RAW RESULTS

This document presents the raw results of the paper Semi-supervised Coarsening of Bipartite Graphs for Text Classification via Graph Neural Network submitted to the IEEE Data Science and Advanced Analytics (DSAA) conference. We present the accuracy, memory usage, and training time for the three coarsening scenarios presented in the main paper. Specifically, we coarsened the word and document partitions individually and simultaneously. In each table, we present the corresponding values for each of the GNNs we used, namely GraphSAGE, GIN, and GAT.

TABLE I: Accuracy results for text classification on the test set. Both partitions of the input graph were coarsened. We report the average accuracy of ten runs and the corresponding standard deviation. Both values are in %.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	96.16 (0.2)	90.66 (0.8)	76.57 (0.41)	55.04 (0.34)	42.72 (2.11)	80.97 (0.48)	97.66 (0.35)	84.86 (0.22)
	1	95.14 (0.37)	87.18 (0.71)	77.36 (0.36)	55.93 (0.26)	41.54 (0.79)	80.29 (0.45)	95.63 (0.52)	83.38 (0.34)
	2	93.89 (0.29)	83.73 (0.47)	78.01 (0.39)	56.41 (0.53)	40.03 (0.87)	79.48 (0.92)	91.47 (0.63)	81.97 (0.87)
	3	92.87 (0.29)	80.15 (0.73)	79.36 (0.79)	53.96 (1.68)	36.92 (1.24)	79.66 (1.11)	89.72 (0.72)	82.8 (0.49)
	4	93.09 (0.55)	75.56 (0.84)	78.23 (0.55)	48.75 (0.86)	39.92 (1.72)	79.58 (1.0)	85.09 (0.98)	80.2 (2.5)
	5	90.16 (0.53)	68.35 (0.72)	77.68 (0.41)	40.09 (1.07)	38.69 (1.4)	80.54 (2.2)	86.68 (1.0)	71.47 (3.15)
	6	85.83 (1.35)	62.16 (1.24)	78.99 (0.26)	19.9 (10.04)	40.15 (1.64)	80.49 (1.42)	83.28 (1.67)	66.0 (4.46)
	7	84.5 (0.64)	52.5 (1.39)	77.83 (0.32)	11.39 (3.44)	40.72 (1.84)	79.22 (1.56)	80.76 (2.52)	61.06 (2.88)
	8	83.16 (1.31)	40.77 (0.8)	71.68 (0.44)	7.45 (0.9)	39.79 (1.88)	74.65 (1.03)	70.38 (2.65)	55.38 (0.96)
	9	77.31 (0.72)	38.02 (1.93)	67.12 (0.45)	9.08 (2.45)	31.2 (3.59)	67.72 (0.97)	72.15 (2.59)	33.72 (3.81)
	10	55.3 (10.86)	31.28 (2.69)	64.33 (0.62)	6.55 (1.35)	19.69 (0.61)	66.74 (2.02)	56.2 (4.21)	31.59 (2.07)
GIN	Input	95.55 (0.4)	91.7 (0.81)	72.92 (1.34)	55.7 (1.27)	23.08 (0.1)	80.51 (0.71)	97.32 (0.29)	88.12 (1.47)
	1	95.41 (0.58)	90.03 (0.85)	75.08 (1.04)	56.64 (1.25)	28.96 (6.39)	80.14 (1.07)	96.38 (0.37)	88.06 (0.98)
	2	94.06 (0.57)	87.66 (0.52)	76.59 (0.64)	54.96 (2.44)	35.91 (0.85)	77.67 (1.68)	94.17 (0.71)	88.19 (1.08)
	3	92.65 (0.41)	84.52 (1.36)	78.11 (1.1)	47.96 (3.28)	37.38 (1.75)	78.06 (1.25)	92.29 (0.95)	88.99 (0.5)
	4	88.5 (1.42)	79.2 (1.21)	78.87 (0.39)	40.56 (3.79)	33.66 (3.59)	77.54 (1.09)	90.18 (0.9)	83.37 (2.51)
	5	88.01 (1.35)	74.96 (0.78)	77.62 (1.31)	34.41 (4.55)	32.27 (1.08)	78.26 (1.3)	89.29 (1.26)	82.25 (3.06)
