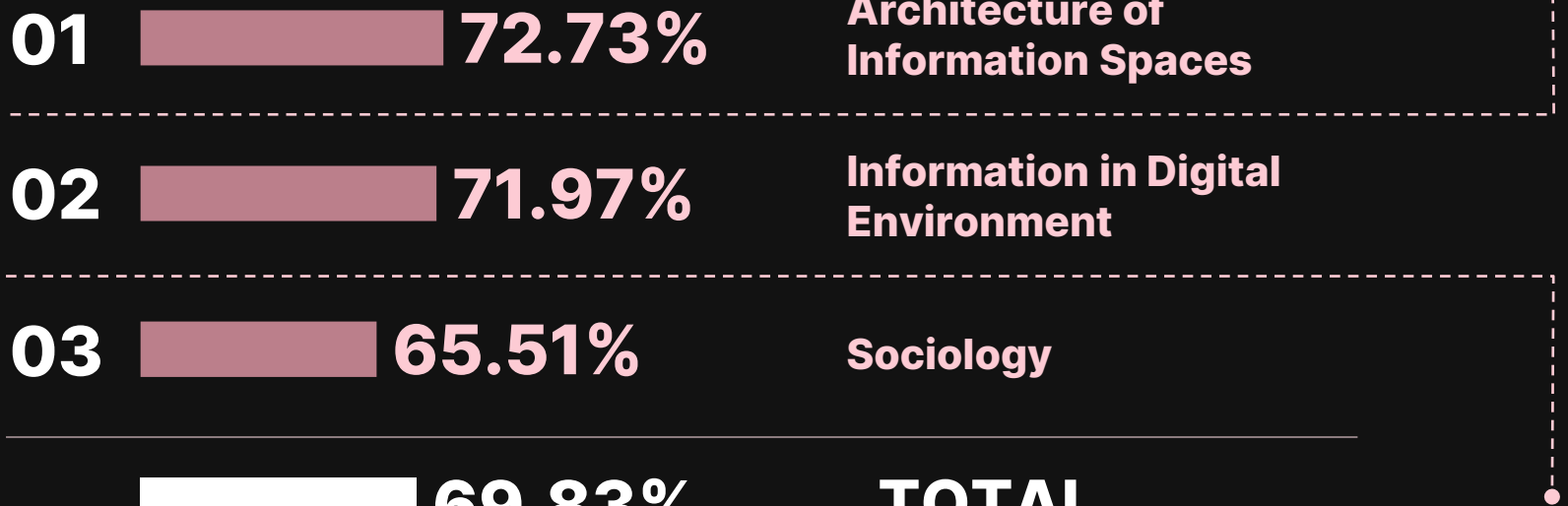
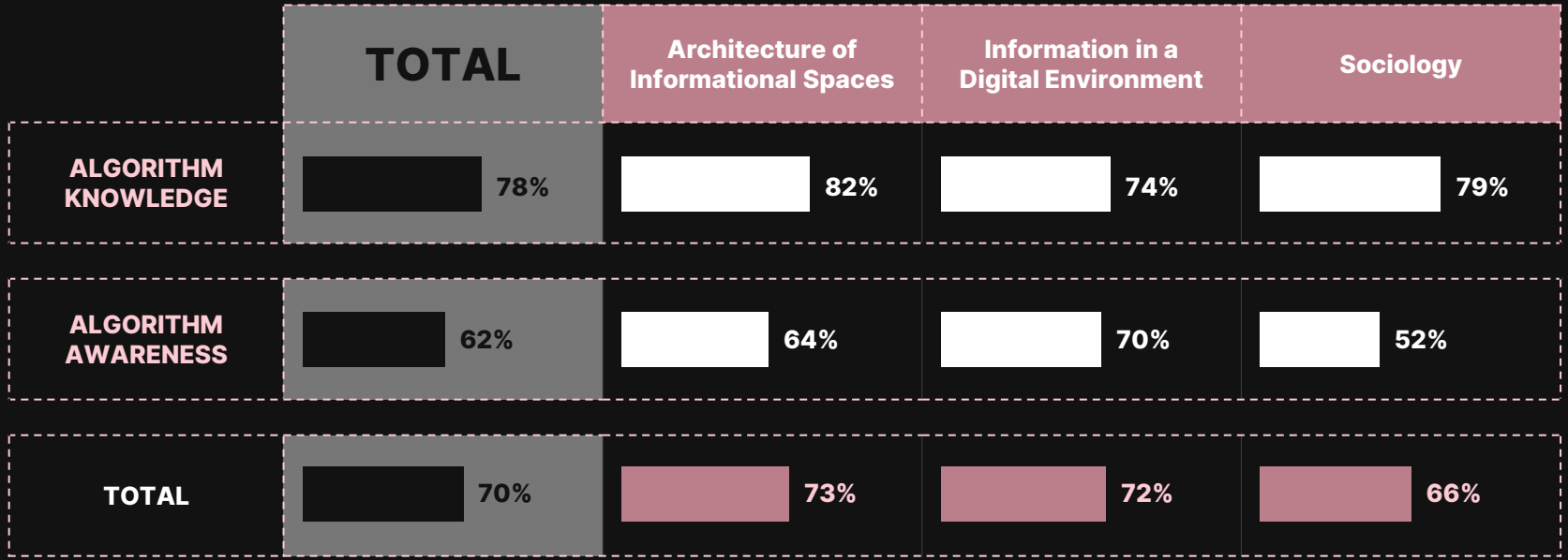
FINDINGS

