Burnout Prevalence in Special Education Teachers, and the Positive Role of ICTs

https://doi.org/10.3991/ijoe.v19i08.38509

Agathi Stathopoulou[1](✉), Despina Spinou[2], Anna Maria Driga[2]
[1]Department of Public and Community Health, University of West Attica, Aigaleo, Greece
[2]Net Media Lab Mind – Brain R&D IIT – N.C.S.R. "Demokritos", Agia Paraskevi, Athens, Greece
a.stathopoulou@uniwa.gr

Abstract—The aim of this study was to investigate special education teacher's level of burnout. In particular, it sought to examine the role their personal characteristics play in the occurrence of the syndrome. A quantitative research design was used to describe the association between the variables The data was collected using the Maslach Burnout Inventory for Education (M.B.I.-E.S.) consisted of three dimensions: Emotional exhaustion, Depersonalization, and Personal accomplishment. The sample consisted of 202 Special Education (S.E) teachers who completed the M.B.I.-E.S. The results of this research showed that: a) the sample experiences burnout and special attention is required for the scale of emotional exhaustion b) age, school settings, specialty, and the total previous service with or without students with special educational needs (S.E.N.) were significantly correlated and affected burnout dimensions.

Keywords—burnout, teachers, special educational needs

1 Burnout syndrome

Occupational burnout does not appear suddenly in the worker's life but its clinical appearance arises gradually after a wide range of symptoms. The first signs appear after personal disappointments or repeated failures in their expectations. Unless internal or external reinforcements take effect in time, the individual may suffer severe emotional, interpersonal or professional consequences [1,2,3]. In particular, the symptomatology includes:

- Intense emotional outbursts such as depression, irritability, sleep disturbances, tensions in their interpersonal relationships and especially within the family,
- Negative influences in the cognitive and professional field such as the difficulty in making decisions, gathering and retrieving important information for one's work,
- Unexpected behavioral reactions manifested by self-destructive tendencies, consumption of alcohol or drugs,
- Frequent occurrence of emotional exhaustion, frustration, low self-esteem, self-confidence and depersonalization [3,4,5]. At this point teachers feel that they have not achieved their initial goals at a personal and social level.

The burnout syndrome has adverse effects on the personal, social and professional life of an employee [6,7]. These burnout impacts on individuals could be grouped into 5 major categories:

- Physical consequences: These concern symptoms that affect the worker's physical condition and have to do with chronic physical exhaustion and lack of energy. This category includes respiratory, musculoskeletal, gastrointestinal and dermatological problems as well as feeding and sleeping problems. Physical exhaustion, severe headaches, constant overexertion, dysfunction in the sexual area as well as abnormalities in weight, menstruation and speech are also evident. In extreme cases, other severe problems can appear such as cardiovascular diseases, diabetes mellitus, ulcers, increased cholesterol and hypertension [8,9].
- Emotional consequences: This category includes all the symptoms that affect the employee's emotional state. These consequences manifest in irritation, cynical attitudes, feelings of insecurity and frustration, depersonalization and a strong sense of inferiority. Also, individuals show intense anger, restlessness, low morale and self-esteem, boredom, lack of patience and obsessive or paranoid thoughts [10,11].
- Interpersonal consequences: They concern the employee's personal, family and social life. In this category, there are strong phenomena of isolation and distancing of the individual from his work environment, withdrawal from his personal social obligations and intense outbursts and conflicts [11,12].
- Professional consequences: They mainly affect work and the working relationships developed in it. The employee exhibits bad and unprofessional behavior in his working environment, being controvercial, reactionary and irritable [12,13].
- Behavioral consequences: These symptoms include the negative effects manifested by the employee in his daily life. As he suffers from the phenomenon of occupational burnout, the employee may resort to the use of alcohol, medicines or even drugs. He exhibits conflicting attitudes at work either expressing dissatisfaction or becoming a "workaholic". He is very often late or absent from work, has the tendency to run away or even thinks about changing professional orientation [11,14,15,16].

2 Method

2.1 Research questions and hypotheses

The purpose of this study was to investigate special education teachers' professional burnout. The study was guided by the following research questions:

1) What are the levels of burnout of teachers that work with students with SEN?
2) How are the burnout dimensions related to their demographic data such as gender, age, school setting, educational level, marital status, specialty as well as years of experience working with students with SEN?

Sample. The socio-demographic and work characteristics of the sample are presented in detail in Table 1.

Table 1. The socio-demographic and work characteristics

Variable	(N) 202	(%)
Gender		
men	32	15.8%
women	170	84.2%
Age		
22–29 years old	58	28.7%
30–35 years old	70	34.7%
36–40 years old	27	13.4%
41–50 years old	25	12.4%
51–60 years old	18	8.9%
61 years old and above	4	2%
Marital status		
Married	98	48.5%
Unmarried	104	51.5%
Educational level		
Degree	56	27.7%
Master Degree	123	60.9%
Phd	3	1.5%
Special Educational Training	20	9.9%
Specialty		
Primary Education		
Kindergarten teacher	17	8.41%
Main stream School Teacher	96	47.5%
Special Education Teacher	43	21.3%
Secondary education		
Language teacher	21	10.4%
Mathematician	7	3.5%
ICT teacher	1	0.5%
Physicist	5	2.5%
Biologist	1	0.5%
English teacher	7	3.5%
Physical Education teacher	4	2%
School settings		
Special Education School	38	18.8%
Main Stream School	113	55.9%
Inclusion classes	10	5%
Parallel support	41	20.3%
Previous Educational service		
0–5 years	70	34.7%
6–10 years	51	25.2%
11–20 years	47	23.3%
21–30 years	26	12.9%
31 years and above	8	4%
Years of experience in Special Education Schools		
0–5 years	92	45.5%
6–10 years	48	23.8%
11–20 years	37	18.3%
21–30 years	20	9.9%
31 years and above	5	2.5%

2.2 Research tools

The M.B.I.-E.S (Maslach Burnout Inventory – Educators Survey) was used to measure the S.E. teachers' professional burnout. The M.B.I.-E.S., translated in Greek and adapted for the Greek special education school settings, has widely been used for the study of the burnout syndrome [17,18]. It consists of twenty-two self-assessment questions that examine the three burnout factors [6,7,14] emotional exhaustion, personal accomplishment and depersonalization. The responses revealing the emotions experienced by the S.E. teachers derive from a seven-point Likert scale ranging from 0=never to 7=every day. The score for each of the three subscales of the syndrome is calculated separately and is classified as high, moderate or low. (Table 2) High percentages in the depersonalization and emotional exhaustion reveal increased burnout, while corresponding results in personal accomplishment reveal lower occurrence of the variables.

Table 2. Burnout levels of M.B.I.-E.S.

	Low	**Moderate**	**High**
emotional exhaustion	≤16	17–26	≥27
Depersonalization	≤8	9–13	≥14
personal accomplishment	≥37	31–36	≤30

The questionnaire was also accompanied by nine demographic question related to quantitative categorical variables such as gender, age, marital status, educational level, the school setting in which the teachers practice their profession, specialty, total years of service as well as years of experience in the education with students with special educational needs.