	6	85.33 (1.34)	65.85 (1.55)	78.93 (0.55)	23.92 (1.75)	31.89 (1.96)	80.18 (0.82)	84.27 (1.58)	76.25 (4.02)
	7	80.78 (1.83)	56.08 (2.25)	77.18 (0.96)	24.36 (2.74)	32.87 (3.23)	79.88 (1.17)	80.61 (1.85)	67.21 (2.35)
	8	73.12 (2.47)	45.27 (2.1)	72.99 (1.87)	18.54 (4.13)	31.76 (2.82)	74.69 (1.75)	74.65 (3.23)	65.38 (2.76)
	9	69.24 (1.9)	38.97 (2.98)	68.56 (0.82)	18.46 (3.52)	25.33 (1.5)	71.9 (1.15)	67.19 (2.12)	58.58 (2.56)
	10	65.5 (2.57)	33.5 (2.2)	66.52 (2.52)	18.61 (4.78)	24.37 (1.27)	71.05 (3.29)	61.09 (2.22)	64.27 (7.46)
GAT	Input	95.09 (0.72)	89.09 (0.58)	74.01 (0.4)	47.62 (2.73)	34.21 (4.43)	79.9 (0.83)	97.1 (0.33)	85.1 (0.72)
	1	94.73 (0.54)	85.89 (1.01)	53.79 (1.15)	39.64 (1.06)	25.8 (1.37)	79.19 (0.54)	95.31 (0.54)	84.9 (0.78)
	2	91.58 (0.55)	76.56 (1.51)	52.6 (0.64)	28.06 (0.3)	24.18 (2.28)	77.38 (0.78)	89.86 (0.64)	80.58 (1.58)
	3	88.25 (1.06)	67.94 (1.45)	50.54 (0.26)	22.81 (1.49)	23.46 (1.96)	63.13 (4.06)	85.47 (1.67)	71.79 (3.08)
	4	87.48 (0.77)	61.05 (3.86)	53.42 (0.95)	18.12 (0.79)	21.39 (1.19)	52.25 (1.07)	83.37 (1.7)	39.04 (9.95)
	5	79.61 (2.72)	46.1 (1.18)	49.84 (0.1)	18.34 (1.38)	20.3 (1.83)	50.07 (0.77)	70.25 (5.35)	30.7 (0.38)
	6	77.46 (2.91)	34.72 (7.4)	49.93 (0.1)	7.44 (0.92)	20.11 (0.95)	50.0 (0.1)	59.01 (1.52)	32.95 (3.07)
	7	58.41 (12.6)	17.23 (2.81)	49.53 (0.1)	13.49 (0.79)	21.64 (0.1)	50.85 (0.8)	66.57 (3.23)	28.85 (0.1)
	8	42.82 (11.68)	7.35 (0.1)	49.42 (0.16)	6.05 (0.1)	20.98 (1.04)	50.94 (1.16)	42.58 (15.64)	26.54 (3.08)
	9	37.97 (5.71)	5.34 (1.04)	47.37 (0.1)	5.57 (0.88)	21.1 (0.44)	51.6 (1.32)	23.97 (0.1)	24.78 (0.1)
	10	31.06 (1.4)	4.78 (0.67)	50.67 (3.27)	5.45 (0.1)	20.54 (0.1)	48.67 (1.12)	25.0 (0.1)	22.8 (1.1)

TABLE II: Accuracy results for text classification on the test set. The document partition of the input graph was coarsened. We report the average accuracy of ten runs and the corresponding standard deviation. Both values are in %.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	96.16 (0.2)	90.66 (0.8)	76.57 (0.41)	55.04 (0.34)	42.72 (2.11)	80.97 (0.48)	97.66 (0.35)	84.86 (0.22)
	1	95.49 (0.38)	88.01 (0.53)	78.09 (0.42)	57.9 (0.23)	42.49 (1.12)	82.45 (0.62)	96.8 (0.21)	84.71 (0.89)
	2	94.77 (0.31)	85.14 (0.54)	79.63 (0.42)	59.92 (0.39)	40.8 (1.02)	81.67 (0.78)	95.23 (0.57)	82.36 (0.73)
	3	94.74 (0.16)	82.56 (0.47)	81.72 (0.36)	61.11 (0.73)	41.48 (2.05)	82.23 (1.14)	94.85 (0.53)	82.34 (0.57)
	4	94.16 (0.37)	80.85 (1.12)	82.84 (0.34)	58.93 (1.57)	44.54 (2.32)	83.42 (0.7)	92.78 (0.93)	84.65 (0.5)
	5	93.2 (0.32)	78.13 (0.92)	83.62 (0.62)	62.91 (2.27)	43.63 (2.85)	85.28 (1.05)	91.79 (0.41)	86.52 (0.65)
	6	92.51 (0.2)	73.93 (1.21)	86.02 (0.35)	59.88 (2.92)	46.51 (2.71)	85.39 (0.9)	91.81 (0.55)	85.59 (1.3)