OVERALL SCORES



MEAN RESULTS BY FIELDS OF STUDIES



ALGORITHM KNOWLEDGE RESULTS

ITEM AK1 – POINTS SCORED BY THE WHOLE GROUP

WHAT DO YOU THINK ALGORITHMS DO ON THE INTERNET?	% OF RIGHT ANSWERS
✗ Algorithms recognize that results, such as e.g., search results, are incomplete and automatically correct themselves	57%
✓ Algorithms can develop themselves in a completely different direction from that for which they were created	45%

✓ - True ✗ - False

ITEM AK2 – POINT SCORED BY THE WHOLE GROUP

YOU WILL NOW SEE SOME STATEMENTS ABOUT ALGORITHMS, SOME OF THEM ARE TRUE, SOME ARE FALSE	% OF RIGHT ANSWERS
✗ Algorithms are able to think like human beings	98%
✓ Algorithms present both chances and risks	96%
✗ Algorithms are independent of government censorship	94%
✓ When searching for a job online, job offers displayed may vary from person to person despite the same search entry	91%
✓ The use of algorithms which deliver personalized content can mean that the content you find is mostly consistent with your pre-existing opinions	91%
✓ I can influence algorithms with my internet usage behavior	89%
✗ Humans are never involved when algorithms are used	87%
✗ The database used by an algorithm is not decisive in determining its quality	72%
✓ For some media companies, content that is repeated regularly (e.g., traffic reports) is already written by algorithms	34%

✓ - True ✗ - False

ALGORITHM AWARENESS RESULTS

ITEM AA1 – SCORE GAINED BY THE WHOLE GROUP

SELECT POSSIBLE SOURCES OF DATA USED BY ALGORITHMS	% OF RIGHT ANSWERS
✓ Internet-Browsers (e.g. Internet Explorer, Firefox, Opera, Google Chrome)	98%
✓ Smart speaker (e.g. Alexa)	72%
✓ Smart TV	64%
✓ Wearable computing devices such as activity trackers, heart rate monitors	62%
✓ Electronic payment (credit-, debit cards)	51%
✓ Computer games	43%
✓ Cell Phone Towers	34%

✓ - True ✗ - False

ITEM AA2 – SCORE GAINED BY THE WHOLE GROUP

DO YOU KNOW WHICH OF THE FOLLOWING FUNCTIONS ARE OFTEN PERFORMED BY ALGORITHMS?	% OF RIGHT ANSWERS
✓ To make product recommendations	100%
✓ To personalize advertisements	98%
✓ To create financial news (stock markets)	34%
✓ To create weather forecast	26%

✓ - True ✗ - False

THE WIDESPREAD KNOWLEDGE

97.87%

Algorithms are not able to think like human beings

95.74%

Algorithms present both chances and risks

93.62%

Algorithms are dependent of government censorship

91.49%

When searching for a job online, job offers displayed may vary from person to person despite the same search entry

91.49%

The use of algorithms which deliver personalized content can mean that the content you find is mostly consistent with your pre-existing opinions