2.3 Data collection process

The research began in January 2022 and ended in May of the same year. A total of 202 questionnaires were completed by teachers working at either Mainstream or Special education school settings randomly selected. Sixty-five S.E. teachers teaching at schools located in the Attica Prefecture completed paper questionnaires, while 140 S.E. teachers from schools all over Greece completed online questionnaires.

2.4 Data analysis

Reliability Testing of the Maslach Burnout Inventory for Educators (MBI -ES). The MBI -ES internal consistency was assessed with the Cronbach's α coefficient. The reliability analysis showed that Emotional Exhaustion and Depersonalization had very high levels of internal consistency: $\alpha = 0.93$ and $\alpha = 0.86$ respectively. Personal accomplishment indicated an acceptable level of internal consistency: $\alpha = 0.75$.

3 Research results

3.1 Levels of occupational burnout

Tables 3 and 4 show that teachers seem to experience burnout, with emotional exhaustion being prominent among the three factors. The data descriptive analysis revealed that a high percentage of participants (67.8%) experience high levels of emotional exhaustion, while almost one third of them (33.7%) experience depersonalization and only an insignificant percentage of 0.5% experience lower personal accomplishment. It seems that emotional exhaustion and depersonalization highly contribute to the S.E. teachers' professional burn out, while they do not seem to experience any impediments in their personal accomplishment.

Table 3. Descriptive data analysis for each dimension of burnout

Subscale	Average A	Standard Deviation SD	Range (R)
emotional exhaustion (possible range 7–63)	33.79	11.58	51
depersonalization (possible range 7–35)	12.26	6.4	25
personal accomplishment (possible range 7–56)	43.77	6.52	63

Table 4. Burnout prevalence percentages

Subscale	Low Levels N (%)	Moderate Levels N (%)	High Levels N (%)
emotional exhaustion	12 (5.9%)	53 (26.2%)	137 (67.8%)
depersonalization	62 (30.7%)	72 (35.6%)	68 (33.7%)
personal accomplishment	175 (86.6%)	26 (12.9%)	1 (0.5%)

3.2 Correlations between teachers' demographic characteristics and burnout factors

Before performing the univariate analyses, the levels of some independent variables were clustered to avoid problems with the statistical analysis power due to the small sample used. In particular, the "Age" categories "51–60 years old" (only 4 participants) and "over 61 years old" were combined to the "over 51 years old" category. The educational level category "PhD" (3 participants) was combined with "Master degree" to form the new category: "PhD/Master degree". The "Years of service" (both total and with students with special needs) category "over 31 years" was combined with the category "21–30 years" to the new category "over 21 years". Finally, the specialty categories "ICT teacher", "mathematician", "physicist" and "biologist" were grouped under "positive science" and "English teacher" and "Physical Education teacher" under the category "Other". The special education kindergarten teacher category was removed from the analysis due to low representation (2 participants).

As can be seen in Table 5, the women of the sample were found to have higher levels of emotional exhaustion as well as more barriers to their personal accomplishment compared to men, while the men were found to have higher levels of depersonalization. However, the student t test for independent samples showed that these differences did not reach the limits of statistical significance for any of the burnout dimensions: $t(200) = -1.56$, $p>0.05$ for Emotional Exhaustion, $t(200) = 1.41$, $p>0.05$ for Depersonalization and $t(200) = -1.11$, $p>0.05$ for Personal accomplishment.

Table 5. Effect of gender on the dimensions of burnout

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization A. (SD.)	Personal Accomplishment A. (SD.)
Men	32	30.88 (12.52)	13.72 (7.87)	42.59 (6.34)
Women	170	34.34 (11.35)^{NS}	11.99 (6.08)^{NS}	43.99 (6.55)^{NS}

Note: ^{NS}non-statistically significant $p>0.05$.

With reference to age, the results are presented in detail in Table 6. As can be seen in the table, the highest levels of emotional exhaustion were observed for the oldest participants (over 41 years old), while the lowest levels appeared in those aged 30–40. Likewise, significantly higher levels of depersonalization were observed for participants aged 51 and over, while those aged 36–40 exhibited the lowest levels of depersonalization. Finally, participants aged 36–40 were also those with the highest levels of personal accomplishment, while teachers over 51 years old had the lowest levels in this factor. The one-way ANOVA analysis showed the effect of age on burnout to be statistically significant for Emotional Exhaustion: $F(4,197) = 2.93$, $p<0.05$ and statistically very significant for Depersonalization and Personal accomplishment: $F(4,197) = 6.39$, $p<0.01$ and $F(4,197) = 6.03$, $p<0.01$ respectively.

Table 6. Effect of age on the dimensions of burnout

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization. A. (SD.)	Personal Accomplishment A. (SD.)
22–29 years old	58	33.48 (11.34)	12.12 (6.23)	44.26 (8.1)
30–35 years old	70	31.87 (10.89)	11.46 (5.43)	44.9 (4.4)
36–40 years old	27	31.89 (11.98)	10.41 (4.6)	45.67 (5.66)
41–50 years old	25	35.84 (10.85)	11.56 (5.82)	42.28 (6.12)
51 years old	22	40.68 (12.67)*	18.27 (8.97)**	38.23 (6.17)**

Note: *Statistical significant $p<0.05$, **Statistical significant $p<0.01$.

Furthermore, a Bonferroni test was carried out to examine whether statistically significant differences appeared between the categories of "Age". Regarding Emotional Exhaustion, a statistically significant difference was found between the "30–35 year-old" and those aged over 51 teachers ($p=0.018$), while a marginal non statistically significant difference was found between "36–40 year-old" teachers and those over

51 years of age (p=0.077). In addition, teachers belonging to age categories under 50 were found to have a statistically significant difference in Depersonalization with teachers aged over 51 (p<0.01). Finally, in terms of Personal accomplishment, participants aged under 40 were found to have a statistically significant difference with those aged over 51 (p<0.01). It is worth noting that no statistically significant differences were found between the ages "41–50" and "over 51" (p=0.269).

With regards to their marital status, the single participants showed slightly higher levels of emotional exhaustion and depersonalization compared to their married ones (Table 7). Similarly, their levels of personal accomplishment were a little lower. Therefore, it is not surprising that the student t test for independent samples showed a non-statistically significant association of marital status with the burnout dimensions: t(200) = –0.34, p>0.05 for Emotional Exhaustion, t(200) = –0.41, p>0.05 for Depersonalization and t(200) = 0.75, p>0.05 for Personal accomplishment.

Table 7. Marital status correlation with the burnout dimensions

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization A. (SD.)	Personal accomplishment A. (SD.)
Married	98	33.5 (11.31)	12.07 (6.43)	44.12 (7.61)
Unmarried	104	34.06 (11.88)^{NS}	12.42 (6.41)^{NS}	43.43 (5.31)^{NS}

Note: ^{NS}non-statistically significant p>0.05.