	7	91.56 (0.57)	68.37 (1.1)	88.84 (0.41)	55.57 (3.29)	49.78 (2.3)	86.46 (1.0)	87.99 (0.65)	85.57 (1.17)
	8	91.96 (1.5)	68.81 (1.31)	89.36 (0.13)	54.2 (2.56)	51.09 (2.59)	88.44 (0.91)	87.31 (1.08)	85.27 (0.87)
	9	91.12 (0.61)	63.66 (2.04)	91.44 (0.45)	62.31 (2.01)	54.98 (3.17)	89.86 (0.9)	85.85 (1.16)	88.23 (0.57)
	10	90.75 (1.62)	58.6 (1.61)	91.83 (0.67)	44.76 (7.44)	57.17 (3.85)	92.31 (1.07)	85.16 (1.32)	92.94 (0.53)
GIN	Input	95.55 (0.4)	91.7 (0.81)	72.92 (1.34)	55.7 (1.27)	23.08 (0.1)	80.51 (0.71)	97.32 (0.29)	88.12 (1.47)
	1	95.8 (0.51)	91.43 (0.3)	76.97 (0.7)	59.56 (1.56)	40.8 (1.12)	81.26 (0.8)	95.67 (1.52)	86.98 (1.08)
	2	95.36 (0.23)	90.08 (0.84)	78.61 (0.46)	60.43 (2.51)	38.92 (0.69)	79.89 (1.68)	96.47 (0.27)	89.18 (1.69)
	3	94.37 (0.69)	89.4 (0.75)	81.22 (0.77)	63.76 (1.91)	38.73 (3.13)	82.73 (1.53)	96.17 (0.87)	88.81 (2.01)
	4	93.61 (0.85)	86.92 (1.31)	82.96 (0.46)	68.35 (3.74)	40.51 (2.47)	84.57 (0.96)	94.17 (1.02)	86.0 (0.96)
	5	93.37 (0.8)	85.61 (1.14)	84.57 (0.42)	70.49 (4.86)	39.19 (1.76)	86.31 (0.9)	90.82 (1.2)	89.27 (1.3)
	6	92.55 (0.9)	84.29 (1.19)	85.14 (0.78)	72.68 (3.1)	40.76 (1.09)	88.01 (1.16)	93.84 (1.61)	84.71 (2.96)
	7	90.56 (1.2)	79.83 (1.42)	86.35 (0.6)	72.96 (4.36)	48.68 (2.96)	88.01 (0.68)	94.32 (0.64)	86.31 (1.55)
	8	92.94 (1.57)	73.85 (1.91)	88.07 (0.52)	79.94 (2.35)	47.49 (2.53)	89.32 (0.73)	94.87 (1.18)	84.87 (1.98)
	9	87.65 (1.75)	68.71 (3.42)	88.73 (0.86)	82.93 (5.03)	51.46 (4.11)	91.89 (0.84)	95.12 (1.92)	80.53 (3.31)
	10	88.57 (1.35)	58.2 (2.5)	89.25 (0.85)	84.21 (3.63)	50.1 (4.92)	94.81 (1.01)	89.34 (3.61)	84.35 (1.9)
GAT	Input	95.09 (0.72)	89.09 (0.58)	74.01 (0.4)	47.62 (2.73)	34.21 (4.43)	79.9 (0.83)	97.1 (0.33)	85.1 (0.72)
	1	95.21 (0.36)	86.47 (0.75)	60.81 (1.17)	44.21 (3.55)	24.58 (1.94)	80.49 (0.5)	95.88 (0.82)	83.99 (0.67)
	2	93.83 (0.58)	84.1 (0.8)	59.89 (1.0)	33.81 (2.68)	26.17 (2.63)	79.3 (0.93)	94.31 (0.73)	83.96 (1.32)
	3	92.2 (0.49)	72.5 (3.32)	60.49 (0.52)	32.62 (4.02)	24.9 (1.69)	79.66 (1.06)	93.85 (0.61)	82.73 (1.52)
	4	91.47 (0.4)	67.76 (2.24)	54.99 (1.68)	23.22 (7.54)	20.95 (1.61)	77.4 (1.01)	90.44 (1.02)	79.61 (1.04)
	5	89.5 (0.83)	53.08 (6.49)	50.16 (0.1)	17.2 (2.34)	20.5 (1.94)	82.07 (0.78)	89.57 (1.34)	68.48 (3.47)
	6	81.24 (9.03)	42.4 (4.4)	50.21 (0.1)	12.63 (2.01)	20.26 (1.32)	80.6 (2.96)	84.87 (1.81)	38.75 (4.43)
	7	83.66 (5.69)	23.59 (3.19)	50.0 (0.1)	8.59 (0.92)	21.75 (0.96)	71.77 (6.58)	69.1 (6.8)	28.08 (0.1)
	8	83.77 (1.39)	30.8 (4.92)	48.84 (0.1)	7.99 (0.46)	20.97 (1.71)	58.5 (5.41)	86.31 (0.86)	28.0 (0.1)
	9	82.09 (1.99)	20.56 (3.52)	47.54 (0.1)	12.0 (2.37)	21.24 (0.93)	63.3 (5.8)	83.41 (20.1)	24.96 (7.43)