THE LIMITED KNOWLEDGE

34.04%

For some media companies, content that is repeated regularly (e.g., traffic reports) is already written by algorithms

THE WIDESPREAD AWARENESS

ALGORITHMS ARE USED

100%
To make product recommendations

97.87%
To personalize advertisements

SOURCES OF DATA FOR ALGORITHMS

97.87%
Internet-Browsers

THE LIMITED AWARENESS

ALGORITHMS ARE USED

34.04%
To create financial news

25.53%
To create weather podcasts

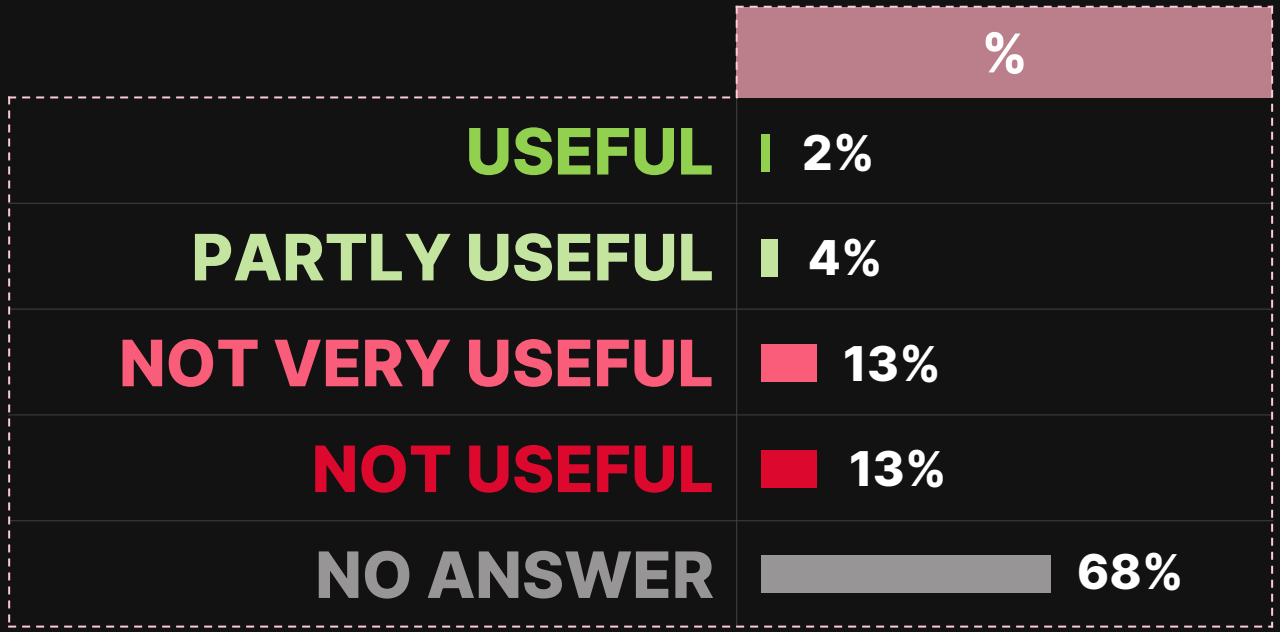
SOURCES OF DATA FOR ALGORITHMS

34.04%
Cell Phone Towers

42.55%
Computer games

USEFULNESS OF KNOWLEDGE FROM STUDIES

USEFULNESS OF KNOWLEDGE ACQUIRED DURING THE STUDIES



05

CRITIQUE OF THE TOOL

CRITICAL ANALYSIS OF THE QUESTIONNAIRE

AMBIGIOUS QUESTIONS:

✗	**„Algorithms recognize that results, such as e.g., search results, are incomplete and automatically correct themselves”**
✓	**„Algorithms can develop themselves in a completely different direction from that for which they were created”**
✓	**„I can influence algorithms with my internet usage behavior”**
✗	**„Algorithms are able to think like human beings”**
✗	**„Humans are never involved when algorithms are used”**

06

PROPOSAL OF FRAMEWORK FOR ALGORITHMIC LITERACY SCALE

PROPOSAL OF FRAMEWORK FOR ALGORITHMIC LITERACY ANALYSIS

Our proposition is inspired by

“The framework catalogue of digital competences”

(Jasiewicz et al., 2015)

The catalogue has a tree structure:

Relevant areas of life

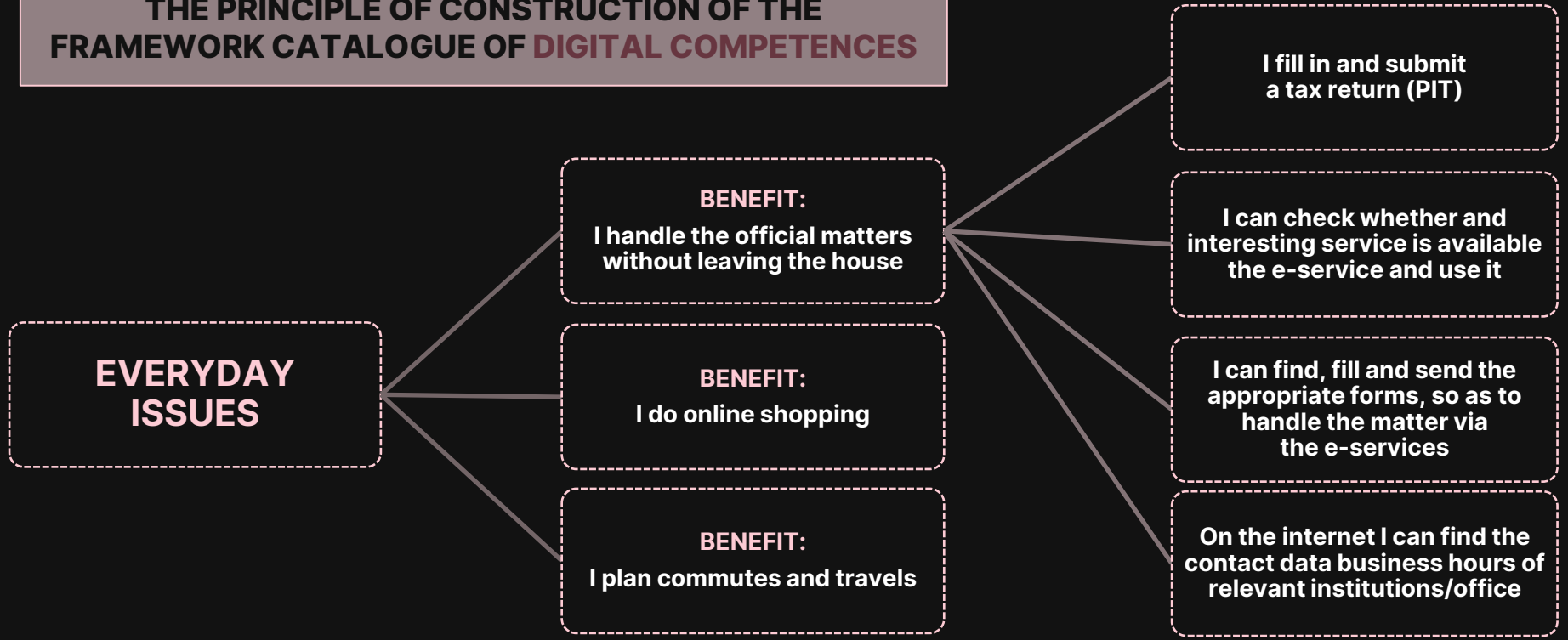
↓

Benefits resulting from the use of digital technologies in each area

↓

Digital competences

THE PRINCIPLE OF CONSTRUCTION OF THE FRAMEWORK CATALOGUE OF DIGITAL COMPETENCES



AREA OF LIFE:
Consumer market

BENEFIT:
I make more informed purchasing decisions

COMPETENCY:
I can critically analyze and evaluate personalized recommendations by e-commerce recommender systems

INDICATORS:

1. DO YOU KNOW WHO OR WHAT CREATES RECOMMENDATIONS IN MOST ON LINE STORES?

A) Automated recommender systems

B) They are prepered manualy by the staff of the store

2. DOES EVERY VISITOR OF MOST ONLINE STORES GETS THE SAME RECOMMENDED OFFERS?

A) Yes

B) No

3. CAN YOU GIVE AT LEAST THREE SOURCES OF DATA THAT MAY BE THE SOURCE OF INFORATION FOR ONLINE STORE RECOMMENDER SYSTEMS?

> .....

THANK YOU!

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