Regarding their educational level, Table 8 shows that teachers with special education training had the highest levels of depersonalization and emotional exhaustion, while they also differentiated for their lowest levels of personal accomplishment. Differences between university graduates and those with a master/doctorate degree did not appear to be significant, although in terms of depersonalization university graduates had slightly higher levels. It is therefore not surprising that the one-way ANOVA revealed a non-statistically significant effect of the educational level on burnout factors: F(2,199) = 0.01, p>0.05 for Emotional Exhaustion, F(2,199) = 0.32, p>0.05 for Depersonalization and F(2,199) = 0.69, p>0.05 for Personal accomplishment.

Table 8. Effect of educational level on the dimensions of burnout

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization A. (SD.)	Personal Accomplishment A. (SD.)
Degree	56	33.73 (12.51)	12.63 (6.94)	43.88 (5.88)
Master Degree/PhD	125	33.75 (11.11)	11.99 (6.28)	43.98 (6.97)
Special Education Training	20	34.2 (12.39)^{NS}	12.95 (5.83)^{NS}	42.15 (5.18)^{NS}

Note: ^{NS}non-statistically significant p>0.05.

Regarding teachers' specialty, the highest levels of emotional exhaustion were detected among Language teachers, while the lowest ones were observed among teachers of other specialties (English, Physical Education, etc.) (Table 9). Similar results were

observed in terms of the depersonalization experienced by the participants in their work. Finally, in terms of personal accomplishment, the highest levels were detected among teachers of "other" specialties and "special education teachers", while the lowest levels were found among "Science teacher". One-way ANOVA revealed a statistically significant association of teachers' specialty with depersonalization and personal accomplishment: $F(5,194) = 1.88$, $p>0.05$ for Emotional Exhaustion, $F(5,194) = 3.68$, $p<0.01$ for Depersonalization and $F(5,194) = 2.81$, $p<0.05$ for Personal accomplishment. Further testing with the Bonferroni index identified a statistically significant difference in terms of depersonalization between Language teachers on the one hand and teachers of other specialties and S.E. teachers on the other ($p<0.05$). Regarding personal accomplishment, a statistically significant difference was found between Science teacher and S.E. teachers ($p<0.05$).

Table 9. Effect of teachers' specialty on the dimensions of burnout

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization A. (SD.)	Personal accomplishment A. (SD.)
Teacher	96	35.01 (11.19)	13.03 (6.37)	43.19 (5.57)
Kindergarten Teacher	15	31.33 (11.73)	10.73 (4.5)	43.8 (5)
Language teachers	21	37.43 (13.14)	15.43 (8)	41.86 (5.67)
Special education teachers	43	32.86 (10.92)	10.67 (4.73)	46.07 (8.25)
Science teacher	14	33.07 (12.86)	13.36 (9.05)	40.64 (6.98)
Other	11	25.91 (10.36)	7.18 (2.79)**	46.82 (7.14)*

Note: *Statistical significant $p<0.05$, **Statistical significant $p<0.01$.

In terms of school settings, participants working in a mainstream school were found to experience the highest emotional exhaustion and depersonalization as compared to those working in the inclusion classes (Table 10). Regarding the personal accomplishment factor, the highest levels were observed for those employed in a special school as compared to mainstream school teachers. The one-way ANOVA showed a statistically significant effect of the school setting on all three dimensions of Professional Burnout: $F(3,198) = 3.64$, $p<0.05$ for Emotional Exhaustion, $F(3, 198) = 6.22$, $p<0.01$ for Depersonalization and $F(3,198) = 2.88$, $p<0.05$ for Personal accomplishment. Further testing with the Bonferroni index, a statistically significant difference emerged between teachers working in a mainstream school and those working in parallel support classes in terms of emotional exhaustion ($p=0.016$) and between the mainstream school teachers and the inclusion teachers ($p=0.028$) on the one hand and those of parallel support classes ($p=0.006$) on the other hand in terms of depersonalization. Finally, regarding Personal accomplishment, a marginal statistically significant difference was detected between the S.E. and the mainstream school teachers ($p=0.07$).

Table 10. Effect of school setting on the dimensions of burnout

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization. A. (SD.)	Personal Accomplishment A. (SD.)
Special Education School	38	33.76 (11)	11.08 (5.02)	45.68 (8.53)
Main Stream School	113	35.76 (11.53)	13.83 (6.98)	42.61 (6.11)
Inclusion classes	10	29.3 (8.93)	8 (2.4)	44.6 (2.41)
Parallel Support	41	29.46 (11.69)*	10.07 (5.24)**	44.98 (5.61)*

Note: *Statistical significant $p<0.05$, **Statistical significant $p<0.01$.

In relation to teachers' total years of service and burnout dimensions, the highest levels of depersonalization and emotional exhaustion, as well as the lowest levels of personal accomplishment were found for teachers with more than 21 years of service (Table 11). Conversely, the lowest levels of emotional exhaustion and depersonalization were detected for teachers with 0–5 years of experience. Finally, participants with 11–20 years of service were found to have the highest levels of personal accomplishment. The one-way ANOVA showed a statistically significant effect of years of service on burnout factors: $F(3,198) = 3.33$, $p<0.05$ for Emotional Exhaustion, $F(3,198) = 2.9$, $p<0.05$ for Depersonalization and $F(3,198) = 5.1$, $p<0.01$ for Personal accomplishment. Further analysis with the Bonferroni index identified a statistically significant difference between participants with 0–5 years of service and those with over 21 years regarding emotional exhaustion and depersonalization ($p<0.05$). In terms of personal accomplishment, the difference was found to be between participants with over 21 years of service and all other categories of "years of service" (0–5 years, 6–10 years and 11–20 years).

Table 11. Effect of years of service on the dimension of burnout

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization A. (SD.)	Personal Accomplishment A. (SD.)
0–5 years	70	31.79 (10.63)	11.64 (5.91)	44.23 (7.96)
6–10 years	51	34.31 (10.82)	11.69 (5.98)	44.37 (3.79)
11–20 years	47	32.45 (12.43)	11.7 (5.29)	45.17 (5.49)
21 years and above	34	38.97 (12.19)*	15.18 (8.55)*	39.97 (6.64)**

Note: *Statistical significant $p<0.05$, **Statistical significant $p<0.01$.

Accordingly, the correlation between previous service with S.E.N. students and professional burnout factors was also examined. As can be seen in Table 12, the highest emotional exhaustion was found to be experienced by teachers who had over 21 years of experience with students with special needs and the lowest by those with the least experience. Regarding depersonalization, teachers with over 21 years of experience were also the most burdened as compared to those with 6–10 years of previous experience. Finally, in terms of personal accomplishment, the lowest levels were detected for teachers with over 21 years of experience. The one-way ANOVA showed that all correlations were statistically very significant: $F(3,198) = 5.92$, $p<0.01$ for Emotional

Exhaustion, $F(3,198) = 4.88$, $p<0.01$ for Depersonalization and $F(3,198) = 8.44$, $p<0.01$ for Personal accomplishment. Further testing with the Bonferroni index revealed that a statistically significant difference lied between teachers with over 21 years of experience with S.E. students and teachers of all other categories of the independent variable (0–5 years, 6–10 years and 11–20 years).