	10	65.03 (4.33)	9.1 (1.72)	53.85 (3.21)	14.45 (2.28)	21.36 (1.08)	65.26 (3.02)	48.02 (11.03)	26.35 (2.12)

TABLE III: Accuracy results for text classification on the test set. The word partition of the input graph was coarsened. We report the average accuracy of ten runs and the corresponding standard deviation. Both values are in %.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	96.16 (0.2)	90.66 (0.8)	76.57 (0.41)	55.04 (0.34)	42.72 (2.11)	80.97 (0.48)	97.66 (0.35)	84.86 (0.22)
	1	95.81 (0.27)	90.22 (0.61)	76.94 (0.3)	53.76 (0.26)	42.1 (1.75)	80.16 (0.38)	96.68 (0.47)	84.13 (0.6)
	2	95.29 (0.31)	88.69 (0.21)	74.88 (0.18)	52.49 (0.35)	40.33 (1.64)	78.24 (0.74)	95.8 (0.9)	83.45 (0.42)
	3	95.26 (0.26)	86.99 (0.29)	73.3 (0.11)	50.51 (0.39)	40.18 (1.29)	76.57 (1.59)	94.34 (0.63)	81.51 (0.16)
	4	94.87 (0.26)	86.49 (0.46)	71.27 (0.15)	47.43 (0.5)	39.57 (0.99)	75.08 (0.88)	92.46 (0.57)	79.52 (0.4)
	5	93.78 (0.23)	85.14 (0.36)	70.65 (0.15)	44.69 (0.33)	37.02 (1.81)	73.16 (0.98)	90.44 (0.83)	78.73 (0.85)
	6	93.23 (0.39)	83.16 (0.45)	68.71 (0.22)	41.11 (0.21)	34.92 (0.68)	71.57 (1.26)	88.2 (0.75)	71.44 (0.38)
	7	91.58 (0.25)	81.31 (0.89)	66.94 (0.11)	36.74 (0.43)	33.9 (0.31)	70.52 (0.76)	81.02 (0.5)	68.19 (0.36)
	8	86.41 (0.5)	77.25 (0.41)	65.76 (0.21)	33.3 (0.47)	32.52 (0.9)	67.53 (1.55)	76.04 (0.37)	63.16 (0.62)
	9	82.61 (0.15)	76.31 (0.65)	61.56 (0.22)	29.31 (0.26)	31.29 (0.54)	66.57 (1.34)	67.9 (0.36)	59.5 (0.44)
	10	79.89 (0.21)	71.37 (0.29)	59.52 (0.18)	24.33 (0.64)	31.37 (0.65)	64.57 (1.49)	66.88 (1.38)	57.06 (0.8)
GIN	Input	95.55 (0.4)	91.7 (0.81)	72.92 (1.34)	55.7 (1.27)	23.08 (0.1)	80.51 (0.71)	97.32 (0.29)	88.12 (1.47)
	1	95.14 (0.66)	90.93 (1.0)	74.07 (1.02)	51.02 (1.59)	39.61 (0.61)	79.26 (0.93)	97.34 (0.61)	87.48 (0.95)
	2	94.41 (0.58)	89.97 (0.84)	71.3 (1.98)	49.72 (2.06)	23.08 (0.1)	76.45 (1.69)	95.7 (0.86)	87.17 (0.92)
	3	93.93 (0.7)	88.12 (1.66)	69.8 (0.64)	44.29 (2.11)	27.14 (1.78)	75.41 (1.08)	93.46 (1.05)	85.85 (1.01)
	4	92.92 (0.64)	87.75 (0.72)	67.17 (1.89)	43.82 (2.5)	23.08 (0.1)	74.04 (2.18)	89.24 (0.64)	85.47 (0.76)
	5	90.84 (0.73)	85.7 (0.7)	67.61 (1.13)	40.56 (1.96)	23.33 (0.12)	72.87 (1.32)	87.52 (0.98)	83.82 (1.08)
	6	90.97 (1.17)	84.05 (1.17)	65.81 (0.45)	33.33 (1.29)	23.16 (0.06)	71.89 (0.84)	87.26 (0.65)	78.4 (1.45)
	7	87.31 (1.0)	80.14 (1.04)	63.38 (1.13)	34.06 (0.6)	31.03 (1.55)	69.12 (1.43)	78.54 (1.85)	75.54 (0.81)
	8	82.19 (2.58)	78.32 (0.88)	61.92 (1.75)	31.5 (0.46)	23.08 (0.1)	68.0 (1.15)	74.02 (1.16)	70.11 (1.68)
	9	79.95 (2.25)	75.94 (0.55)	58.76 (1.36)	29.08 (0.77)	23.38 (0.11)	66.75 (1.02)	64.7 (0.9)	63.7 (1.88)
	10	76.52 (1.09)	70.45 (1.03)	57.39 (0.88)	23.69 (0.51)	23.08 (0.1)	65.31 (0.78)	57.84 (1.66)	64.23 (1.48)
GAT	Input	95.09 (0.72)	89.09 (0.58)	74.01 (0.4)	47.62 (2.73)	34.21 (4.43)	79.9 (0.83)	97.1 (0.33)	85.1 (0.72)
	1	94.43 (0.34)	87.71 (1.2)	59.42 (1.07)	45.79 (2.08)	36.41 (2.79)	79.37 (0.64)	95.56 (0.28)	85.64 (0.81)
	2	93.93 (0.38)	86.09 (1.04)	66.89 (2.65)	45.79 (0.94)	24.34 (1.54)	76.95 (0.98)	95.14 (0.61)	83.09 (0.82)
	3	92.7 (0.4)	84.98 (0.57)	52.3 (1.19)	44.26 (0.68)	24.7 (2.06)	72.28 (0.81)	93.64 (1.0)	79.46 (1.02)
	4	92.43 (0.66)	83.31 (1.34)	51.87 (1.06)	40.54 (0.72)	27.01 (2.43)	71.07 (0.47)	91.04 (1.01)	72.99 (1.12)
	5	90.53 (1.18)	79.72 (0.78)	51.48 (0.41)	37.86 (0.57)	24.66 (1.55)	69.58 (0.56)	89.54 (0.82)	67.86 (1.91)
	6	88.32 (0.5)	79.67 (0.73)	51.59 (0.89)	36.4 (0.92)	25.41 (2.14)	66.52 (0.64)	85.82 (1.44)	68.14 (1.29)
	7	88.64 (0.61)	75.9 (0.9)	51.52 (0.38)	30.18 (0.8)	24.76 (1.97)	66.74 (1.31)	82.78 (0.75)	62.67 (1.13)
	8	83.69 (0.66)	72.15 (1.29)	51.43 (0.49)	29.92 (0.6)	24.58 (2.07)	64.63 (0.78)	74.16 (1.56)	61.33 (0.4)
	9	81.01 (1.23)	70.56 (0.4)	50.92 (0.75)	25.89 (0.06)	24.1 (1.57)	61.19 (1.25)	67.06 (0.88)	55.67 (3.5)
	10	78.29 (1.3)	68.61 (0.58)	50.38 (1.04)	23.13 (0.27)	24.15 (1.53)	62.0 (1.58)	66.1 (0.84)	61.11 (0.74)

TABLE IV: Memory used (MB) by the GNNs at each coarsening level. Here, the values are related to the coarsening of both partitions.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	1630	1672	640	2410	536	560	212	2400
	1	590	2040	288	2542	814	354	116	1856
	2	834	1662	317	3012	724	362	122	916
	3	758	940	442	1834	576	460	114	564
	4	444	544	281	1158	418	237	106	470
	5	356	420	244	896	358	204	94	370
	6	264	304	202	632	292	236	80	400
	7	184	208	162	292	162	138	70	122
	8	152	92	126	118	126	110	56	134
	9	96	110	104	152	96	88	54	130
	10	60	72	74	92	74	62	54	94
GIN	Input	1632	1670	639	2412	538	660	212	2398
	1	592	2038	554	2542	816	464	160	1854
	2	836	1662	318	2990	606	364	122	916
	3	758	940	444	1834	456	366	116	562
	4	446	546	282	1160	422	238	106	470
	5	358	422	246	896	362	206	92	445
	6	266	308	204	634	290	236	80	406
	7	184	208	162	298	162	138	70	124
	8	154	96	124	120	124	74	56	134
	9	96	114	106	152	68	88	54	130
	10	60	72	74	92	74	62	52	94
GAT	Input	22952	13699	12482	15553	14254	14664	3954	11240
	1	8618	13865	4200	22322	15200	9494	1362	18503
	2	22766	19409	4354	16625	6720	6690	1352	10437
	3	14014	17502	4240	20359	8140	6410	1274	8114
	4	6274	7854	3804	16704	3952	8516	1130	6740
	5	4942	5934	6014	12724	3328	4896	1030	5140
	6	3522	4152	2606	14232	2644	2092	810	3702
	7	2304	2678	1956	5640	1980	1598	614	2808
	8	1436	1654	1400	3396	1400	1261	514	1952
	9	950	1092	1050	1418	1050	850	386	1350
	10	650	670	690	928	710	630	266	1020