Table 12. Effect of service with S.E.N. students on the dimensions of burnout

Variable	N	Emotional Exhaustion A. (SD.)	Depersonalization A. (SD.)	Personal accomplishment A. (SD.)
0–5 years	92	32 (11.39)	11.6 (5.97)	44.39 (7.4)
6–10 years	48	33.31 (10.98)	11.38 (5.8)	45.13 (3.1)
11–20 years	37	32.97 (11.68)	12.08 (5.48)	44.35 (6.42)
21 years and above	25	42.48 (9.9)*	16.68 (6.4)*	38 (5.26)*

Note: *Statistical significant $p<0.05$, **Statistical significant $p<0.01$.

4 Conclusion

The purpose of this paper was to describe the burnout dominance in the field of special education. There is plenty of research on educational practice demonstrating teachers developing mental illness, including heightened work stress and emotional exhaustion and frustration. In this research, we examined the three dimensions of special education teachers' burnout in relation to their demographic characteristics. The data analysis results showed that emotional exhaustion had the highest values among the three burnout dimensions with 67.8% of the special education teachers meeting the criteria for high emotional exhaustion. In contrast, only one in three was found to experience depersonalization (33.7%) and almost one in a hundred experienced an absence of personal accomplishment (0.5%). The combination of these results suggests that it is emotional exhaustion that provokes teachers' burnout, which then triggers depersonalization and not the other way round. The finding that the sample experiences high personal accomplishment demonstrates that the syndrome has not developed sufficiently to affect this dimension. It is noticeable that this study's results agree with the findings of previous research [19,20] and emphasize that Greek special education teachers present lower levels of burnout in comparison to their colleagues who live and work in Northern European and North American countries based on findings of corresponding research conducted in these countries [21,22]. The fact is probably explained by the existing cultural differences in these countries. It seems that burnout has appeared around the globe but with high indexes prevalence it is essentially a Western phenomenon [23].

Regarding socio-demographic factors, the existing research has reported conflicting results regarding the effect of gender on burnout [24,25]. In the present study, gender was not found to be related to burnout as no statistically significant differences were found between the variables. Likewise, marital status was not found to play a significant role in burnout, although research has shown that single teachers are those with the highest burnout levels [25,26,27,28]. It is obvious that both gender and marital status

are not the main burnout factors but other external variables related to the teachers' workplace provoke its appearance. In terms of school settings, participants working in a mainstream school were found to experience the highest emotional exhaustion and depersonalization as compared to those working in the inclusion classes. Our results show that teachers in Parallel Support in mainstream settings report significantly higher levels of burnout than others teachers. This result is inconsistent with previous studies reporting that teachers working in special settings are typically more vulnerable to stress and burnout than those working in mainstream schools with special needs students [29].

In terms of educational level, master and PhD degree holders were not found to differ in burnout levels. However, studies report that teachers holding a high level education degree are more prone to the syndrome, as they take responsibilities and pressure, have high expectations of their work and themselves, and they get frustrated when they can't implement them [30,31].

Regarding age, the results showed that teachers aged over 51 had the highest levels of depersonalization and emotional exhaustion, as well as the lowest levels of personal accomplishment. The results suggest that there is a significant correlation between age and emotional exhaustion for teachers and a significant correlation between age and depersonalization. In other researches on special education teacher burnout, younger, less experienced, have been found to be at greater risk for emotional exhaustion [32,33].

Finally, examining the service factor the highest emotional exhaustion was found to be experienced by teachers who had over 21 years of experience with students with special needs. The finding that the number of years of teaching experience in special education schools was related to emotional exhaustion was expected, and considerable evidence exists in the literature [34–37].

Finalizing, we emphasize the significance of all digital technologies in the field of education and the positive impact on teachers, which is highly effective and productive for assessment, intervention, and educational procedures via mobile devices that bring educational activities to everybody [42–49], various ICTs applications that are the main supporters of education [50–65], AI, STEM, and ROBOTICS that raise educational procedures to new performance levers [66–77], and games which support a very friendly and enjoyable procedure in the education [78–84]. Additionally, the integration of ICTs with theories and models of metacognition, mindfulness, meditation, and the cultivation of emotional intelligence [85–112], as well as with nutrition and environmental factors [38–41], accelerates and improves more than educational practices and results, especially in emotional situation of the teachers and a soothing positive impact on their burn out possibility.

5 References

[1] Brady, K. J., Ni, P., Sheldrick, R. C., Trockel, M. T., Shanafelt, T. D., Rowe, S. G., … & Kazis, L. E. (2020). Describing the emotional exhaustion, depersonalization, and low personal accomplishment symptoms associated with Maslach Burnout Inventory subscale scores in US physicians: an item response theory analysis. Journal of patient-reported outcomes, 4(1), 1–14. https://doi.org/10.1186/s41687-020-00204-x