TABLE V: Memory used (MB) by the GNNs at each coarsening level. Here, the values are related to the coarsening of the document partition.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	1630	1672	640	2410	536	560	212	2400
	1	592	1366	542	3018	662	448	116	1542
	2	588	1056	418	3128	554	350	156	944
	3	586	1416	310	2158	702	374	196	942
	4	1126	1392	312	2644	452	264	150	916
	5	1094	1026	312	2578	314	264	94	1156
	6	1054	672	308	1994	474	264	94	1100
	7	774	630	458	1008	332	396	142	544
	8	736	584	212	1376	326	282	140	506
	9	682	534	210	924	328	190	134	468
	10	634	491	206	864	204	272	156	430
GIN	Input	1632	1670	639	2412	538	660	212	2398
	1	590	1664	430	3016	662	358	162	1540
	2	586	1360	304	3126	556	256	158	942
	3	584	722	308	2136	588	374	198	628
	4	572	710	312	2662	452	264	150	608
	5	554	682	312	2098	316	266	146	592
	6	540	1282	308	1532	473	264	142	560
	7	518	912	458	1916	332	246	142	780
	8	734	846	286	1802	422	244	138	728
	9	682	762	210	1310	216	246	98	583
	10	424	294	560	1222	558	470	120	258
GAT	Input	22952	13699	12482	15553	14254	14664	3954	11240
	1	8618	20624	9392	22208	11204	6262	2580	11991
	2	8600	12826	4156	22880	15248	6438	2486	17688
	3	8550	10590	7900	17328	11778	6558	1292	9116
	4	8340	10354	4288	21690	8032	6648	1650	8904
	5	8074	9986	4266	22461	8170	6644	1348	8588
	6	7848	9522	4262	21720	4354	3564	1300	8104
	7	7452	8918	4252	15148	4290	3544	1264	8382
	8	7024	9044	4202	19512	7880	3890	1366	7782
	9	7262	8208	4582	18448	4628	3842	1328	7098
	10	6722	7482	4506	18506	4526	4136	1512	7120

TABLE VI: Memory used (MB) by the GNNs at each coarsening level. Here, the values are related to the coarsening of the word partition.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	1630	1672	640	2410	536	560	212	2400
	1	1408	2062	532	1996	554	574	210	2162
	2	1694	2080	696	2042	584	484	214	2172
	3	1942	1732	730	2044	888	484	218	2136
	4	1096	1360	594	1974	590	492	170	1758
	5	1032	1276	684	1418	720	374	170	1618
	6	490	1188	674	1296	430	342	212	1216
	7	790	1264	644	766	508	414	156	846
	8	360	682	482	960	362	302	174	544
	9	276	732	414	754	234	340	124	312
	10	344	466	430	580	292	212	136	268
GIN	Input	1632	1670	639	2412	538	660	212	2398
	1	1408	2062	532	1996	554	680	208	2160
	2	1693	2080	694	2044	582	598	214	2172
	3	1944	1732	730	2044	888	704	122	2136
	4	1096	1360	592	1974	588	490	120	1760
	5	1032	1274	682	1418	718	484	120	1618
	6	486	1188	672	1298	430	444	210	1216
	7	620	1262	644	766	506	506	110	846
	8	358	680	480	958	360	478	192	542
	9	406	730	412	754	232	340	142	312
	10	450	464	428	580	204	212	118	266
GAT	Input	22952	13699	12482	15553	14254	14664	3954	11240
	1	12497	20333	18346	17453	11226	18198	2690	15049