[2] Bakker, A. B., & de Vries, J. D. (2021). Job Demands–Resources theory and self-regulation: New explanations and remedies for job burnout. Anxiety, Stress, & Coping, 34(1), 1–21. https://doi.org/10.1080/10615806.2020.1797695
[3] Lubbadeh, T. (2020). Job burnout: A general literature review. International Review of Management and Marketing, 10(3), 7. https://doi.org/10.32479/irmm.9398
[4] Upadyaya, K., Vartiainen, M., & Salmela-Aro, K. (2016). From job demands and resources to work engagement, burnout, life satisfaction, depressive symptoms, and occupational health. Burnout Research, 3(4), 101–108. https://doi.org/10.1016/j.burn.2016.10.001
[5] Leiter, M. P. (2018). Burnout as a developmental process: Consideration of models. In Professional burnout: Recent developments in theory and research (pp. 237–250). CRC Press. https://doi.org/10.4324/9781315227979-18
[6] Maslach, C., & Schaufeli, W. B. (2018). Historical and conceptual development of burnout. In Professional burnout: Recent developments in theory and research (pp. 1–16). CRC Press. https://doi.org/10.4324/9781315227979-1
[7] Maslach, C. (2018). Burnout: A multidimensional perspective. In Professional burnout: Recent developments in theory and research (pp. 19–32). CRC Press. https://doi.org/10.4324/9781315227979-3
[8] Shirom, A., Melamed, S., & Toker, S. (2005), Burnout and health review: Current knowledge and future research directions. In: Hodgkinson, G. P., Ford, J. K., editors. International Review of Industrial and Organizational Psychology. Vol. 20. New Jersey, United States: John Wiley & Sons. P 269–308. https://doi.org/10.1002/0470029307.ch7
[9] Naczenski, L. M., de Vries, J. D., van Hooff, M. L., & Kompier, M. A. (2017). Systematic review of the association between physical activity and burnout. Journal of Occupational Health, 59(6), 477–494. https://doi.org/10.1539/joh.17-0050-RA
[10] Patel, R. S., Bachu, R., Adikey, A., Malik, M., & Shah, M. (2018). Factors related to physician burnout and its consequences: A review. Behavioral Sciences, 8(11), 98. https://doi.org/10.3390/bs8110098
[11] Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. Annual Review of Psychology, 52(1), 397–422. https://doi.org/10.1146/annurev.psych.52.1.397
[12] Williams, E. S., Rathert, C., & Buttigieg, S. C. (2020). The personal and professional consequences of physician burnout: A systematic review of the literature. Medical Care Research and Review, 77(5), 371–386. https://doi.org/10.1177/1077558719856787
[13] Yang, Y., & Hayes, J. A. (2020). Causes and consequences of burnout among mental health professionals: A practice-oriented review of recent empirical literature. Psychotherapy, 57(3), 426. https://doi.org/10.1037/pst0000317
[14] Maslach, C., Leiter, M. P., & Schaufeli, W. B. (2008). Measuring burnout. In Cooper, C.L., Cartwright, S. (Eds), The Oxford Handbook of Organizational Wellbeing, Oxford University Press (P. 86–108). Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199211913.003.0005
[15] Aust, F., Beneke, T., Peifer, C., & Wekenborg, M. (2022). The relationship between flow experience and burnout symptoms: A systematic review. Int J Environ Res Public Health. https://doi.org/10.3390/ijerph19073865
[16] Nimon, K., & Shuck, B. (2020). Work engagement and burnout: Testing the theoretical continuums of identification and energy. Human Resource Development Quarterly, 31(3), 301–318. https://doi.org/10.1002/hrdq.21379
[17] Kokkinos, C. M. (2006). Factor structure and psychometric properties of the Maslach burnout inventory-educators survey among elementary and secondary teachers in Cyprus. Stress and Health, 22(1), 25–33. https://doi.org/10.1002/smi.1079
[18] Platsidou, M. (2010). Trait emotional intelligence of Greek special education teachers in relation to burnout and job satisfaction. School Psychology International, 31(1), 60–76. https://doi.org/10.1177/0143034309360436

[19] Antoniou, A. S., Polychroni, F., & Walters, B. (2000). Sources of stress and professional burnout of teachers of special educational needs in Greece. Paper presented at International Special Education Congress 2000, 24–28, July 2000, 1–11. U.K.: University of Manchester.
[20] Platsidou, M., & Agaliotis, I. (2008). Burnout, job satisfaction and instructional assignment-related sources of stress in Greek special education teachers. International Journal of Disability, Development and Education, 55(1), 61–76. https://doi.org/10.1080/10349120701654613
[21] Billingsley, B. S., Carlson, E., & Klein, S. (2004). The working conditions and induction support of early career serial educators. Exceptional Children, 70, 333–347. https://doi.org/10.1177/001440290407000305
[22] Wisniewski, L., & Gargiulo, R. M. (1997). Occupational stress and burnout among special educators: A review of the literature. The Journal of Special Education, 31, 325–346. https://doi.org/10.1177/002246699703100303
[23] Schaufeli, W. B. (2017). Burnout: A short socio-cultural history. In Burnout, fatigue, exhaustion (pp. 105–127). Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-52887-8_5
[24] Garcia-Arroyo, J. A., Osca Segovia, A., & Peiró, J. M. (2019). Meta-analytical review of teacher burnout across 36 societies: The role of national learning assessments and gender egalitarianism. Psychology & Health, 34(6), 733–753. https://doi.org/10.1080/08870446.2019.1568013
[25] Sari, C., & Hakan, D. L. (2004). Analysis of burnout and job satisfaction among Turkish special school Headteachers and Teachers, and the factors effecting their burnout and job satisfaction. https://doi.org/10.1080/0305569042000224233
[26] Küçüksüleymanoglu, R. (2011). Burnout syndrome levels of Teachers in special education schools in Turkey. International Journal of Special Education, 26(1), 53–63.
[27] Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. Annual Review of Psychology, 52(1), 397–422. https://doi.org/10.1146/annurev.psych.52.1.397
[28] Maslach, C., & Leiter, M. P. (2008). Early predictors of job burnout and engagement. Journal of Applied Psychology, 93, 498–512. https://doi.org/10.1037/0021-9010.93.3.498
[29] Maslach, C., Leiter, M. P., & Schaufeli, W. B. (2008). Measuring burnout. In Cooper, C. L., Cartwright, S. (Eds), The Oxford Handbook of Organizational Wellbeing, Oxford University Press (pp. 86–108). Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199211913.003.0005
[30] Cappe, E., Bolduc, M., Poirier, N., Popa-Roch, M. A., & Boujut, E. (2017). Teaching students with Autism Spectrum Disorder across various educational settings: The factors involved in burnout. Teaching and Teacher Education, 67, 498–508. https://doi.org/10.1016/j.tate.2017.07.014
[31] Arnold, K. A., Connelly, C. E., Walsh, M. M., & Martin Ginis, K. A. (2015). Leadership styles, emotion regulation, and burnout. Journal of Occupational Health Psychology, 20(4), 481. https://doi.org/10.1037/a0039045
[32] Shanafelt, T. D., Gorringe, G., Menaker, R., Storz, K. A., Reeves, D., Buskirk, S. J., … & Swensen, S. J. (2015, April). Impact of organizational leadership on physician burnout and satisfaction. In Mayo Clinic Proceedings (Vol. 90, No. 4, pp. 432–440). Elsevier. https://doi.org/10.1016/j.mayocp.2015.01.012
[33] Zabel, R. H., & Kay Zabel, M. (2001). Revisiting burnout among special education teachers: Do age, experience, and preparation still matter? Teacher Education and Special Education, 24(2), 128–139. https://doi.org/10.1177/088840640102400207
[34] Brunsting, N. C., Sreckovic, M. A., & Lane, K. L. (2014). Special education teacher burnout: A synthesis of research from 1979 to 2013. Education and Treatment of Children, 681–711. https://doi.org/10.1353/etc.2014.0032

[35] Mahmoodi-Shahrebabaki, M. (2019). Teacher burnout. The TESOL encyclopedia of English language teaching, 1–8. https://doi.org/10.1002/9781118784235.eelt0964

[36] Maslach, C. (1999). 12. Progress in understanding teacher burnout. Understanding and preventing teacher burnout: A sourcebook of international research and practice, 211–222. https://doi.org/10.1017/CBO9780511527784.014

[37] Awa, W. L., Plaumann, M., & Walter, U. (2010). Burnout prevention: A review of intervention programs. Patient Education and Counseling, 78(2), 184–190. https://doi.org/10.1016/j.pec.2009.04.008

[38] Stavridou Th., Driga, A. M., & Drigas, A. S., (2021). Blood markers in detection of Autism, International Journal of Recent Contributions from Engineering Science & IT (iJES), 9(2):79–86. https://doi.org/10.3991/ijes.v9i2.21283

[39] Zavitsanou, A., & Drigas, A. (2021). Nutrition in mental and physical health. Technium Soc. Sci. J., 23, 67. https://doi.org/10.47577/tssj.v23i1.4126

[40] Driga, A. M., & Drigas, A. S. (2019). Climate change 101: How everyday activities contribute to the ever-growing issue. International Journal of Recent Contributions from Engineering, Science & IT, 7(1), 22–31. https://doi.org/10.3991/ijes.v7i1.10031

[41] Driga, A. M., & Drigas, A. S. (2019). ADHD in the early years: Pre-Natal and early causes and alternative ways of dealing, International Journal of Online and Biomedical Engineering (IJOE), vol. 15, no. 13, p. 95. https://doi.org/10.3991/ijoe.v15i13.11203

[42] Vlachou, J., & Drigas, A. S. (2017). Mobile technology for students and adults with Autistic Spectrum Disorders (ASD). International Journal of Interactive Mobile Technologies, 11(1), pp. 4–17. https://doi.org/10.3991/ijim.v11i1.5922

[43] Papoutsi, C., Drigas, A. S., & C. Skianis. (2018). Mobile applications to improve emotional intelligence in autism—A review. Int. J. Interact. Mob. Technol. (iJIM), 12(6), https://doi.org/10.3991/ijim.v12i6.9073

[44] Karabatzaki, Z., Stathopoulou, A., Kokkalia, G., Dimitriou, E., Loukeri, P., Economou, A., & Drigas, A. (2018). Mobile application tools for students in secondary education. An evaluation study. International Journal of Interactive Mobile Technologies (iJIM), 12(2), 142–161. https://doi.org/10.3991/ijim.v12i2.8158

[45] Stathopoulou, A., Loukeris, D., Karabatzaki, Z., Politi, E., Salapata, Y., & Drigas, A. S. (2020). Evaluation of mobile apps effectiveness in children with autism social training via digital social stories, Int. J. Interact. Mob. Technol. (iJIM), 14(03), https://doi.org/10.3991/ijim.v14i03.10281

[46] Stathopoulou, A., Karabatzaki, Z., Kokkalia, G., Dimitriou, E., Loukeri, P. I., Economou, A., & Drigas, A. (2018). Mobile assessment procedures for mental health and literacy skills in education. International Journal of Interactive Mobile Technologies, 12(3), 21–37. https://doi.org/10.3991/ijim.v12i3.8038

[47] Kokkalia, G., Drigas, A. S., & Economou, A. (2016). Mobile learning for preschool education. International Journal of Interactive Mobile Technologies, 10(4). https://doi.org/10.3991/ijim.v10i4.6021

[48] Stathopoulou, A., Karabatzaki, Z., Tsiros, D., Katsantoni, S., & Drigas, A. (2019). Mobile apps the educational solution for autistic students in secondary education. Journal of Interactive Mobile Technologies, 13(2), 89–101. https://doi.org/10.3991/ijim.v13i02.9896

[49] Alexopoulou, A., Batsou, A., & Drigas, A. (2020). Mobiles and cognition: The associations between mobile technology and cognitive flexibility. iJIM, 14(3), 146–156. https://doi.org/10.3991/ijim.v14i03.11233

[50] Drigas, A., & Charami, F. (2014). ICTs in English Learning and Teaching. International Journal of Engineering and Science, 2(4), 4–10. https://doi.org/10.3991/ijes.v2i4.4016

[51] Pappas, M., Drigas, A., Papagerasimou, Y., Dimitriou, H., Katsanou, N., Papakonstantinou, S., et al. (2018). Female entrepreneurship and employability in the digital era: The case of Greece. Journal of Open Innovation: Technology, Market, and Complexity. 4(2), 15. https://doi.org/10.3390/joitmc4020015
[52] Papanastasiou, G., Drigas, A. S., Skianis Ch., Lytras, M., & Papanastasiou, E. (2018). Patient-centric ICTs based healthcare for students with learning, physical and/or sensory disabilities. Telemat Inform, 35(4), 654–664. https://doi.org/10.1016/j.tele.2017.09.002
[53] Papanastasiou, G., Drigas, A., Skianis, C., & Lytras, M. (2020). Brain computer interface based applications for training and rehabilitation of students with neurodevelopmental disorders. A Literature Review. Heliyon 6:e04250. https://doi.org/10.1016/j.heliyon.2020.e04250
[54] Pappas, M., Demertzi, E., Papagerasimou, Y., Koukianakis, L., Kouremenos, D., Loukidis, I., & Drigas, A. (2018). E-Learning for deaf adults from a user-centered perspective. Education Sciences, 8(4), 206. https://doi.org/10.3390/educsci8040206
[55] Pappas, M., Eleftheria Demertzi, Yannis Papagerasimou, Lefteris Koukianakis, Nikitas Voukelatos, & Drigas, A. S. (2019). Cognitive based E-learning design for older adults. Social Sciences, 8(1), 6. https://doi.org/10.3390/socsci8010006
[56] Theodorou, P., & Drigas, A. (2017). ICTs and Music in generic learning disabilities. Int. J. Emerg. Technol. Learn. 12(4), 101–110. https://doi.org/10.3991/ijet.v12i04.6588
[57] Pappas, M. A., & Drigas, A. S. (2015). ICT based screening tools and etiology of dyscalculia. International Journal of Engineering Pedagogy, 5(3), 61–66. https://doi.org/10.3991/ijep.v5i3.4735
[58] Alexopoulou, A., & Batsou, A. (2019). Resilience and academic underachievement in gifted students: Causes, consequences and strategic methods of prevention and intervention. International Journal of Online and Biomedical Engineering (iJOE), 15(14), 78. https://doi.org/10.3991/ijoe.v15i14.11251
[59] Bakola, L., Rizos, N., & Drigas, A. (2019). ICTs for emotional and social skills development for children with ADHD and ASD co-existence. International Int. J. Emerg. Technol. Learn., 14(5), 122–131. https://doi.org/10.3991/ijet.v14i05.9430
[60] Kontostavlou, E. Z., & Drigas, A. S. (2019). The use of Information and Communications Technology (ICT) in gifted students. International Journal of Recent Contributions from Engineering, Science and IT, 7(2), 60–67. https://doi.org/10.3991/ijes.v7i2.10815
[61] Bravou, V., Oikonomidou, D., & Drigas, A. (2022). Applications of virtual reality for autism inclusion. A review Retos, 45, 779–785. https://doi.org/10.47197/retos.v45i0.92078
[62] Chaidi, I., & Drigas, A. (2022). "Parents' views Questionnaire for the education of emotions in Autism Spectrum Disorder" in a Greek context and the role of ICTs Technium Social Sciences Journal 33, 73–91. https://doi.org/10.47577/tssj.v33i1.6878
[63] Bravou, V., & Drigas, A. (2019). A contemporary view on online and web tools for students with sensory & learning disabilities. iJOE, 15(12), 97. https://doi.org/10.3991/ijoe.v15i12.10833
[64] Chaidi, I., Drigas, A., & Karagiannidis, C. (2021). ICT in Special Education Technium Soc. Sci. J. 23, 187. https://doi.org/10.47577/tssj.v23i1.4277
[65] Vrettaros, J., Tagoulis, A., Giannopoulou, N., & Drigas, A. (2009). An empirical study on the use of Web 2.0 by Greek adult instructors in educational procedures. World Summit on Knowledge System (WSKS), 49, 164–170. https://doi.org/10.1007/978-3-642-04757-2_18
[66] Pappas, M., & Drigas, A. (2016). Incorporation of artificial intelligence tutoring techniques in mathematics. International Journal of Engineering Pedagogy, 6(4), 12–16. https://doi.org/10.3991/ijep.v6i4.6063
[67] Lytra, N., & Drigas, A. (2021). STEAM education-metacognition–specific learning disabilities scientific electronic archives. 14(10). https://doi.org/10.36560/141020211442