	2	10122	22460	15570	16109	6711	15898	2810	11135
	3	9973	20204	19768	17688	8145	15896	1516	11862
	4	9729	11564	19980	21620	16016	9904	2826	10418
	5	12392	18498	19148	16472	7115	12960	2826	10539
	6	19480	11990	16908	13980	7782	14734	2756	14760
	7	16858	18914	14432	12424	13564	13504	2518	13014
	8	14028	10806	13408	18355	12460	7726	1168	14542
	9	7696	15274	10020	17153	5954	4484	2018	15718
	10	6384	9130	7196	18188	5036	2086	1764	10042

TABLE VII: Training time of each GNN on the input and coarsened graphs. Here, the values are related to the graphs where both partitions were coarsened. The values reported here are in seconds.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	33.7	61.9	32.7	31.7	46.6	31.2	18.5	17.0
	1	24.1	36.6	22.8	24.7	29.4	20.0	10.6	11.2
	2	15.9	25.1	15.2	18.6	19.9	13.2	7.0	8.1
	3	10.5	17.0	10.1	13.6	12.4	8.3	4.3	5.5
	4	6.5	11.2	6.4	9.1	8.2	5.5	3.0	3.4
	5	4.6	6.7	4.1	5.5	5.3	3.6	1.8	2.2
	6	2.4	4.2	2.9	3.1	3.1	2.2	1.3	1.2
	7	1.5	2.2	1.9	1.7	2.0	1.4	0.9	0.9
	8	1.0	1.3	1.2	0.9	1.4	1.0	0.7	0.6
	9	0.7	0.9	0.9	0.6	0.8	0.7	0.5	0.3
	10	0.4	0.6	0.7	0.4	0.6	0.5	0.4	0.3
GIN	Input	55.4	70.4	35.0	32.1	49.8	47.4	24.2	28.9
	1	29.7	51.0	23.4	27.0	43.2	27.6	16.0	18.4
	2	18.9	32.3	15.3	18.7	25.9	15.3	10.1	11.6
	3	13.6	21.1	10.1	14.2	15.8	10.0	6.2	7.5
	4	6.8	16.0	6.8	8.9	9.2	7.4	3.8	5.4
	5	5.0	9.4	5.1	6.7	5.9	4.5	2.6	8.6
	6	2.9	4.5	3.0	3.7	3.7	3.1	1.9	1.4
	7	2.2	2.6	2.1	1.9	2.5	1.8	1.2	1.1
	8	1.2	1.6	1.4	1.2	1.8	1.2	0.9	0.8
	9	0.8	1.3	0.9	0.8	1.0	0.9	0.7	0.5
	10	0.5	0.7	0.7	0.5	0.8	0.6	0.5	0.5
GAT	Input	207.0	418.7	153.7	225.8	219.5	140.8	57.9	128.9
	1	159.4	256.0	111.4	172.4	143.5	97.6	34.5	89.2
	2	101.6	167.2	77.6	142.4	99.7	67.1	24.0	77.3
	3	76.4	105.3	54.1	102.8	66.4	43.7	16.5	43.9
	4	46.9	68.1	36.1	61.9	42.4	26.9	10.6	23.9
	5	30.1	38.3	19.6	38.5	25.5	16.5	5.8	14.5
	6	13.4	20.8	12.4	19.9	14.9	9.3	3.6	7.8
	7	7.8	10.2	7.8	11.0	8.1	5.7	2.2	3.6
	8	3.8	4.1	3.7	4.5	4.5	3.4	1.4	2.0
	9	1.8	2.2	2.1	2.3	2.3	1.9	0.9	1.1
	10	1.0	1.1	1.2	1.1	1.4	1.2	0.6	0.8

TABLE VIII: Training time of each GNN on the input and coarsened graphs. Here, the values are related to the graphs where the document partition was coarsened. The values reported here are in seconds.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	33.7	61.9	32.7	31.7	46.6	31.2	18.5	17.0
	1	23.9	37.3	23.9	23.9	30.6	20.9	10.7	12.1
	2	16.0	27.0	14.4	18.9	18.8	13.9	7.7	8.4
	3	11.6	18.5	9.7	13.6	12.2	8.7	5.1	6.4
	4	8.4	13.8	6.2	9.4	8.6	5.4	3.0	4.2
	5	5.8	9.8	4.9	8.2	6.0	4.4	2.2	3.3
	6	4.2	6.4	3.6	6.3	4.3	3.1	1.4	2.5
	7	3.1	4.4	2.7	4.8	3.1	2.3	1.2	1.7
	8	2.4	3.4	2.0	3.6	2.3	1.6	0.9	1.4
	9	1.9	2.6	1.7	2.9	1.9	1.3	0.7	1.1
	10	1.2	1.8	1.2	2.1	1.4	1.0	0.6	1.0