[68] Mitsea, E., Lytra, N., Akrivopoulou, A., & Drigas, A. (2020). Metacognition, mindfulness and robots for autism inclusion. Int. J. Recent Contributions Eng. Sci. IT, 8(2), 4–20. https://doi.org/10.3991/ijes.v8i2.14213

[69] Stavridis, S., Papageorgiou, D., & Doulgeri, Z. (2017). Dynamical system based robotic motion generation with obstacle avoidance. IEEE Robotics and Automation Letters, 2(2), 712–718. https://doi.org/10.1109/LRA.2017.2651172

[70] Kastritsi, T., Papageorgiou, D., Sarantopoulos, I., Stavridis, S., & Doulgeri, Z. (2019). Guaranteed active constraints enforcement on point cloud-approximated regions for surgical applications. 2019 International Conference on Robotics and Automation (ICRA), 8346–8352. https://doi.org/10.1109/ICRA.2019.8793953

[71] Stavridis, S., & Doulgeri, Z. (2018). Bimanual assembly of two parts with relative motion generation and task related optimization. 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Madrid, Spain, pp. 7131–7136. https://doi.org/10.1109/IROS.2018.8593928

[72] Stavridis, S., Falco, P., & Doulgeri, Z. (2020). Pick-and-place in dynamic environments with a mobile dual-arm robot equipped with distributed distance sensors. IEEE-RAS 20th International Conference on Humanoid Robots (Humanoids).

[73] Papageorgiou, D., Stavridis, S., Papakonstantinou, C., & Doulgeri, Z. (2021). Task geometry aware assistance for kinesthetic teaching of redundant robots. 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Prague, Czech Republic, pp. 7285–7291. https://doi.org/10.1109/IROS51168.2021.9636209

[74] Kastritsi, T., Sarantopoulos, I., Stavridis, S., Papageorgiou, D., & Doulgeri, Z. (2020). Manipulation of a whole surgical tool within safe regions utilizing barrier artificial potentials. In XV Mediterranean Conference on Medical and Biological Engineering and Computing–MEDICON 2019. Proceedings of MEDICON 2019, September 26–28, 2019, Coimbra, Portugal (pp. 1559–1570). Springer International Publishing. https://doi.org/10.1007/978-3-030-31635-8_193

[75] Stavridis, S., Papageorgiou, D., Droukas, L., & Doulgeri, Z. (2022). Bimanual crop manipulation for human-inspired robotic harvesting arXiv preprint arXiv:2209.06074.

[76] Ntaountaki, P., Lorentzou, G., Lykothanasi, A., Anagnostopoulou, P., Alexandropoulou, V., & Drigas, A. (2019). Robotics in Autism Intervention. Int. J. Recent Contributions Eng. Sci. IT, 7(4), 4–17. https://doi.org/10.3991/ijes.v7i4.11448

[77] Demertzi, E., Voukelatos, N., Papagerasimou, Y., & Drigas, A. (2018). Online learning facilities to support coding and robotics courses for youth. International Journal of Engineering Pedagogy (iJEP), 8(3), 69–80. https://doi.org/10.3991/ijep.v8i3.8044

[78] Chaidi, I., & Drigas, A. (2022). Digital games & special education. Technium Social Sciences Journal, 34, 214–236. https://doi.org/10.47577/tssj.v34i1.7054

[79] Papanastasiou, G. P., Drigas, A. S., & Skianis, C. (2017). Serious games in preschool and primary education: Benefits and impacts on curriculum course syllabus. International Journal of Emerging Technologies in Learning, 12(1), 44–56. https://doi.org/10.3991/ijet.v12i01.6065

[80] Doulou, A., & Drigas, A. (2022). Electronic, VR & Augmented Reality Games for Intervention in ADHD Technium Social Sciences Journal, 28, 159. https://doi.org/10.47577/tssj.v28i1.5728

[81] Kokkalia, G., Drigas, A., Economou, A., Roussos, P., & Choli, S. (2017). The use of serious games in preschool education. International Journal of Emerging Technologies in Learning, 12(11), 15–27. https://doi.org/10.3991/ijet.v12i11.6991

[82] Kokkalia, G., Drigas, A., & Economou, A. (2016). The role of games in special preschool education. International Journal of Emerging Technologies in Learning (iJET), 11(12), 30–35. https://doi.org/10.3991/ijet.v11i12.5945