GIN	Input	55.4	70.4	35.0	32.1	49.8	47.4	24.2	28.9
	1	35.9	51.1	22.9	27.3	42.4	29.1	15.4	17.0
	2	20.1	34.8	14.2	19.7	22.1	15.7	11.6	13.2
	3	19.3	26.9	12.2	15.2	17.7	10.2	8.5	10.8
	4	10.6	19.8	8.2	14.9	10.9	7.1	5.0	6.2
	5	7.2	15.1	5.7	10.4	7.2	5.1	3.6	4.8
	6	6.5	11.6	4.5	9.7	4.7	5.0	2.4	4.3
	7	4.3	7.5	3.7	7.8	3.9	2.9	2.2	2.6
	8	4.3	5.7	2.9	6.1	3.1	2.2	1.6	2.2
	9	2.5	4.2	2.9	5.3	2.2	1.9	1.6	21.0
	10	2.3	2.9	2.2	4.1	2.0	1.8	1.4	1.4
GAT	Input	207.0	418.7	153.7	225.8	219.5	140.8	57.9	128.9
	1	152.6	245.8	109.5	176.6	142.6	96.0	36.7	83.1
	2	109.7	189.4	76.5	136.2	98.6	65.8	24.1	63.2
	3	81.4	116.7	53.3	103.6	64.0	46.2	15.7	43.8
	4	57.0	83.5	38.7	81.3	43.5	36.4	11.2	31.9
	5	44.5	58.2	24.2	58.3	30.2	24.9	7.2	22.9
	6	29.8	40.3	18.0	42.8	20.7	19.5	4.9	18.1
	7	21.0	26.1	12.6	30.6	15.1	11.8	3.8	10.2
	8	16.7	19.2	9.4	23.3	11.3	8.3	3.2	7.6
	9	11.5	13.5	7.2	18.4	9.5	6.7	2.5	5.4
	10	8.5	9.5	8.5	14.6	6.6	5.2	2.0	4.7

TABLE IX: Training time of each GNN on the input and coarsened graphs. Here, the values are related to the graphs where the word partition was coarsened. The values reported here are in seconds.

GNN	Coarse	R8	R52	MR	Ohsumed	SST1	SST2	TREC	WebKB
SAGE	Input	33.7	61.9	32.7	31.7	46.6	31.2	18.5	17.0
	1	36.2	73.2	36.4	34.3	46.9	33.7	16.7	19.1
	2	37.5	57.1	35.6	35.1	49.8	33.8	15.4	18.6
	3	38.3	54.8	36.6	37.2	48.1	35.6	15.5	17.6
	4	36.4	57.6	34.5	38.3	49.5	34.9	16.7	17.3
	5	36.5	56.4	35.1	34.9	48.8	35.2	15.0	16.2
	6	35.6	52.1	35.6	34.0	49.5	32.8	14.5	16.7
	7	33.7	51.4	34.1	29.8	45.8	28.6	14.5	14.5
	8	30.4	43.2	35.1	29.5	46.7	32.0	12.7	13.5
	9	27.8	38.9	31.2	23.8	39.8	29.6	12.9	12.4
	10	24.8	35.3	27.1	20.4	42.6	27.7	12.2	10.9
GIN	Input	55.4	70.4	35.0	32.1	49.8	47.4	24.2	28.9
	1	42.0	83.9	34.8	36.1	56.5	35.2	26.5	25.5
	2	43.1	77.5	33.1	36.5	51.7	40.9	30.7	20.7
	3	41.8	74.8	37.5	38.4	53.9	37.4	24.6	23.6
	4	45.3	68.6	36.4	36.1	51.7	36.0	17.7	23.5
	5	40.1	63.3	34.4	36.2	59.8	36.4	16.9	20.7
	6	43.9	66.2	36.8	40.3	58.9	32.9	18.9	17.4
	7	34.8	50.5	36.0	34.2	53.9	35.6	19.3	15.9
	8	35.5	45.8	34.7	31.8	46.2	34.2	14.7	14.5
	9	31.7	40.1	33.8	25.6	69.8	32.9	15.3	13.1
	10	32.7	35.5	30.5	22.6	44.4	30.3	15.0	11.2
GAT	Input	207.0	418.7	153.7	225.8	219.5	140.8	57.9	128.9
	1	253.7	399.0	161.2	229.4	218.5	144.5	56.4	126.4
	2	274.2	378.5	176.0	237.6	224.7	150.3	64.2	121.7
	3	211.6	352.2	170.6	244.0	225.5	149.8	61.6	134.2
	4	239.3	321.9	170.1	236.2	246.0	154.3	57.0	142.3
	5	265.3	295.4	164.6	228.5	231.5	156.0	53.0	109.5
	6	192.6	275.2	163.0	224.3	217.6	145.5	53.5	103.4
	7	167.7	248.4	159.9	188.6	206.4	138.8	51.0	89.2
	8	148.5	217.6	148.9	161.8	189.2	130.8	44.3	78.3
	9	119.6	185.0	135.1	128.0	179.6	116.4	41.8	69.6
	10	109.6	159.6	117.9	112.2	162.9	107.2	38.7	56.7