[83] Papanastasiou, G., Drigas, A., Skianis, C., & Lytras, M. D. (2017). Serious games in K-12 education: Benefits and impacts on students with attention, memory and developmental disabilities. Program, 51(4), 424–440. https://doi.org/10.1108/PROG-02-2016-0020
[84] Kefalis, C., Kontostavlou, E. Z., & Drigas, A. (2020). The effects of video games in memory and attention. Int. J. Eng. Pedagog. 10(1), 51–61. https://doi.org/10.3991/ijep.v10i1.11290
[85] Kokkalia, G., Drigas, A., Economou, A., & Roussos, P. (2019). School readiness from kindergarten to primary school. International Journal of Emerging Technologies in Learning, 14(11), 4–18. https://doi.org/10.3991/ijet.v14i11.10090
[86] Pappas, M., & Drigas, A. (2019). Computerized training for neuroplasticity and cognitive improvement. International Journal of Engineering Pedagogy, 9(4), 50–62. https://doi.org/10.3991/ijep.v9i4.10285
[87] Papoutsi, C., & Drigas, A. (2017). Empathy and Mobile Applications. International Journal of Interactive Mobile Technologies, 11(3), 57. https://doi.org/10.3991/ijim.v11i3.6385
[88] Papoutsi, C., Drigas, A., & Skianis, C. (2019). Emotional intelligence as an important asset for HR in organizations: Attitudes and working variables. International Journal of Advanced Corporate Learning, 12(2), 21–35. https://doi.org/10.3991/ijac.v12i2.9620
[89] Papoutsi, C., & Drigas, A. (2016). Games for empathy for social impact. International Journal of Engineering Pedagogy, 6(4), 36–40. https://doi.org/10.3991/ijep.v6i4.6064
[90] Drigas, A., & Mitsea, E. (2021). Neuro-Linguistic Programming & VR via the 8 Pillars of Metacognition X 8 Layers of Consciousness X 8 Intelligences Technium Soc. Sci. J. 26, 159. https://doi.org/10.47577/tssj.v26i1.5273
[91] Chaidi, I., & Drigas, A. S. (2020). Autism, expression, and understanding of emotions: Literature review, Int. J. Online Biomed. Eng., 16(02), 94–111. https://doi.org/10.3991/ijoe.v16i02.11991
[92] Karyotaki, M., & Drigas, A. S. (2016). "Latest trends in problem solving assessment," International Journal of Recent contributions from Engineering, Science & IT (iJES), 4(2), 4–10. https://doi.org/10.3991/ijes.v4i2.5800
[93] Drigas, A., & Mitsea, E. (2022). Conscious breathing: A powerful tool for physical & neuropsychological regulation. The role of Mobile Apps Technium Social Sciences Journal, 28, 135–158. https://doi.org/10.47577/tssj.v28i1.5922
[94] Tourimpampa, A., Drigas, A., Economou, A., & Roussos, P. (2018). Perception and text comprehension. It's a matter of perception! International Journal of Emerging Technologies in Learning (iJET), 13(7). https://doi.org/10.3991/ijet.v13i07.7909
[95] Mitsea, E., Drigas, A. S., & Mantas, P. (2021). Soft skills & metacognition as inclusion amplifiers in the 21st century, Int. J. Online Biomed. Eng. IJOE, vol. 17, no. 04, Art. no. 04, https://doi.org/10.3991/ijoe.v17i04.20567
[96] Drigas, A., & Mitsea, E. (2020). A metacognition based 8 pillars mindfulness model and training strategies. International Journal of Recent Contributions from Engineering, Science & IT, 8(4), 4–17. https://doi.org/10.3991/ijes.v8i4.17419
[97] Angelopoulou, E., & Drigas, A. (2021). Working memory, attention and their relationship: A theoretical overview. Research, Society and Development, 10(5), e46410515288–e46410515288. https://doi.org/10.33448/rsd-v10i5.15288
[98] Papoutsi, C., Drigas, A., & Skianis, C. (2021). Virtual and augmented reality for developing emotional intelligence skills. Int. J. Recent Contrib. Eng. Sci. IT (IJES), 9(3), 35–53. https://doi.org/10.3991/ijes.v9i3.23939
[99] Kapsi, S., Katsantoni, S., & Drigas, A. (2020). The role of sleep and impact on brain and learning. Int. J. Recent Contributions Eng. Sci. IT, 8(3), 59–68. https://doi.org/10.3991/ijes.v8i3.17099

[100] Karyotaki, M., & Drigas, A. (2015). Online and other ICT applications for cognitive training and assessment. International Journal of Online and Biomedical Engineering, 11(2), 36–42. https://doi.org/10.3991/ijoe.v11i2.4360

[101] Drigas, A., Mitsea, E., & Skianis, C. (2022). Clinical Hypnosis & VR, Subconscious Restructuring-Brain Rewiring & the Entanglement with the 8 Pillars of Metacognition X 8 Layers of Consciousness X 8 Intelligences. International Journal of Online & Biomedical Engineering, 18(1). https://doi.org/10.3991/ijoe.v18i01.26859

[102] Galitskaya, V., & Drigas, A. (2021). The importance of working memory in children with Dyscalculia and Ageometria. Scientific Electronic Archives, 14(10). https://doi.org/10.36560/141020211449

[103] Chaidi, I., & Drigas, A. (2020). Parents' involvement in the education of their children with Autism: Related research and its results. International Journal Of Emerging Technologies In Learning (Ijet), 15(14), 194–203. https://doi.org/10.3991/ijet.v15i14.12509

[104] Bamicha, V., & Drigas, A. (2022). ToM & ASD: The interconnection of Theory of Mind with the social-emotional, cognitive development of children with Autism Spectrum Disorder. The use of ICTs as an alternative form of intervention in ASD. Technium Social Sciences Journal, 33(1), 42–72. https://doi.org/10.47577/tssj.v33i1.6845

[105] Drigas, A., Mitsea, E., & Skianis, C. (2022). Virtual reality and metacognition training techniques for learning disabilities. Sustainability, 14(16), 10170. https://doi.org/10.3390/su141610170

[106] Bakola, L., & Drigas, A. (2020). Technological development process of emotional intelligence as a therapeutic recovery implement in children with ADHD and ASD comorbidity. International Journal of Online & Biomedical Engineering, 16(3), 75–85. https://doi.org/10.3991/ijoe.v16i03.12877

[107] Karyotaki, M., & Drigas, A. (2016). Online and other ICT-based training tools for problem-solving skills. International Journal of Emerging Technologies in Learning, 11(6). https://doi.org/10.3991/ijet.v11i06.5340

[108] Karyotaki, M., Bakola, L., Drigas, A., & Skianis, C. (2022). Women's leadership via digital technology and entrepreneurship in business and society. Technium Social Sciences Journal, 28(1), 246–252. https://doi.org/10.47577/tssj.v28i1.5907

[109] Mitsea, E., & Drigas, A. (2019). A journey into the metacognitive learning strategies. International Journal of Online & Biomedical Engineering, 15(14). https://doi.org/10.3991/ijoe.v15i14.11379

[110] Bamicha, V., & Drigas, A. (2022). The Evolutionary Course of Theory of Mind – Factors that facilitate or inhibit its operation & the role of ICTs. Technium Social Sciences Journal, 30(1), 138–158. https://doi.org/10.47577/tssj.v30i1.6220

[111] Mitsea, E., Drigas, A., & Skianis, C. (2022). Breathing, attention & consciousness in sync: The role of breathing training, metacognition & virtual reality. Technium Social Sciences Journal, 29(1), 79–97. https://doi.org/10.47577/tssj.v29i1.6145

[112] Mitsea, E., Drigas, A., & Skianis, C. (2022). ICTs and speed learning in special education: High-consciousness training strategies for high-capacity learners through metacognition lens. Technium Social Sciences Journal, 27(1), 230–252. https://doi.org/10.47577/tssj.v27i1.5599

6 Authors

Agathi Stathopoulou is a Member of Laboratory Teaching Staff in the Department of Public and Community Health at the University of West Attica. Greece. She is also a scientific associate at Net Media Lab of N.C.S.R. 'Demokritos'. Athens, Greece (e-mail: a.stathopoulou@uniwa.gr).

Despina Spinou is a special education teacher. She has a Master Degree in 'Specialization in Information and Communication Technologies and Special Education – Psychopedagogy of inclusion' from Democritus University of Thrace, Department of Greek Philology (e-mail: spinou@gmail.com).

Anna Maria Driga is a research associate Net Media Lab Mind – Brain R&D IIT – N.C.S.R. "Demokritos", Agia Paraskevi, 153 10, Athens, Greece (e-mail: anna.maria.driga@gmail.com).

Article submitted 2023-01-31. Resubmitted 2023-03-23. Final acceptance 2023-03-23. Final version published as submitted by the authors.